



CONSTRUCTION CONTRACT

New York City
Department of
Environmental Protection
59-17 Junction Boulevard
Flushing, New York 11373

Rohit Aggarwala
Commissioner

Joseph Vaicels
Assistant Commissioner
Agency Chief
Contracting Officer

Invitation for Bids for Furnishing all Labor and Material Necessary and Required for:

Contract(s):	KENS-EAST-2
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	<hr/>
Description:	KENSICO-EASTVIEW CONNECTION
	<hr/>
	KENSICO SITE PREPARATION
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**Volume 1 of 2
Contract Terms and Specifications
(with separate Bid Booklet)**

April 2023

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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENGINEERING DESIGN AND CONSTRUCTION

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Notice To Bidders

Web-based access to BEDC EHS information

In conjunction with the requirements of Detailed Specification 01 35 27 – Environmental, Health and Safety (EHS) Requirements, DEP’s Bureau of Engineering Design & Construction (BEDC) has provided the most recent version of DEP’s EHS Policies and Procedures, BEDC EHS Standards, and other DEP EHS guidelines and additional information on the DEP Knowledge Reservoir of the BEDC web-based Project Management Information System (PMIS) at the following website:

<https://app.e-builder.net/public/publicLanding.aspx?QS=33fcd8611637450095d280fe48f856f1>

For any question regarding the website, contact BEDC EHS at (718) 595-6228 or bedcehs@dep.nyc.gov.

Compliance with the latest versions of DEP EHS Policies and Procedures, BEDC EHS Standards, and DEP Guidelines are required on all DEP Contract work.

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Rev. 7/2020

NO TEXT FOR THIS PAGE

CITY OF NEW YORK
STANDARD CONSTRUCTION CONTRACT

March 2017

NO TEXT ON THIS PAGE

NYC EARNED SAFE AND SICK TIME ACT CONTRACT RIDER

(To supersede Section 4.06 of the November 2018 Appendix A and Section 35.5 of the March 2017 Standard Construction Contract and to be attached to other City contracts and solicitations)

A. Introduction and General Provisions.

1. The Earned Safe and Sick Time Act (“ESSTA”), codified at Title 20, Chapter 8 of the New York City Administrative Code, also known as the “Paid Safe and Sick Leave Law,” requires covered employees (as defined in Admin. Code § 20-912) in New York City (“City”) to be provided with paid safe and sick time. Contractors of the City or of other governmental entities may be required to provide safe and sick time pursuant to the ESSTA. The ESSTA is enforced by the City’s Department of Consumer and Worker Protection (“DCWP”), which has promulgated 6 RCNY §§ 7-101 and 201 *et seq.* (“DCWP Rules”).

2. The Contractor agrees to comply in all respects with the ESSTA and the DCWP Rules, and as amended, if applicable, in the performance of this agreement. The Contractor further acknowledges that such compliance is a material term of this agreement and that failure to comply with the ESSTA in performance of this agreement may result in its termination.

3. The Contractor must notify (with a copy to DCWP at ComplianceMonitoring@dcwp.nyc.gov) the Agency Chief Contracting Officer of the City Agency or other entity with whom it is contracting in writing within 10 days of receipt of a complaint (whether oral or written) or notice of investigation regarding the ESSTA involving the performance of this agreement. Additionally, the Contractor must cooperate with DCWP’s guidance and must comply with DCWP’s subpoenas, requests for information, and other document demands as set forth in the ESSTA and the DCWP Rules. More information is available at <https://www1.nyc.gov/site/dca/about/paid-sick-leave-what-employers-need-to-know.page>.

4. Upon conclusion of a DCWP investigation, Contractor will receive a findings letter detailing any employee relief and civil penalties owed. Pursuant to the findings, Contractor will have the opportunity to settle any violations and cure the breach of this agreement caused by failure to comply with the ESSTA either i) without a trial by entering into a consent order or ii) appearing before an impartial judge at the City’s administrative tribunal. In addition to and notwithstanding any other rights and remedies available to the City, non-payment of relief and penalties owed pursuant to a consent order or final adjudication within 30 days of such consent order or final adjudication may result in the termination of this agreement without further opportunity to settle or cure the violations.

5. The ESSTA is briefly summarized below for the convenience of the Contractor. The Contractor is advised to review the ESSTA and the DCWP Rules in their entirety. The Contractor may go to www.nyc.gov/PaidSickLeave for resources for employers, such as Frequently Asked Questions, timekeeping tools and model forms, and an event calendar of upcoming presentations and webinars at which the Contractor can get more information about how to comply with the ESSTA and the DCWP Rules. The Contractor acknowledges that it is responsible for compliance with the ESSTA and the DCWP Rules notwithstanding any inconsistent language contained herein.

B. *Pursuant to the ESSTA and DCWP Rules: Applicability, Accrual, and Use.*

1. An employee who works within the City must be provided paid safe and sick time.¹ Employers with one hundred or more employees are required to provide 56 hours of safe and sick time for an employee each calendar year. Employers with fewer than one hundred employees are required to provide 40 hours of sick leave each calendar year. Employers must provide a minimum of one hour of safe and sick time for every 30 hours worked by an employee and compensation for such safe and sick time must be provided at the greater of the employee's regular hourly rate or the minimum wage at the time the paid safe or sick time is taken. Employers are not discouraged or prohibited from providing more generous safe and sick time policies than what the ESSTA requires.

2. Employees have the right to determine how much safe and sick time they will use, provided that an employer may set a reasonable minimum increment for the use of safe and sick time not to exceed four hours per day. For the use of safe time or sick time beyond the set minimum increment, an employer may set fixed periods of up to thirty minutes beyond the minimum increment. In addition, an employee may carry over up to 40 or 56 hours of unused safe and sick time to the following calendar year, provided that no employer is required to carry over unused paid safe and sick time if the employee is paid for such unused safe and sick time and the employer provides the employee with at least the legally required amount of paid safe and sick time for such employee for the immediately subsequent calendar year on the first day of such calendar year.

3. An employee entitled to safe and sick time pursuant to the ESSTA may use safe and sick time for any of the following:

a. such employee's mental illness, physical illness, injury, or health condition or the care of such illness, injury, or condition or such employee's need for medical diagnosis or preventive medical care;

b. such employee's care of a family member (an employee's child, spouse, domestic partner, parent, sibling, grandchild, or grandparent, the child or parent of an employee's spouse or domestic partner, any other individual related by blood to the employee, and any other individual whose close association with the employee is the equivalent of a family relationship) who has a mental illness, physical illness, injury or health condition or who has a need for medical diagnosis or preventive medical care;

¹ Pursuant to the ESSTA, if fewer than five employees work for the same employer, and the employer had a net income of less than one million dollars during the previous tax year, such employer has the option of providing such employees uncompensated safe and sick time.

c. closure of such employee's place of business by order of a public official due to a public health emergency;

d. such employee's need to care for a child whose school or childcare provider has been closed due to a public health emergency; or

e. when the employee or a family member has been the victim of a family offense matter, sexual offense, stalking, or human trafficking:

1. to obtain services from a domestic violence shelter, rape crisis center, or other shelter or services program for relief from a family offense matter, sexual offense, stalking, or human trafficking;
2. to participate in safety planning, temporarily or permanently relocate, or take other actions to increase the safety of the employee or employee's family members from future family offense matters, sexual offenses, stalking, or human trafficking;
3. to meet with a civil attorney or other social service provider to obtain information and advice on, and prepare for or participate in any criminal or civil proceeding, including but not limited to, matters related to a family offense matter, sexual offense, stalking, human trafficking, custody, visitation, matrimonial issues, orders of protection, immigration, housing, discrimination in employment, housing or consumer credit;
4. to file a complaint or domestic incident report with law enforcement;
5. to meet with a district attorney's office;
6. to enroll children in a new school; or
7. to take other actions necessary to maintain, improve, or restore the physical, psychological, or economic, health or safety of the employee or the employee's family member or to protect those who associate or work with the employee.

4. An employer must not require an employee, as a condition of taking safe and sick time, to search for a replacement. However, where the employee's need for safe and sick time is foreseeable, an employer may require an employee to provide reasonable notice of the need to use safe and sick time. For an absence of more than three consecutive work days, an employer may require reasonable documentation that the use of safe and sick time was needed for a reason listed in Admin. Code § 20-914; and/or written confirmation that an employee used safe and sick time pursuant to the ESSTA. However, an employer may not require documentation specifying the nature of a medical condition, require disclosure of the details of a medical condition, or require disclosure of the details of a family offense matter, sexual offense, stalking, or human trafficking, as a condition of providing safe and sick time. Health information and information concerning family offenses, sexual offenses, stalking or human trafficking obtained solely due to an

employee's use of safe and sick time pursuant to the ESSTA must be treated by the employer as confidential. An employer must reimburse an employee for all reasonable costs or expenses incurred in obtaining such documentation for the employer.

5. An employer must provide to all employees a written policy explaining its method of calculating sick time, policies regarding the use of safe and sick time (including any permissible discretionary conditions on use), and policies regarding carry-over of unused time at the end of the year, among other topics. It must provide the policy to employees using a delivery method that reasonably ensures that employees receive the policy. If such employer has not provided its written policy, it may not deny safe and sick time to an employee because of non-compliance with such a policy.

6. An employer must provide a pay statement or other form of written documentation that informs the employee of the amount of safe/sick time accrued and used during the relevant pay period and the total balance of the employee's accrued safe/sick time available for use.

7. Safe and sick time to which an employee is entitled must be paid no later than the payday for the next regular payroll period beginning after the safe and sick time was used.

C. *Exemptions and Exceptions.* Notwithstanding the above, the ESSTA does not apply to any of the following:

1. an independent contractor who does not meet the definition of employee under N.Y. Labor Law § 190(2);

2. an employee covered by a valid collective bargaining agreement, if the provisions of the ESSTA are expressly waived in such agreement and such agreement provides a benefit comparable to that provided by the ESSTA for such employee;

3. an audiologist, occupational therapist, physical therapist, or speech language pathologist who is licensed by the New York State Department of Education and who calls in for work assignments at will, determines their own schedule, has the ability to reject or accept any assignment referred to them, and is paid an average hourly wage that is at least four times the federal minimum wage;

4. an employee in a work study program under Section 2753 of Chapter 42 of the United States Code;

5. an employee whose work is compensated by a qualified scholarship program as that term is defined in the Internal Revenue Code, Section 117 of Chapter 20 of the United States Code; or

6. a participant in a Work Experience Program (WEP) under N.Y. Social Services Law § 336-c.

D. *Retaliation Prohibited.* An employer shall not take any adverse action against an employee that penalizes the employee for, or is reasonably likely to deter the employee from or interfere with the employee exercising or attempting in good faith to exercise any right provided by the ESSTA. In addition, an employer shall not interfere with any investigation, proceeding, or hearing pursuant to the ESSTA.

E. *Notice of Rights.*

1. An employer must provide its employees with written notice of their rights pursuant to the ESSTA. Such notice must be in English and the primary language spoken by an employee, provided that DCWP has made available a translation into such language. Downloadable notices are available on DCWP's website at <https://www1.nyc.gov/site/dca/about/Paid-Safe-Sick-Leave-Notice-of-Employee-Rights.page>. The notice must be provided to the employees by a method that reasonably ensures personal receipt by the employee.

2. Any person or entity that willfully violates these notice requirements is subject to a civil penalty in an amount not to exceed \$50.00 for each employee who was not given appropriate notice.

F. *Records.* An employer must retain records documenting its compliance with the ESSTA for a period of at least three years, and must allow DCWP to access such records in furtherance of an investigation related to an alleged violation of the ESSTA.

G. *Enforcement and Penalties.*

1. Upon receiving a complaint alleging a violation of the ESSTA, DCWP must investigate such complaint. DCWP may also open an investigation to determine compliance with the ESSTA on its own initiative. Upon notification of a complaint or an investigation by DCWP, the employer must provide DCWP with a written response and any such other information as DCWP may request. If DCWP believes that a violation of the ESSTA has occurred, it has the right to issue a notice of violation to the employer.

2. DCWP has the power to grant an employee or former employee all appropriate relief as set forth in Admin. Code § 20-924(d). Such relief may include, but is not limited to, treble damages for the wages that should have been paid; statutory damages for unlawful retaliation; and damages, including statutory damages, full compensation for wages and benefits lost, and reinstatement, for unlawful discharge. In addition, DCWP may impose on an employer found to have violated the ESSTA civil penalties not to exceed \$500.00 for a first violation, \$750.00 for a second violation within two years of the first violation, and \$1,000.00 for each succeeding violation within two years of the previous violation. When an employer has a policy or practice of not providing or refusing to allow the use of safe and sick time to its employees, DCWP may seek penalties and relief on a per employee basis.

3. Pursuant to Admin. Code § 20-924.2, (a) where reasonable cause exists to believe that an employer is engaged in a pattern or practice of violations of the ESSTA, the Corporation Counsel may commence a civil action on behalf of the City in a court of competent jurisdiction by filing a complaint setting forth facts relating to such pattern or practice and requesting relief, which may include injunctive relief, civil penalties and any other appropriate relief. Nothing in § 20-924.2 prohibits DCWP from exercising its authority under section 20-924 or the Charter, provided that a civil action pursuant to § 20-924.2 shall not have previously been commenced.

H. *More Generous Policies and Other Legal Requirements.* Nothing in the ESSTA is intended to discourage, prohibit, diminish, or impair the adoption or retention of a more generous safe and sick time policy, or the obligation of an employer to comply with any contract, collective bargaining agreement, employment benefit plan or other agreement providing more generous safe and sick time. The ESSTA provides minimum requirements pertaining to safe and sick time and does not preempt, limit, or otherwise affect the applicability of any other law, regulation, rule, requirement, policy or standard that provides for greater accrual or use by employees of safe and sick leave or time, whether paid or unpaid, or that extends other protections to employees. The ESSTA may not be construed as creating or imposing any requirement in conflict with any federal or state law, rule or regulation.

RIDER TO NEW YORK CITY STANDARD CONSTRUCTION CONTRACT (MARCH 2017) REGARDING NON-COMPENSABLE DELAYS AND GROUNDS FOR EXTENSION

[Instructions to Agencies: Please attach this Rider to the March 2017 version of the New York City Standard Construction Contract]

The following provisions supersede the corresponding provisions in the March 2017 version of the New York City Standard Construction Contract:

1. Section **11.5.1** provides as follows:

11.5.1 The acts or omissions of public or government bodies (other than **City** agencies) or of any third parties who are disclosed in the **Contract Documents**, or those third parties who are ordinarily encountered or who are generally recognized as related to the **Work**, including but not limited to, **Other Contractors**, utilities or private enterprises;

2. Section **11.5.6** provides as follows:

11.5.6 Climatic conditions, storms, floods, droughts, tidal waves, fires, hurricanes, earthquakes, landslides or other catastrophes or acts of God; acts of war or of the public enemy or terrorist acts; disruption, outage or power failure caused by a utility's inability or failure to provide service, pandemics, epidemics, outbreaks of infectious disease or any other public health emergency; other states of emergency declared by the City, State or Federal government, quarantine restrictions, and freight embargoes; including the **City's** reasonable responses to any of the above; and

3. Section **13.3** provides as follows:

13.3 Grounds for Extension: If such application is made, the **Contractor** shall be entitled to an extension of time for delay in completion of the **Work** caused solely:

13.3.1 By any of the acts or omissions of the **City**, its officials, agents or employees set forth in Articles **11.4.1.1** through **11.4.1.9**; or

13.3.2 By or attributable to any of the items set forth in Articles **11.5.1** through **11.5.7**.

13.3.3 The **Contractor** shall, however, be entitled to an extension of time for such causes only for the number of **Days** of delay which the **ACCO** or the Board may determine to be due solely to such causes, and then only if the **Contractor** shall have strictly complied with all of the requirements of Articles 9 and 10

NO TEXT ON THIS PAGE

**CITY OF NEW YORK
STANDARD CONSTRUCTION CONTRACT**

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WITNESSETH:

The parties, in consideration of the mutual agreements contained herein, agree as follows:

CHAPTER I: THE CONTRACT AND DEFINITIONS

ARTICLE 1. THE CONTRACT

1.1 Except for titles, subtitles, headings, running headlines, tables of contents and indices (all of which are printed herein merely for convenience), the following, except for such portions thereof as may be specifically excluded, shall be deemed to be part of this **Contract**:

1.1.1 All provisions required by law to be inserted in this **Contract**, whether actually inserted or not;

1.1.2 The Contract Drawings and Specifications;

1.1.3 The General Conditions and Special Conditions, if any;

1.1.4 The **Contract**;

1.1.5 The Information for Bidders; Request for Proposals; Notice of Solicitation and Proposal For Bids; Bid or Proposal, and, if used, the Bid Booklet;

1.1.6 All Addenda issued prior to the receipt of the bids; the Notice of Award; Performance and Payment Bonds, if required; and the Notice to Proceed or the Order to Work.

1.2 Should any conflict occur in or between the Drawings and Specifications, the **Contractor** shall be deemed to have estimated the most expensive way of doing the **Work**, unless the **Contractor** shall have asked for and obtained a decision in writing from the **Commissioner** of the **Agency** that is entering into this **Contract**, before the submission of its bid, as to what shall govern.

ARTICLE 2. DEFINITIONS

2.1 The following words and expressions, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless a different meaning is clear from the context:

2.1.1 “**Addendum**” or “**Addenda**” shall mean the additional Contract provisions and/or technical clarifications issued in writing by the Commissioner prior to the receipt of bids.

2.1.2 “**Agency**” shall mean a city, county, borough or other office, position, department, division, bureau, board or commission, or a corporation, institution or agency of government, the expenses of which are paid in whole or in part from the City treasury.

2.1.3 “**Agency Chief Contracting Officer**” (**ACCO**) shall mean a person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the CCPO, or his/her duly authorized representative.

2.1.4 “**Allowance**” shall mean a sum of money which the Agency may include in the total amount of the Contract for such specific contingencies as the Agency believes may be necessary to complete the Work, *e.g.*, lead or asbestos remediation, and for which the Contractor will be paid on the basis of stipulated unit prices or a formula set forth in the Contract or negotiated between the parties provided, however, that if the Contractor is not directed to use the Allowance, the Contractor shall have no right to such money and it shall be deducted from the total amount of the Contract.

2.1.5 “**City**” shall mean the City of New York.

2.1.6 “**City Chief Procurement Officer**” (CCPO) shall mean a person delegated authority by the Mayor to coordinate and oversee the procurement activity of Mayoral agency staff, including the ACCO and any offices which have oversight responsibility for the procurement of construction, or his/her duly authorized representative.

2.1.7 “**Commissioner**” shall mean the head of the Agency that has entered into this Contract, or his/her duly authorized representative.

2.1.8 “**Comptroller**” shall mean the Comptroller of the City of New York.

2.1.9 “**Contract**” or “**Contract Documents**” shall mean each of the various parts of the contract referred to in Article 1 hereof, both as a whole and severally.

2.1.10 “**Contract Drawings**” shall mean only those drawings specifically entitled as such and listed in the Specifications or in any Addendum, or any drawings furnished by the Commissioner, pertaining or supplemental thereto.

2.1.11 “**Contract Work**” shall mean everything required to be furnished and done by the Contractor by any one or more of the parts of the Contract referred to in Article 1, except Extra Work as hereinafter defined.

2.1.12 “**Contractor**” shall mean the entity which executed this Contract, whether a corporation, firm, partnership, joint venture, individual, or any combination thereof, and its, their, his/her successors, personal representatives, executors, administrators, and assigns, and any person, firm, partnership, joint venture, individual, or corporation which shall at any time be substituted in the place of the Contractor under this Contract.

2.1.13 “**Days**” shall mean calendar days, except where otherwise specified.

2.1.14 “**Engineer**” or “**Architect**” or “**Project Manager**” shall mean the person so designated in writing by the Commissioner in the Notice to Proceed or the Order to Work to act as such in relation to this Contract, including a private Architect or Engineer or Project Manager, as the case may be. Subject to written approval by the Commissioner, the Engineer, Architect or Project Manager may designate an authorized representative.

2.1.15 “**Engineering Audit Officer**” (EAO) shall mean the person so designated by the Commissioner to perform responsible auditing functions hereunder.

2.1.16 “**Extra Work**” shall mean Work other than that required by the Contract at the time of award which is authorized by the Commissioner pursuant to Chapter VI of this Contract.

- 2.1.17 **“Federal-Aid Contract”** shall mean a contract in which the United States (federal) Government provides financial funding as so designated in the Information for Bidders.
- 2.1.18 **“Final Acceptance”** shall mean final written acceptance of all the Work by the Commissioner, a copy of which shall be sent to the Contractor.
- 2.1.19 **“Final Approved Punch List”** shall mean a list, approved pursuant to Article 14.2.2, specifying those items of Work to be completed by the Contractor after Substantial Completion and dates for the completion of each item of Work.
- 2.1.20 **“Law”** or **“Laws”** shall mean the Constitution of the State of New York, the New York City Charter, the New York City Administrative Code, a statute of the United States or of the State of New York, a local law of the City of New York, any ordinance, rule or regulation having the force of law, or common law.
- 2.1.21 **“Materialman”** shall mean any corporation, firm, partnership, joint venture, or individual, other than employees of the Contractor, who or which contracts with the Contractor or any Subcontractor, to fabricate or deliver, or who actually fabricates or delivers, plant, materials or equipment to be incorporated in the Work.
- 2.1.22 **“Means and Methods of Construction”** shall mean the labor, materials, temporary structures, tools, plant, and construction equipment, and the manner and time of their use, necessary to accomplish the result intended by this Contract.
- 2.1.23 **“Notice to Proceed”** or **“Order to Work”** shall mean the written notice issued by the Commissioner specifying the time for commencement of the Work and the Engineer, Architect or Project Manager.
- 2.1.24 **“Other Contractor(s)”** shall mean any contractor (other than the entity which executed this Contract or its Subcontractors) who or which has a contract with the City for work on or adjacent to the building or Site of the Work.
- 2.1.25 **“Payroll Taxes”** shall mean State Unemployment Insurance (SUI), Federal Unemployment Insurance (FUI), and payments pursuant to the Federal Insurance Contributions Act (FICA).
- 2.1.26 **“Project”** shall mean the public improvement to which this Contract relates.
- 2.1.27 **“Procurement Policy Board” (PPB)** shall mean the Agency of the City of New York whose function is to establish comprehensive and consistent procurement policies and rules which shall have broad application throughout the City.
- 2.1.28 **“Required Quantity”** in a unit price Contract shall mean the actual quantity of any item of Work or materials which is required to be performed or furnished in order to comply with the Contract.
- 2.1.29 **“Resident Engineer”** shall mean the representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the Work.
- 2.1.30 **“Site”** shall mean the area upon or in which the Contractor’s operations are carried on, and such other areas adjacent thereto as may be designated as such by the Engineer.

2.1.31 “**Small Tools**” shall mean items that are ordinarily required for a worker’s job function, including but not limited to, equipment that ordinarily has no licensing, insurance or substantive storage costs associated with it; such as circular and chain saws, impact drills, threaders, benders, wrenches, socket tools, etc.

2.1.32 “**Specifications**” shall mean all of the directions, requirements, and standards of performance applying to the Work as hereinafter detailed and designated under the Specifications.

2.1.33 “**Subcontractor**” shall mean any person, firm or corporation, other than employees of the Contractor, who or which contracts with the Contractor or with its subcontractors to furnish, or actually furnishes labor, or labor and materials, or labor and equipment, or superintendence, supervision and/or management at the Site. Wherever the word Subcontractor appears, it shall also mean sub-Subcontractor.

2.1.34 “**Substantial Completion**” shall mean the written determination by the Engineer that the Work required under this Contract is substantially, but not entirely, complete and the approval of the **Final Approved Punch List**.

2.1.35 “**Work**” shall mean all services required to complete the Project in accordance with the Contract Documents, including without limitation, labor, material, superintendence, management, administration, equipment, and incidentals, and obtaining any and all permits, certifications and licenses as may be necessary and required to complete the Work, and shall include both Contract Work and Extra Work.

CHAPTER II: THE WORK AND ITS PERFORMANCE

ARTICLE 3. CHARACTER OF THE WORK

3.1 Unless otherwise expressly provided in the **Contract Drawings, Specifications, and Addenda**, the **Work** shall be performed in accordance with the best modern practice, utilizing, unless otherwise specified in writing, new and unused materials of standard first grade quality and workmanship and design of the highest quality, to the satisfaction of the **Commissioner**.

ARTICLE 4. MEANS AND METHODS OF CONSTRUCTION

4.1 Unless otherwise expressly provided in the **Contract Drawings, Specifications, and Addenda**, the **Means and Methods of Construction** shall be such as the **Contractor** may choose; subject, however, to the **Engineer’s** right to reject the **Means and Methods of Construction** proposed by the **Contractor** which in the opinion of the **Engineer**:

4.1.1 Will constitute or create a hazard to the **Work**, or to persons or property; or

4.1.2 Will not produce finished **Work** in accordance with the terms of the **Contract**; or

4.1.3 Will be detrimental to the overall progress of the **Project**.

4.2 The **Engineer’s** approval of the **Contractor’s Means and Methods of Construction**, or his/her failure to exercise his/her right to reject such means or methods, shall not relieve the **Contractor**

of its obligation to complete the **Work** as provided in this **Contract**; nor shall the exercise of such right to reject create a cause of action for damages.

ARTICLE 5. COMPLIANCE WITH LAWS

5.1 The **Contractor** shall comply with all **Laws** applicable to this **Contract** and to the **Work** to be done hereunder.

5.2 Procurement Policy Board Rules: This **Contract** is subject to the Rules of the **PPB** (“**PPB Rules**”) in effect at the time of the bid opening for this **Contract**. In the event of a conflict between the **PPB Rules** and a provision of this **Contract**, the **PPB Rules** shall take precedence.

5.3 Noise Control Code provisions.

5.3.1 In accordance with the provisions of Section 24-216(b) of the Administrative Code of the **City** (“Administrative Code”), Noise Abatement Contract Compliance, devices and activities which will be operated, conducted, constructed or manufactured pursuant to this **Contract** and which are subject to the provisions of the **City** Noise Control Code shall be operated, conducted, constructed, or manufactured without causing a violation of the Administrative Code. Such devices and activities shall incorporate advances in the art of noise control development for the kind and level of noise emitted or produced by such devices and activities, in accordance with regulations issued by the **Commissioner** of the **City** Department of Environmental Protection.

5.3.2 The **Contractor** agrees to comply with Section 24-219 of the Administrative Code and implementing rules codified at 15 Rules of the City of New York (“RCNY”) Section 28-100 *et seq.* In accordance with such provisions, the **Contractor**, if the **Contractor** is the responsible party under such regulations, shall prepare and post a Construction Noise Mitigation Plan at each **Site**, in which the **Contractor** shall certify that all construction tools and equipment have been maintained so that they operate at normal manufacturers operating specifications. If the **Contractor** cannot make this certification, it must have in place an Alternative Noise Mitigation Plan approved by the **City** Department of Environmental Protection. In addition, the **Contractor**’s certified Construction Noise Mitigation Plan is subject inspection by the **City** Department of Environmental Protection in accordance with Section 28-101 of Title 15 of RCNY. No **Contract Work** may take place at a **Site** unless there is a Construction Noise Mitigation Plan or approved Alternative Noise Mitigation Plan in place. In addition, the **Contractor** shall create and implement a noise mitigation training program. Failure to comply with these requirements may result in fines and other penalties pursuant to the applicable provisions of the Administrative Code and RCNY.

5.4 Ultra Low Sulfur Diesel Fuel: In accordance with the provisions of Section 24-163.3 of the Administrative Code, the **Contractor** specifically agrees as follows:

5.4.1 Definitions. For purposes of this Article 5.4, the following definitions apply:

5.4.1(a) “Contractor” means any person or entity that enters into a Public Works Contract with a **City Agency**, or any person or entity that enters into an agreement with such person or entity, to perform work or provide labor or services related to such Public Works Contract.

5.4.1(b) “Motor Vehicle” means any self-propelled vehicle designed for transporting persons or property on a street or highway.

5.4.1(c) “Nonroad Engine” means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under Section 7411 or Section 7521 of Title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

5.4.1(d) “Nonroad Vehicle” means a vehicle that is powered by a Nonroad Engine, fifty (50) horsepower and greater, and that is not a Motor Vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers, and similar equipment, except that this term shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five (65) horsepower or less and that are not used in any construction program or project.

5.4.1(e) “Public Works Contract” means a contract with a **City Agency** for a construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; a contract with a **City Agency** for the preparation for any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; or a contract with a **City Agency** for any final work involved in the completion of any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge.

5.4.1(f) “Ultra Low Sulfur Diesel Fuel” means diesel fuel that has a sulfur content of no more than fifteen parts per million (15 ppm).

5.4.2 Ultra Low Sulfur Diesel Fuel

5.4.2(a) All **Contractors** shall use Ultra Low Sulfur Diesel Fuel in diesel-powered Nonroad Vehicles in the performance of this **Contract**.

5.4.2(b) Notwithstanding the requirements of Article 5.4.2(a), **Contractors** may use diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) to fulfill the requirements of this Article 5.4.2, where the Commissioner of the **City** Department of Environmental Protection (“DEP Commissioner”) has issued a determination that a sufficient quantity of Ultra Low Sulfur Diesel Fuel is not available to meet the needs of **Agencies** and **Contractors**. Any such determination shall expire after six (6) months unless renewed.

5.4.2(c) **Contractors** shall not be required to comply with this Article 5.4.2 where the **City Agency** letting this **Contract** makes a written finding, which is approved, in writing, by the DEP Commissioner, that a sufficient quantity of Ultra Low Sulfur Diesel Fuel, or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) is not available to meet the requirements of Section 24-163.3 of the Administrative Code, provided that such **Contractor** in its fulfillment of the

requirements of this **Contract**, to the extent practicable, shall use whatever quantity of Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) is available. Any finding made pursuant to this Article 5.4.2(c) shall expire after sixty (60) **Days**, at which time the requirements of this Article 5.4.2 shall be in full force and effect unless the **City Agency** renews the finding in writing and such renewal is approved by the DEP Commissioner.

5.4.2(d) **Contractors** may check on determinations and approvals issued by the DEP Commissioner pursuant to Section 24-163.3 of the Administrative Code, if any, at www.dep.nyc.gov or by contacting the **City Agency** letting this **Contract**.

5.4.2(e) The requirements of this Article 5.4.2 do not apply where they are precluded by federal or State funding requirements or where the **Contract** is an emergency procurement.

5.4.3 Best Available Technology

5.4.3(a) All **Contractors** shall utilize the best available technology for reducing the emission of pollutants for diesel-powered Nonroad Vehicles in the performance of this **Contract**. For determinations of best available technology for each type of diesel-powered Nonroad Vehicle, **Contractors** shall comply with the regulations of the **City** Department of Environmental Protection, as and when adopted, Chapter 14 of Title 15 of the Rules of the City of New York (RCNY). The **Contractor** shall fully document all steps in the best available technology selection process and shall furnish such documentation to the **City Agency** or the DEP Commissioner upon request. The **Contractor** shall retain all documentation generated in the best available technology selection process for as long as the selected best available technology is in use.

5.4.3(b) No **Contractor** shall be required to replace best available technology for reducing the emission of pollutants or other authorized technology utilized for a diesel-powered Nonroad Vehicle in accordance with the provisions of this Article 5.4.3 within three (3) years of having first utilized such technology for such vehicle.

5.4.3(c) This Article 5.4.3 shall not apply to any vehicle used to satisfy the requirements of a specific Public Works Contract for fewer than twenty (20) **Days**.

5.4.3(d) The **Contractor** shall not be required to comply with this Article 5.4.3 with respect to a diesel-powered Nonroad Vehicle under the following circumstances:

5.4.3(d)(i) Where the **City Agency** makes a written finding, which is approved, in writing, by the DEP Commissioner, that the best available technology for reducing the emission of pollutants as required by this Article 5.4.3 is unavailable for such vehicle, the **Contractor** shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle.

5.4.3(d)(ii) Where the DEP Commissioner has issued a written waiver based upon the **Contractor** having demonstrated to the DEP Commissioner that the use of the best available technology for reducing the emission of pollutants might endanger the operator of such vehicle or those working near such vehicle, due to engine malfunction, the **Contractor** shall use whatever technology for

reducing the emission of pollutants, if any, is available and appropriate for such vehicle, which would not endanger the operator of such vehicle or those working near such vehicle.

5.4.3(d)(iii) In determining which technology to use for the purposes of Articles 5.4.3(d)(i) and 5.4.3(d)(ii) above, the **Contractor** shall primarily consider the reduction in emissions of particulate matter and secondarily consider the reduction in emissions of nitrogen oxides associated with the use of such technology, which shall in no event result in an increase in the emissions of either such pollutant.

5.4.3(d)(iv) The **Contractor** shall submit requests for a finding or a waiver pursuant to this Article 5.4.3(d) in writing to the DEP Commissioner, with a copy to the **ACCO** of the **City Agency** letting this **Contract**. Any finding or waiver made or issued pursuant to Articles 5.4.3(d)(i) and 5.4.3(d)(ii) above shall expire after one hundred eighty (180) **Days**, at which time the requirements of Article 5.4.3(a) shall be in full force and effect unless the **City Agency** renews the finding, in writing, and the DEP Commissioner approves such finding, in writing, or the DEP Commissioner renews the waiver, in writing.

5.4.3(e) The requirements of this Article 5.4.3 do not apply where they are precluded by federal or State funding requirements or where the **Contract** is an emergency procurement.

5.4.4 Section 24-163 of the Administrative Code. The **Contractor** shall comply with Section 24-163 of the Administrative Code related to the idling of the engines of motor vehicles while parking.

5.4.5 Compliance

5.4.5(a) The **Contractor's** compliance with Article 5.4 may be independently monitored. If it is determined that the **Contractor** has failed to comply with any provision of Article 5.4, any costs associated with any independent monitoring incurred by the **City** shall be reimbursed by the **Contractor**.

5.4.5(b) Any **Contractor** who violates any provision of Article 5.4, except as provided in Article 5.4.5(c) below, shall be liable for a civil penalty between the amounts of one thousand (\$1,000) and ten thousand (\$10,000) dollars, in addition to twice the amount of money saved by such **Contractor** for failure to comply with Article 5.4.

5.4.5(c) No **Contractor** shall make a false claim with respect to the provisions of Article 5.4 to a **City Agency**. Where a **Contractor** has been found to have done so, such **Contractor** shall be liable for a civil penalty of twenty thousand (\$20,000) dollars, in addition to twice the amount of money saved by such **Contractor** in association with having made such false claim.

5.4.6 Reporting

5.4.6(a) For all Public Works Contracts covered by this Article 5.4, the **Contractor** shall report to the **City Agency** the following information:

5.4.6(a)(i) The total number of diesel-powered Nonroad Vehicles used to fulfill the requirements of this Public Works Contract;

5.4.6(a)(ii) The number of such Nonroad Vehicles that were powered by Ultra Low Sulfur Diesel Fuel;

5.4.6(a)(iii) The number of such Nonroad Vehicles that utilized the best available technology for reducing the emission of pollutants, including a breakdown by vehicle model and the type of technology;

5.4.6(a)(iv) The number of such Nonroad Vehicles that utilized such other authorized technology in accordance with Article 5.4.3, including a breakdown by vehicle model and the type of technology used for each such vehicle;

5.4.6(a)(v) The locations where such Nonroad Vehicles were used; and

5.4.6(a)(vi) Where a determination is in effect pursuant to Article 5.4.2(b) or 5.4.2(c), detailed information concerning the **Contractor's** efforts to obtain Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm).

5.4.6(b) The **Contractor** shall submit the information required by Article 5.4.6(a) at the completion of **Work** under the Public Works Contract and on a yearly basis no later than August 1 throughout the term of the Public Works Contract. The yearly report shall cover **Work** performed during the preceding fiscal year (July 1 - June 30).

5.5 Ultra Low Sulfur Diesel Fuel. In accordance with the Coordinated Construction Act for Lower Manhattan, as amended:

5.5.1 Definitions. For purposes of this Article 5.5, the following definitions apply:

5.5.1(a) "Lower Manhattan" means the area to the south of and within the following lines: a line beginning at a point where the United States pierhead line in the Hudson River as it exists now or may be extended would intersect with the southerly line of West Houston Street in the Borough of Manhattan extended, thence easterly along the southerly side of West Houston Street to the southerly side of Houston Street, thence easterly along the southerly side of Houston Street to the southerly side of East Houston Street, thence northeasterly along the southerly side of East Houston Street to the point where it would intersect with the United States pierhead line in the East River as it exists now or may be extended, including tax lots within or immediately adjacent thereto.

5.5.1(b) "Lower Manhattan Redevelopment Project" means any project in Lower Manhattan that is funded in whole or in part with federal or State funding, or any project intended to improve transportation between Lower Manhattan and the two air terminals in the **City** known as LaGuardia Airport and John F. Kennedy International Airport, or between Lower Manhattan and the air terminal in Newark known as Newark Liberty International Airport, and that is funded in whole or in part with federal funding.

5.5.1(c) “Nonroad Engine” means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under Section 7411 or Section 7521 of Title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

5.5.1(d) “Nonroad Vehicle” means a vehicle that is powered by a Nonroad Engine, fifty (50) horsepower (HP) and greater, and that is not a Motor Vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers, and similar equipment, except that this terms shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five (65) HP or less and that are not used in any construction program or project.

5.5.1(e) “Ultra Low Sulfur Diesel Fuel” means diesel fuel that has a sulfur content of no more than fifteen parts per million (15 ppm).

5.5.2 Requirements. **Contractors** and **Subcontractors** are required to use only Ultra Low Sulfur Diesel Fuel to power the diesel-powered Nonroad Vehicles with engine HP rating of fifty (50) HP and above used on a Lower Manhattan Redevelopment Project and, where practicable, to reduce the emission of pollutants by retrofitting such Nonroad Vehicles with oxidation catalysts, particulate filters, or technology that achieves lowest particulate matter emissions.

5.6 Pesticides. In accordance with Section 17-1209 of the Administrative Code, to the extent that the **Contractor** or any **Subcontractor** applies pesticides to any property owned or leased by the **City**, the **Contractor**, and any **Subcontractor** shall comply with Chapter 12 of the Administrative Code.

5.7 Waste Treatment, Storage, and Disposal Facilities and Transporters. In connection with the **Work**, the **Contractor** and any **Subcontractor** shall use only those waste treatment, storage, and disposal facilities and waste transporters that possess the requisite license, permit or other governmental approval necessary to treat, store, dispose, or transport the waste, materials or hazardous substances.

5.8 Environmentally Preferable Purchasing. The **Contractor** shall ensure that products purchased or leased by the **Contractor** or any **Subcontractor** for the **Work** that are not specified by the **City** or are submitted as equivalents to a product specified by the **City** comply with the requirements of the New York City Environmentally Preferable Purchasing Program contained in Chapter 11 of Title 43 of the RCNY, pursuant to Chapter 3 of Title 6 of the Administrative Code.

ARTICLE 6. INSPECTION

6.1 During the progress of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall at all times afford the representatives of the **City** every reasonable, safe, and proper facility for inspecting all **Work** done or being done at the **Site** and also for inspecting the manufacture or preparation of materials and equipment at the place of such manufacture or preparation.

6.2 The **Contractor’s** obligation hereunder shall include the uncovering or taking down of finished **Work** and its restoration thereafter; provided, however, that the order to uncover, take down and restore shall be in writing, and further provided that if **Work** thus exposed proves satisfactory, and if the **Contractor** has complied with Article 6.1, such uncovering or taking down and restoration shall be

considered an item of **Extra Work** to be paid for in accordance with the provisions of Article 26. If the **Work** thus exposed proves unsatisfactory, the **City** has no obligation to compensate the **Contractor** for the uncovering, taking down or restoration.

6.3 Inspection and approval by the **Commissioner**, the **Engineer**, **Project Manager**, or **Resident Engineer**, of finished **Work** or of **Work** being performed, or of materials and equipment at the place of manufacture or preparation, shall not relieve the **Contractor** of its obligation to perform the **Work** in strict accordance with the **Contract**. Finished or unfinished **Work** not found to be in strict accordance with the **Contract** shall be replaced as directed by the **Engineer**, even though such **Work** may have been previously approved and paid for. Such corrective **Work** is **Contract Work** and shall not be deemed **Extra Work**.

6.4 Rejected **Work** and materials shall be promptly taken down and removed from the **Site**, which must at all times be kept in a reasonably clean and neat condition.

ARTICLE 7. PROTECTION OF WORK AND OF PERSONS AND PROPERTY; NOTICES AND INDEMNIFICATION

7.1 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall be under an absolute obligation to protect the finished and unfinished **Work** against any damage, loss, injury, theft and/or vandalism and in the event of such damage, loss, injury, theft and/or vandalism, it shall promptly replace and/or repair such **Work** at the **Contractor's** sole cost and expense, as directed by the **Resident Engineer**. The obligation to deliver finished **Work** in strict accordance with the **Contract** prior to **Final Acceptance** shall be absolute and shall not be affected by the **Resident Engineer's** approval of, or failure to prohibit, the **Means and Methods of Construction** used by the **Contractor**.

7.2 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall take all reasonable precautions to protect all persons and the property of the **City** and of others from damage, loss or injury resulting from the **Contractor's**, and/or its **Subcontractors'** operations under this **Contract**. The **Contractor's** obligation to protect shall include the duty to provide, place or replace, and adequately maintain at or about the **Site** suitable and sufficient protection such as lights, barricades, and enclosures.

7.3 The **Contractor** shall comply with the notification requirements set forth below in the event of any loss, damage or injury to **Work**, persons or property, or any accidents arising out of the operations of the **Contractor** and/or its **Subcontractors** under this **Contract**.

7.3.1 The **Contractor** shall make a full and complete report in writing to the **Resident Engineer** within three (3) **Days** after the occurrence.

7.3.2 The **Contractor** shall also send written notice of any such event to all insurance carriers that issued potentially responsive policies (including commercial general liability insurance carriers for events relating to the **Contractor's** own employees) no later than twenty (20) days after such event and again no later than twenty (20) days after the initiation of any claim and/or action resulting therefrom. Such notice shall contain the following information: the number of the insurance policy, the name of the Named Insured, the date and location of the incident, and the identity of the persons injured or property damaged. For any policy on which the **City** and/or the **Engineer**, **Architect**, or **Project Manager** are Additional Insureds, such notice shall expressly specify that "this notice is

being given on behalf of the City of New York as Additional Insured, such other Additional Insureds, as well as the Named Insured.”

7.3.2(a) Whenever such notice is sent under a policy on which the **City** is an Additional Insured, the **Contractor** shall provide copies of the notice to the **Comptroller**, the **Commissioner** and the **City** Corporation Counsel. The copy to the **Comptroller** shall be sent to the Insurance Unit, NYC Comptroller’s Office, 1 Centre Street – Room 1222, New York, New York, 10007. The copy to the **Commissioner** shall be sent to the address set forth in Schedule A of the General Conditions. The copy to the **City** Corporation Counsel shall be sent to Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, New York 10007.

7.3.2(b) If the **Contractor** fails to provide any of the foregoing notices to any appropriate insurance carrier(s) in a timely and complete manner, the **Contractor** shall indemnify the **City** for all losses, judgments, settlements, and expenses, including reasonable attorneys’ fees, arising from an insurer’s disclaimer of coverage citing late notice by or on behalf of the **City**.

7.4 To the fullest extent permitted by law, the **Contractor** shall defend, indemnify, and hold the **City**, its employees, and officials (the “Indemnitees”) harmless against any and all claims (including but not limited to claims asserted by any employee of the **Contractor** and/or its **Subcontractors**) and costs and expenses of whatever kind (including but not limited to payment or reimbursement of attorneys’ fees and disbursements) allegedly arising out of or in any way related to the operations of the **Contractor** and/or its **Subcontractors** in the performance of this **Contract** or from the **Contractor’s** and/or its **Subcontractors’** failure to comply with any of the provisions of this **Contract** or of the **Law**. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this Article 7.4 by way of cross-claim, third-party claim, declaratory action or otherwise. The parties expressly agree that the indemnification obligation hereunder contemplates (1) full indemnity in the event of liability imposed against the Indemnitees without negligence and solely by reason of statute, operation of **Law** or otherwise; and (2) partial indemnity in the event of any actual negligence on the part of the Indemnitees either causing or contributing to the underlying claim (in which case, indemnification will be limited to any liability imposed over and above that percentage attributable to actual fault whether by statute, by operation of **Law**, or otherwise). Where partial indemnity is provided hereunder, all costs and expenses shall be indemnified on a pro rata basis.

7.4.1 Indemnification under Article 7.4 or any other provision of the **Contract** shall operate whether or not **Contractor** or its **Subcontractors** have placed and maintained the insurance specified under Article 22.

7.5 The provisions of this Article 7 shall not be deemed to create any new right of action in favor of third parties against the **Contractor** or the **City**.

CHAPTER III: TIME PROVISIONS

ARTICLE 8. COMMENCEMENT AND PROSECUTION OF THE WORK

8.1 The **Contractor** shall commence the **Work** on the date specified in the **Notice to Proceed** or the **Order to Work**. The time for performance of the **Work** under the **Contract** shall be computed from

the date specified in the **Notice to Proceed** or the **Order to Work**. **TIME BEING OF THE ESSENCE** to the **City**, the **Contractor** shall thereafter prosecute the **Work** diligently, using such **Means and Methods of Construction** as are in accord with Article 4 herein and as will assure its completion not later than the date specified in this Contract, or on the date to which the time for completion may be extended.

ARTICLE 9. PROGRESS SCHEDULES

9.1 To enable the **Work** to be performed in an orderly and expeditious manner, the **Contractor**, within fifteen (15) **Days** after the **Notice to Proceed** or **Order to Work**, unless otherwise directed by the **Engineer**, shall submit to the **Engineer** a proposed progress schedule based on the Critical Path Method in the form of a bar graph or in such other form as specified by the **Engineer**, and monthly cash flow requirements, showing:

9.1.1 The anticipated time of commencement and completion of each of the various operations to be performed under this **Contract**; and

9.1.2 The sequence and interrelation of each of these operations with the others and with those of other related contracts; and

9.1.3 The estimated time required for fabrication or delivery, or both, of all materials and equipment required for the **Work**, including the anticipated time for obtaining required approvals pursuant to Article 10; and

9.1.4 The estimated amount in dollars the **Contractor** will claim on a monthly basis.

9.2 The proposed schedule shall be revised as directed by the **Engineer**, until finally approved by the **Engineer**, and after such approval, subject to the provisions of Article 11, shall be strictly adhered to by the **Contractor**.

9.3 If the **Contractor** shall fail to adhere to the approved progress schedule, or to the schedule as revised pursuant to Article 11, it shall promptly adopt such other or additional **Means and Methods of Construction**, at its sole cost and expense, as will make up for the time lost and will assure completion in accordance with the approved progress schedule. The approval by the **City** of a progress schedule which is shorter than the time allotted under the **Contract** shall not create any liability for the **City** if the approved progress schedule is not met.

9.4 The **Contractor** will not receive any payments until the proposed progress schedule is submitted.

ARTICLE 10. REQUESTS FOR INFORMATION OR APPROVAL

10.1 From time to time as the **Work** progresses and in the sequence indicated by the approved progress schedule, the **Contractor** shall submit to the **Engineer** a specific request in writing for each item of information or approval required by the **Contractor**. These requests shall state the latest date upon which the information or approval is actually required by the **Contractor**, and shall be submitted in a reasonable time in advance thereof to provide the **Engineer** a sufficient time to act upon such submissions, or any necessary re-submissions thereof.

10.2 The **Contractor** shall not have any right to an extension of time on account of delays due to the **Contractor's** failure to submit requests for the required information or the required approval in accordance with the above requirements.

ARTICLE 11. NOTICE OF CONDITIONS CAUSING DELAY AND DOCUMENTATION OF DAMAGES CAUSED BY DELAY

11.1 After the commencement of any condition which is causing or may cause a delay in completion of the **Work**, including conditions for which the **Contractor** may be entitled to an extension of time, the following notifications and submittals are required:

11.1.1 Within fifteen (15) **Days** after the **Contractor** becomes aware or reasonably should be aware of each such condition, the **Contractor** must notify the **Resident Engineer** or **Engineer**, as directed by the **Commissioner**, in writing of the existence, nature and effect of such condition upon the approved progress schedule and the **Work**, and must state why and in what respects, if any, the condition is causing or may cause a delay. Such notice shall include a description of the construction activities that are or could be affected by the condition and may include any recommendations the **Contractor** may have to address the delay condition and any activities the **Contractor** may take to avoid or minimize the delay.

11.1.2 If the **Contractor** shall claim to be sustaining damages for delay as provided for in this Article 11, within forty-five (45) **Days** from the time such damages are first incurred for each such condition, the **Contractor** shall submit to the **Commissioner** a verified written statement of the details and estimates of the amounts of such damages, including categories of expected damages and projected monthly costs, together with documentary evidence of such damages as the **Contractor** may have at the time of submission ("statement of delay damages"), as further detailed in Article 11.6. The **Contractor** may submit the above statement within such additional time as may be granted by the **Commissioner** in writing upon written request therefor.

11.1.3 Articles 11.1.1 and 11.1.2 do not relieve the **Contractor** of its obligation to comply with the provisions of Article 44.

11.2 Failure of the **Contractor** to strictly comply with the requirements of Article 11.1.1 may, in the discretion of the **Commissioner**, be deemed sufficient cause to deny any extension of time on account of delay arising out of such condition. Failure of the **Contractor** to strictly comply with the requirements of both Articles 11.1.1 and 11.1.2 shall be deemed a conclusive waiver by the **Contractor** of any and all claims for damages for delay arising from such condition and no right to recover on such claims shall exist.

11.3 When appropriate and directed by the **Engineer**, the progress schedule shall be revised by the **Contractor** until finally approved by the **Engineer**. The revised progress schedule must be strictly adhered to by the **Contractor**.

11.4 Compensable Delays

11.4.1 The **Contractor** agrees to make claim only for additional costs attributable to delay in the performance of this **Contract** necessarily extending the time for completion of the **Work** or resulting from acceleration directed by the **Commissioner** and required to maintain the progress schedule, occasioned solely by any act or omission to act of the **City** listed below. The **Contractor** also agrees that delay from any other cause shall be

compensated, if at all, solely by an extension of time to complete the performance of the **Work**.

11.4.1.1 The failure of the **City** to take reasonable measures to coordinate and progress the **Work** to the extent required by the **Contract**, except that the **City** shall not be responsible for the **Contractor's** obligation to coordinate and progress the **Work** of its **Subcontractors**.

11.4.1.2 Unreasonable delays attributable to the review of shop drawings, the issuance of change orders, or the cumulative impact of change orders that were not brought about by any act or omission of the **Contractor**.

11.4.1.3 The unavailability of the **Site** caused by acts or omissions of the **City**.

11.4.1.4 The issuance by the **Engineer** of a stop work order that was not brought about through any act or omission of the **Contractor**.

11.4.1.5 Differing site conditions or environmental hazards that were neither known nor reasonably ascertainable on a pre-bid inspection of the **Site** or review of the bid documents or other publicly available sources, and that are not ordinarily encountered in the **Project's** geographical area or neighborhood or in the type of **Work** to be performed.

11.4.1.6 Delays caused by the **City's** bad faith or its willful, malicious, or grossly negligent conduct;

11.4.1.7 Delays not contemplated by the parties;

11.4.1.8 Delays so unreasonable that they constitute an intentional abandonment of the **Contract** by the **City**; and

11.4.1.9 Delays resulting from the **City's** breach of a fundamental obligation of the **Contract**.

11.4.2 No claim may be made for any alleged delay in **Substantial Completion** of the **Work** if the **Work** will be or is substantially completed by the date of **Substantial Completion** provided for in Schedule A unless acceleration has been directed by the **Commissioner** to meet the date of **Substantial Completion** set forth in Schedule A, or unless there is a provision in the **Contract** providing for additional compensation for early completion.

11.4.3 The provisions of this Article 11 apply only to claims for additional costs attributable to delay and do not preclude determinations by the **Commissioner** allowing reimbursements for additional costs for **Extra Work** pursuant to Articles 25 and 26 of this **Contract**. To the extent that any cost attributable to delay is reimbursed as part of a change order, no additional claim for compensation under this Article 11 shall be allowed.

11.5 Non-Compensable Delays. The **Contractor** agrees to make no claim for, and is deemed to have included in its bid prices for the various items of the **Contract**, the extra/additional costs attributable to any delays caused by or attributable to the items set forth below. For such items, the **Contractor** shall be compensated, if at all, solely by an extension of time to complete the performance of the **Work**, in accordance with the provisions of Article 13. Such extensions of time will be granted, if at all, pursuant to the grounds set forth in Article 13.3.

11.5.1 The acts or omissions of any third parties, including but not limited to **Other Contractors**, public/ governmental bodies (other than **City Agencies**), utilities or private enterprises, who are disclosed in the **Contract Documents** or are ordinarily encountered or generally recognized as related to the **Work**;

11.5.2 Any situation which was within the contemplation of the parties at the time of entering into the **Contract**, including any delay indicated or disclosed in the **Contract Documents** or that would be generally recognized by a reasonably prudent contractor as related to the nature of the **Work**, and/or the existence of any facility or appurtenance owned, operated or maintained by any third party, as indicated or disclosed in the **Contract Documents** or ordinarily encountered or generally recognized as related to the nature of the **Work**;

11.5.3 Restraining orders, injunctions or judgments issued by a court which were caused by a Contractor's submission, action or inaction or by a Contractor's **Means and Methods of Construction**, or by third parties, unless such order, injunction or judgment was the result of an act or omission by the **City**;

11.5.4 Any labor boycott, strike, picketing, lockout or similar situation;

11.5.5 Any shortages of supplies or materials, or unavailability of equipment, required by the **Contract Work**;

11.5.6 Climatic conditions, storms, floods, droughts, tidal waves, fires, hurricanes, earthquakes, landslides or other catastrophes or acts of God, or acts of war or of the public enemy or terrorist acts, including the **City's** reasonable responses thereto; and

11.5.7 **Extra Work** which does not significantly affect the overall completion of the **Contract**, reasonable delays in the review or issuance of change orders or field orders and/or in shop drawing reviews or approvals.

11.6 Required Content of Submission of Statement of Delay Damages

11.6.1 In the verified written statement of delay damages required by Article 11.1.2, the following information shall be provided by the **Contractor**:

11.6.1.1 For each delay, the start and end dates of the claimed periods of delay and, in addition, a description of the operations that were delayed, an explanation of how they were delayed, and the reasons for the delay, including identifying the applicable act or omission of the **City** listed in Article 11.4.

11.6.1.2 A detailed factual statement of the claim providing all necessary dates, locations and items of **Work** affected by the claim.

11.6.1.3 The estimated amount of additional compensation sought and a breakdown of that amount into categories as described in Article 11.7.

11.6.1.4 Any additional information requested by the **Commissioner**.

11.7 Recoverable Costs

11.7.1 Delay damages may be recoverable for the following costs actually and necessarily incurred in the performance of the **Work**:

11.7.1.1 Direct labor, including payroll taxes (subject to statutory wage caps) and supplemental benefits, based on time and materials records;

11.7.1.2 Necessary materials (including transportation to the **Site**), based on time and material records;

- 11.7.1.3 Reasonable rental value of necessary plant and equipment other than small tools, plus fuel/energy costs according to the applicable formula set forth in Articles 26.2.4 and/or 26.2.8, based on time and material records;
- 11.7.1.4 Additional insurance and bond costs;
- 11.7.1.5 Extended **Site** overhead, field office rental, salaries of field office staff, on-site project managers and superintendents, field office staff vehicles, **Project**-specific storage, field office utilities and telephone, and field office consumables;
- 11.7.1.6 Labor escalation costs based on actual costs;
- 11.7.1.7 Materials and equipment escalation costs based on applicable industry indices unless documentation of actual increased cost is provided;
- 11.7.1.8 Additional material and equipment storage costs based on actual documented costs and additional costs necessitated by extended manufacturer warranty periods; and
- 11.7.1.9 Extended home office overhead calculated based on the following formula:
 - (1) Subtract from the original **Contract** amount the amount earned by original contractual **Substantial Completion** date (not including change orders);
 - (2) Remove 15% overhead and profit from the calculation in item (1) by dividing the results of item (1) by 1.15;
 - (3) Multiply the result of item (2) by 7.25% for the total home office overhead;
 - (4) Multiply the result of item (3) by 7.25% for the total profit; and
 - (5) The total extended home office overhead will be the total of items (3) and (4).

11.7.2 Recoverable Subcontractor Costs. When the **Work** is performed by a **Subcontractor**, the **Contractor** may be paid the actual and necessary costs of such subcontracted **Work** as outlined above in Articles 11.7.1.1 through 11.7.1.8, and an additional overhead of 5% of the costs outlined in Articles 11.7.1.1 through 11.7.1.3.

11.7.3 Non-Recoverable Costs. The parties agree that the **City** will have no liability for the following items and the **Contractor** agrees it shall make no claim for the following items:

- 11.7.3.1 Profit, or loss of anticipated or unanticipated profit, except as provided in Article 11.7.1.9;
- 11.7.3.2 Consequential damages, including, but not limited to, construction or bridge loans or interest paid on such loans, loss of bonding capacity, bidding opportunities, or interest in investment, or any resulting insolvency;
- 11.7.3.3 Indirect costs or expenses of any nature except those included in Article 11.7.1;
- 11.7.3.4 Direct or indirect costs attributable to performance of **Work** where the **Contractor**, because of situations or conditions within its control, has not progressed the **Work** in a satisfactory manner; and
- 11.7.3.5 Attorneys' fees and dispute and claims preparation expenses.

- 11.8 Any claims for delay under this Article 11 are not subject to the jurisdiction of the Contract Dispute Resolution Board pursuant to the dispute resolution process set forth in Article 27.
- 11.9 Any compensation provided to the **Contractor** in accordance with this Article 11 will be made pursuant to a claim filed with the **Comptroller**. Nothing in this Article 11 extends the time for the **Contractor** to file an action with respect to a claim within six months after **Substantial Completion** pursuant to Article 56.

ARTICLE 12. COORDINATION WITH OTHER CONTRACTORS

12.1 During the progress of the **Work**, **Other Contractors** may be engaged in performing other work or may be awarded other contracts for additional work on this **Project**. In that event, the **Contractor** shall coordinate the **Work** to be done hereunder with the work of such **Other Contractors** and the **Contractor** shall fully cooperate with such **Other Contractors** and carefully fit its own **Work** to that provided under other contracts as may be directed by the **Engineer**. The **Contractor** shall not commit or permit any act which will interfere with the performance of work by any **Other Contractors**.

12.2 If the **Engineer** determines that the **Contractor** is failing to coordinate its **Work** with the work of **Other Contractors** as the **Engineer** has directed, then the **Commissioner** shall have the right to withhold any payments otherwise due hereunder until the **Contractor** completely complies with the **Engineer's** directions.

12.3 The **Contractor** shall notify the **Engineer** in writing if any **Other Contractor** on this **Project** is failing to coordinate its work with the **Work** of this **Contract**. If the **Engineer** finds such charges to be true, the **Engineer** shall promptly issue such directions to the **Other Contractor** with respect thereto as the situation may require. The **City** shall not, however, be liable for any damages suffered by any **Other Contractor's** failure to coordinate its work with the **Work** of this **Contract** or by reason of the **Other Contractor's** failure to promptly comply with the directions so issued by the **Engineer**, or by reason of any **Other Contractor's** default in performance, it being understood that the **City** does not guarantee the responsibility or continued efficiency of any contractor. The **Contractor** agrees to make no claim against the **City** for any damages relating to or arising out of any directions issued by the **Engineer** pursuant to this Article 12 (including but not limited to the failure of any **Other Contractor** to comply or promptly comply with such directions), or the failure of any **Other Contractor** to coordinate its work, or the default in performance of any **Other Contractor**.

12.4 The **Contractor** shall indemnify and hold the **City** harmless from any and all claims or judgments for damages and from costs and expenses to which the **City** may be subjected or which it may suffer or incur by reason of the **Contractor's** failure to comply with the **Engineer's** directions promptly; and the **Comptroller** shall have the right to exercise the powers reserved in Article 23 with respect to any claims which may be made for damages due to the **Contractor's** failure to comply with the **Engineer's** directions promptly. Insofar as the facts and **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent provided by **Law**.

12.5 Should the **Contractor** sustain any damage through any act or omission of any **Other Contractor** having a contract with the **City** for the performance of work upon the **Site** or of work which may be necessary to be performed for the proper prosecution of the **Work** to be performed hereunder, or through any act or omission of a subcontractor of such **Other Contractor**, the **Contractor** shall have no claim against the **City** for such damage, but shall have a right to recover such damage from the **Other**

Contractor under the provision similar to the following provisions which apply to this **Contract** and have been or will be inserted in the contracts with such **Other Contractors**:

12.5.1 Should any **Other Contractor** having or who shall hereafter have a contract with the **City** for the performance of work upon the **Site** sustain any damage through any act or omission of the **Contractor** hereunder or through any act or omission of any **Subcontractor** of the **Contractor**, the **Contractor** agrees to reimburse such **Other Contractor** for all such damages and to defend at its own expense any action based upon such claim and if any judgment or claim (even if the allegations of the action are without merit) against the **City** shall be allowed the **Contractor** shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and agrees to indemnify and hold the **City** harmless from all such claims. Insofar as the facts and **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent provided by **Law**.

12.6 The **City's** right to indemnification hereunder shall in no way be diminished, waived or discharged by its recourse to assessment of liquidated damages as provided in Article 15, or by the exercise of any other remedy provided for by **Contract** or by **Law**.

ARTICLE 13. EXTENSION OF TIME FOR PERFORMANCE

13.1 If performance by the **Contractor** is delayed for a reason set forth in Article 13.3, the **Contractor** may be allowed a reasonable extension of time in conformance with this Article 13 and the **PPB** Rules.

13.2 Any extension of time may be granted only by the **ACCO** or by the Board for the Extension of Time (hereafter "Board") (as set forth below) upon written application by the **Contractor**.

13.3 Grounds for Extension: If such application is made, the **Contractor** shall be entitled to an extension of time for delay in completion of the **Work** caused solely:

13.3.1 By the acts or omissions of the **City**, its officials, agents or employees; or

13.3.2 By the act or omissions of **Other Contractors** on this **Project**; or

13.3.3 By supervening conditions entirely beyond the control of either party hereto (such as, but not limited to, acts of God or the public enemy, excessive inclement weather, war or other national emergency making performance temporarily impossible or illegal, or strikes or labor disputes not brought about by any act or omission of the **Contractor**).

13.3.4 The **Contractor** shall, however, be entitled to an extension of time for such causes only for the number of **Days** of delay which the **ACCO** or the Board may determine to be due solely to such causes, and then only if the **Contractor** shall have strictly complied with all of the requirements of Articles 9 and 10.

13.4 The **Contractor** shall not be entitled to receive a separate extension of time for each of several causes of delay operating concurrently, but, if at all, only for the actual period of delay in completion of the **Work** as determined by the **ACCO** or the Board, irrespective of the number of causes contributing to produce such delay. If one of several causes of delay operating concurrently results from any act, fault or omission of the **Contractor** or of its **Subcontractors** or **Materialmen**, and would of itself (irrespective

of the concurrent causes) have delayed the **Work**, no extension of time will be allowed for the period of delay resulting from such act, fault or omission.

13.5 The determination made by the **ACCO** or the Board on an application for an extension of time shall be binding and conclusive on the **Contractor**.

13.6 The **ACCO** or the Board acting entirely within their discretion may grant an application for an extension of time for causes of delay other than those herein referred.

13.7 Permitting the **Contractor** to continue with the **Work** after the time fixed for its completion has expired, or after the time to which such completion may have been extended has expired, or the making of any payment to the **Contractor** after such time, shall in no way operate as a waiver on the part of the **City** of any of its rights under this **Contract**.

13.8 Application for Extension of Time:

13.8.1 Before the **Contractor's** time extension request will be considered, the **Contractor** shall notify the **ACCO** of the condition which allegedly has caused or is causing the delay, and shall submit a written application to the **ACCO** identifying:

13.8.1(a) The **Contractor**; the registration number; and **Project** description;

13.8.1(b) Liquidated damage assessment rate, as specified in the **Contract**;

13.8.1(c) Original total bid price;

13.8.1(d) The original **Contract** start date and completion date;

13.8.1(e) Any previous time extensions granted (number and duration); and

13.8.1(f) The extension of time requested.

13.8.2 In addition, the application for extension of time shall set forth in detail:

13.8.2(a) The nature of each alleged cause of delay in completing the **Work**;

13.8.2(b) The date upon which each such cause of delay began and ended and the number of **Days** attributable to each such cause;

13.8.2(c) A statement that the **Contractor** waives all claims except for those delineated in the application, and the particulars of any claims which the **Contractor** does not agree to waive. For time extensions for **Substantial Completion** and final completion payments, the application shall include a detailed statement of the dollar amounts of each element of claim item reserved; and

13.8.2(d) A statement indicating the **Contractor's** understanding that the time extension is granted only for purposes of permitting continuation of **Contract** performance and payment for **Work** performed and that the **City** retains its right to conduct an investigation and assess liquidated damages as appropriate in the future.

13.9 Analysis and Approval of Time Extensions:

13.9.1 For time extensions for partial payments, a written determination shall be made by the **ACCO** who may, for good and sufficient cause, extend the time for the performance of the **Contract** as follows:

13.9.1(a) If the **Work** is to be completed within six (6) months, the time for performance may be extended for sixty (60) **Days**;

13.9.1(b) If the **Work** is to be completed within less than one (1) year but more than six (6) months, an extension of ninety (90) **Days** may be granted;

13.9.1(c) If the **Contract** period exceeds one (1) year, besides the extension granted in Article 13.9.1(b), an additional thirty (30) **Days** may be granted for each multiple of six (6) months involved beyond the one (1) year period; or

13.9.1(d) If exceptional circumstances exist, the **ACCO** may extend the time for performance beyond the extensions in Articles 13.9.1(a), 13.9.1(b), and 13.9.1(c). In that event, the **ACCO** shall file with the Mayor's Office of Contract Services a written explanation of the exceptional circumstances.

13.9.2 For extensions of time for **Substantial Completion** and final completion payments, the **Engineer**, in consultation with the **ACCO**, shall prepare a written analysis of the delay (including a preliminary determination of the causes of delay, the beginning and end dates for each such cause of delay, and whether the delays are excusable under the terms of this **Contract**). The report shall be subject to review by and approval of the Board, which shall have authority to question its analysis and determinations and request additional facts or documentation. The report as reviewed and made final by the Board shall be made a part of the **Agency** contract file. Neither the report itself nor anything contained therein shall operate as a waiver or release of any claim the **City** may have against the **Contractor** for either actual or liquidated damages.

13.9.3 Approval Mechanism for Time Extensions for **Substantial Completion** or Final Completion Payments: An extension shall be granted only with the approval of the Board which is comprised of the **ACCO** of the **Agency**, the **City** Corporation Counsel, and the **Comptroller**, or their authorized representatives.

13.9.4 Neither the granting of any application for an extension of time to the **Contractor** or any **Other Contractor** on this **Project** nor the papers, records or reports related to any application for or grant of an extension of time or determination related thereto shall be referred to or offered in evidence by the **Contractor** or its attorneys in any action or proceeding.

13.10 No Damage for Delay: The **Contractor** agrees to make no claim for damages for delay in the performance of this **Contract** occasioned by any act or omission to act of the **City** or any of its representatives, except as provided for in Article 11.

ARTICLE 14. COMPLETION AND FINAL ACCEPTANCE OF THE WORK

14.1 Date for **Substantial Completion**: The **Contractor** shall substantially complete the **Work** within the time fixed in Schedule A of the General Conditions, or within the time to which such **Substantial Completion** may be extended.

14.2 Determining the Date of **Substantial Completion**: The **Work** will be deemed to be substantially complete when the two conditions set forth below have been met.

14.2.1 Inspection: The **Engineer** or **Resident Engineer**, as applicable, has inspected the **Work** and has made a written determination that it is substantially complete.

14.2.2 Approval of **Final Approved Punch List** and Date for **Final Acceptance**: Following inspection of the **Work**, the **Engineer/Resident Engineer** shall furnish the **Contractor** with a final punch list, specifying all items of **Work** to be completed and proposing dates for the completion of each specified item of **Work**. The **Contractor** shall then submit in writing to the **Engineer/Resident Engineer** within ten (10) **Days** of the **Engineer/Resident Engineer** furnishing the final punch list either acceptance of the dates or proposed alternative dates for the completion of each specified item of **Work**. If the **Contractor** neither accepts the dates nor proposes alternative dates within ten (10) **Days**, the schedule proposed by the **Engineer/Resident Engineer** shall be deemed accepted. If the **Contractor** proposes alternative dates, then, within a reasonable time after receipt, the **Engineer/Resident Engineer**, in a written notification to the **Contractor**, shall approve the **Contractor's** completion dates or, if they are unable to agree, the **Engineer/Resident Engineer** shall establish dates for the completion of each item of **Work**. The latest completion date specified shall be the date for **Final Acceptance** of the **Work**.

14.3 Date of **Substantial Completion**. The date of approval of the **Final Approved Punch List**, shall be the date of **Substantial Completion**. The date of approval of the **Final Approved Punch List** shall be either (a) if the **Contractor** approves the final punch list and proposed dates for completion furnished by the **Engineer/Resident Engineer**, the date of the **Contractor's** approval; or (b) if the **Contractor** neither accepts the dates nor proposes alternative dates, ten (10) **Days** after the **Engineer/Resident Engineer** furnishes the **Contractor** with a final punch list and proposed dates for completion; or (c) if the **Contractor** proposes alternative dates, the date that the **Engineer/Resident Engineer** sends written notification to the **Contractor** either approving the **Contractor's** proposed alternative dates or establishing dates for the completion for each item of **Work**.

14.4 Determining the Date of **Final Acceptance**: The **Work** will be accepted as final and complete as of the date of the **Engineer's/Resident Engineer's** inspection if, upon such inspection, the **Engineer/Resident Engineer** finds that all items on the **Final Approved Punch List** are complete and no further **Work** remains to be done. The **Commissioner** will then issue a written determination of **Final Acceptance**.

14.5 Request for Inspection: Inspection of the **Work** by the **Engineer/Resident Engineer** for the purpose of **Substantial Completion** or **Final Acceptance** shall be made within fourteen (14) **Days** after receipt of the **Contractor's** written request therefor.

14.6 Request for Re-inspection: If upon inspection for the purpose of **Substantial Completion** or **Final Acceptance**, the **Engineer/Resident Engineer** determines that there are items of **Work** still to be performed, the **Contractor** shall promptly perform them and then request a re-inspection. If upon re-inspection, the **Engineer/Resident Engineer** determines that the **Work** is substantially complete or finally accepted, the date of such re-inspection shall be the date of **Substantial Completion** or **Final Acceptance**. Re-inspection by the **Engineer/Resident Engineer** shall be made within ten (10) **Days** after receipt of the **Contractor's** written request therefor.

14.7 Initiation of Inspection by the **Engineer/Resident Engineer**: If the **Contractor** does not request inspection or re-inspection of the **Work** for the purpose of **Substantial Completion** or **Final Acceptance**, the **Engineer/Resident Engineer** may initiate such inspection or re-inspection.

ARTICLE 15. LIQUIDATED DAMAGES

15.1 In the event the **Contractor** fails to substantially complete the **Work** within the time fixed for such **Substantial Completion** in Schedule A of the General Conditions, plus authorized time extensions, or if the **Contractor**, in the sole determination of the **Commissioner**, has abandoned the **Work**, the **Contractor** shall pay to the **City** the sum fixed in Schedule A of the General Conditions, for each and every **Day** that the time consumed in substantially completing the **Work** exceeds the time allowed therefor; which said sum, in view of the difficulty of accurately ascertaining the loss which the **City** will suffer by reason of delay in the **Substantial Completion** of the **Work** hereunder, is hereby fixed and agreed as the liquidated damages that the **City** will suffer by reason of such delay, and not as a penalty. This Article 15 shall also apply to the **Contractor** whether or not the **Contractor** is defaulted pursuant to Chapter X of this **Contract**. Neither the failure to assess liquidated damages nor the granting of any time extension shall operate as a waiver or release of any claim the **City** may have against the **Contractor** for either actual or liquidated damages.

15.2 Liquidated damages received hereunder are not intended to be nor shall they be treated as either a partial or full waiver or discharge of the **City's** right to indemnification, or the **Contractor's** obligation to indemnify the **City**, or to any other remedy provided for in this **Contract** or by **Law**.

15.3 The **Commissioner** may deduct and retain out of the monies which may become due hereunder, the amount of any such liquidated damages; and in case the amount which may become due hereunder shall be less than the amount of liquidated damages suffered by the **City**, the **Contractor** shall be liable to pay the difference.

ARTICLE 16. OCCUPATION OR USE PRIOR TO COMPLETION

16.1 Unless otherwise provided for in the **Specifications**, the **Commissioner** may take over, use, occupy or operate any part of the **Work** at any time prior to **Final Acceptance**, upon written notification to the **Contractor**. The **Engineer** or **Resident Engineer**, as applicable, shall inspect the part of the **Work** to be taken over, used, occupied, or operated, and will furnish the **Contractor** with a written statement of the **Work**, if any, which remains to be performed on such part. The **Contractor** shall not object to, nor interfere with, the **Commissioner's** decision to exercise the rights granted by Article 16. In the event the **Commissioner** takes over, uses, occupies, or operates any part of the **Work**:

16.1.1 the **Engineer/Resident Engineer** shall issue a written determination of **Substantial Completion** with respect to such part of the **Work**;

16.1.2 the **Contractor** shall be relieved of its absolute obligation to protect such part of the unfinished **Work** in accordance with Article 7;

16.1.3 the **Contractor's** guarantee on such part of the **Work** shall begin on the date of such use by the **City**; and;

16.1.4 the **Contractor** shall be entitled to a return of so much of the amount retained in accordance with Article 21 as it relates to such part of the **Work**, except so much thereof as may be retained under Articles 24 and 44.

CHAPTER IV: SUBCONTRACTS AND ASSIGNMENTS

ARTICLE 17. SUBCONTRACTS

17.1 The **Contractor** shall not make subcontracts totaling an amount more than the percentage of the total **Contract** price fixed in Schedule A of the General Conditions, without prior written permission from the **Commissioner**. All subcontracts made by the **Contractor** shall be in writing. No **Work** may be performed by a **Subcontractor** prior to the **Contractor** entering into a written subcontract with the **Subcontractor** and complying with the provisions of this Article 17.

17.2 Before making any subcontracts, the **Contractor** shall submit a written statement to the **Commissioner** giving the name and address of the proposed **Subcontractor**; the portion of the **Work** and materials which it is to perform and furnish; the cost of the subcontract; the VENDEX questionnaire if required; the proposed subcontract if requested by the **Commissioner**; and any other information tending to prove that the proposed **Subcontractor** has the necessary facilities, skill, integrity, past experience, and financial resources to perform the **Work** in accordance with the terms and conditions of this **Contract**.

17.3 In addition to the requirements in Article 17.2, **Contractor** is required to list the **Subcontractor** in the web based Subcontractor Reporting System through the City's Payee Information Portal (PIP), available at www.nyc.gov/pip.¹ For each **Subcontractor** listed, **Contractor** is required to provide the following information: maximum contract value, description of **Subcontractor's** Work, start and end date of the subcontract and identification of the **Subcontractor's** industry. Thereafter, **Contractor** will be required to report in the system the payments made to each **Subcontractor** within 30 days of making the payment. If any of the required information changes throughout the Term of the **Contract**, **Contractor** will be required to revise the information in the system.

Failure of the **Contractor** to list a **Subcontractor** and/or to report **Subcontractor** payments in a timely fashion may result in the **Commissioner** declaring the **Contractor** in default of the **Contract** and will subject **Contractor** to liquidated damages in the amount of \$100 per day for each day that the **Contractor** fails to identify a **Subcontractor** along with the required information about the **Subcontractor** and/or fails to report payments to a **Subcontractor**, beyond the time frames set forth herein or in the notice from the **City**. Article 15 shall govern the issue of liquidated damages.

17.4 If an approved **Subcontractor** elects to subcontract any portion of its subcontract, the proposed sub-subcontract shall be submitted in the same manner as directed above.

17.5 The **Commissioner** will notify the **Contractor** in writing whether the proposed **Subcontractor** is approved. If the proposed **Subcontractor** is not approved, the **Contractor** may submit another proposed **Subcontractor** unless the **Contractor** decides to do the **Work**. No **Subcontractor** shall be permitted to enter or perform any work on the **Site** unless approved.

17.6 Before entering into any subcontract hereunder, the **Contractor** shall provide the proposed **Subcontractor** with a complete copy of this document and inform the proposed **Subcontractor** fully and completely of all provisions and requirements of this **Contract** relating either directly or indirectly to the **Work** to be performed and the materials to be furnished under such subcontract, and every such

¹ In order to use the new system, a PIP account will be required. Detailed instructions on creating a PIP account and using the new system are also available at www.nyc.gov/pip. Additional assistance with PIP may be obtained by emailing the Financial Information Services Agency Help Desk at pip@fisa.nyc.gov.

Subcontractor shall expressly stipulate that all labor performed and materials furnished by the **Subcontractor** shall strictly comply with the requirements of this **Contract**.

17.7 Documents given to a prospective **Subcontractor** for the purpose of soliciting the **Subcontractor's** bid shall include either a copy of the bid cover or a separate information sheet setting forth the **Project** name, the **Contract** number (if available), the **Agency** (as noted in Article 2.1.6), and the **Project's** location.

17.8 The **Commissioner's** approval of a **Subcontractor** shall not relieve the **Contractor** of any of its responsibilities, duties, and liabilities hereunder. The **Contractor** shall be solely responsible to the **City** for the acts or defaults of its **Subcontractor** and of such **Subcontractor's** officers, agents, and employees, each of whom shall, for this purpose, be deemed to be the agent or employee of the **Contractor** to the extent of its subcontract.

17.9 If the **Subcontractor** fails to maintain the necessary facilities, skill, integrity, past experience, and financial resources (other than due to the **Contractor's** failure to make payments where required) to perform the **Work** in accordance with the terms and conditions of this **Contract**, the **Contractor** shall promptly notify the **Commissioner** and replace such **Subcontractor** with a newly approved **Subcontractor** in accordance with this Article 17.

17.10 The **Contractor** shall be responsible for ensuring that all **Subcontractors** performing **Work** at the **Site** maintain all insurance required by **Law**.

17.11 The **Contractor** shall promptly, upon request, file with the **Engineer** a conformed copy of the subcontract and its cost. The subcontract shall provide the following:

17.11.1 Payment to **Subcontractors**: The agreement between the **Contractor** and its **Subcontractor** shall contain the same terms and conditions as to method of payment for **Work**, labor, and materials, and as to retained percentages, as are contained in this **Contract**.

17.11.2 Prevailing Rate of Wages: The agreement between the **Contractor** and its **Subcontractor** shall include the prevailing wage rates and supplemental benefits to be paid in accordance with Labor Law Section 220.

17.11.3 Section 6-123 of the Administrative Code: Pursuant to the requirements of Section 6-123 of the Administrative Code, every agreement between the **Contractor** and a **Subcontractor** in excess of fifty thousand (\$50,000) dollars shall include a provision that the **Subcontractor** shall not engage in any unlawful discriminatory practice as defined in Title VIII of the Administrative Code (Section 8-101 *et seq.*).

17.11.4 All requirements required pursuant to federal and/or state grant agreement(s), if applicable to the **Work**.

17.12 The **Commissioner** may deduct from the amounts certified under this **Contract** to be due to the **Contractor**, the sum or sums due and owing from the **Contractor** to the **Subcontractors** according to the terms of the said subcontracts, and in case of dispute between the **Contractor** and its **Subcontractor**, or **Subcontractors**, as to the amount due and owing, the **Commissioner** may deduct and withhold from the amounts certified under this **Contract** to be due to the **Contractor** such sum or sums as may be claimed by such **Subcontractor**, or **Subcontractors**, in a sworn affidavit, to be due and owing until such time as such claim or claims shall have been finally resolved.

17.13 On contracts where performance bonds and payment bonds are executed, the **Contractor** shall include on each requisition for payment the following data: **Subcontractor's** name, value of the subcontract, total amount previously paid to **Subcontractor** for **Work** previously requisitioned, and the amount, including retainage, to be paid to the **Subcontractor** for **Work** included in the requisition.

17.14 On **Contracts** where performance bonds and payment bonds are not executed, the **Contractor** shall include with each requisition for payment submitted hereunder, a signed statement from each and every **Subcontractor** and/or **Materialman** for whom payment is requested in such requisition. Such signed statement shall be on the letterhead of the **Subcontractor** and/or **Materialman** for whom payment is requested and shall (i) verify that such **Subcontractor** and/or **Materialman** has been paid in full for all **Work** performed and/or material supplied to date, exclusive of any amount retained and any amount included on the current requisition, and (ii) state the total amount of retainage to date, exclusive of any amount retained on the current requisition.

ARTICLE 18. ASSIGNMENTS

18.1 The **Contractor** shall not assign, transfer, convey or otherwise dispose of this **Contract**, or the right to execute it, or the right, title or interest in or to it or any part thereof, or assign, by power of attorney or otherwise any of the monies due or to become due under this **Contract**, unless the previous written consent of the **Commissioner** shall first be obtained thereto, and the giving of any such consent to a particular assignment shall not dispense with the necessity of such consent to any further or other assignments.

18.2 Such assignment, transfer, conveyance or other disposition of this **Contract** shall not be valid until filed in the office of the **Commissioner** and the **Comptroller**, with the written consent of the **Commissioner** endorsed thereon or attached thereto.

18.3 Failure to obtain the previous written consent of the **Commissioner** to such an assignment, transfer, conveyance or other disposition, may result in the revocation and annulment of this **Contract**. The **City** shall thereupon be relieved and discharged from any further liability to the **Contractor**, its assignees, transferees or sublessees, who shall forfeit and lose all monies therefor earned under the **Contract**, except so much as may be required to pay the **Contractor's** employees.

18.4 The provisions of this clause shall not hinder, prevent, or affect an assignment by the **Contractor** for the benefit of its creditors made pursuant to the **Laws** of the State of New York.

18.5 This **Contract** may be assigned by the **City** to any corporation, agency or instrumentality having authority to accept such assignment.

CHAPTER V: CONTRACTOR'S SECURITY AND GUARANTEE

ARTICLE 19. SECURITY DEPOSIT

19.1 If performance and payment bonds are required, the **City** shall retain the bid security to ensure that the successful bidder executes the **Contract** and furnishes the required payment and performance security within ten (10) **Days** after notice of the award of the **Contract**. If the successful bidder fails to execute the **Contract** and furnish the required payment and performance security, the **City** shall retain such bid security as set forth in the Information for Bidders. If the successful bidder executes the

Contract and furnishes the required payment and performance security, the **City** shall return the bid security within a reasonable time after the furnishing of such bonds and execution of the **Contract** by the **City**.

19.2 If performance and payment bonds are not required, the bid security shall be retained by the **City** as security for the **Contractor's** faithful performance of the **Contract**. If partial payments are provided, the bid security will be returned to the **Contractor** after the sum retained under Article 21 equals the amount of the bid security, subject to other provisions of this **Contract**. If partial payments are not provided, the bid security will be released when final payment is certified by the **City** for payment.

19.3 If the **Contractor** is declared in default under Article 48 prior to the return of the deposit, or if any claim is made such as referred to in Article 23, the amount of such deposit, or so much thereof as the **Comptroller** may deem necessary, may be retained and then applied by the **Comptroller**:

19.3.1 To compensate the **City** for any expense, loss or damage suffered or incurred by reason of or resulting from such default, including the cost of re-letting and liquidated damages; or

19.3.2 To indemnify the **City** against any and all claims.

ARTICLE 20. PAYMENT GUARANTEE

20.1 On **Contracts** where one hundred (100%) percent performance bonds and payment bonds are executed, this Article 20 does not apply.

20.2 In the event the terms of this **Contract** do not require the **Contractor** to provide a payment bond or where the **Contract** does not require a payment bond for one hundred (100%) percent of the **Contract** price, the **City** shall, in accordance with the terms of this Article 20, guarantee payment of all lawful claims for:

20.2.1 Wages and compensation for labor performed and/or services rendered; and

20.2.2 Materials, equipment, and supplies provided, whether incorporated into the **Work** or not, when demands have been filed with the **City** as provided hereinafter by any person, firm, or corporation which furnished labor, material, equipment, supplies, or any combination thereof, in connection with the **Work** performed hereunder (hereinafter referred to as the "beneficiary") at the direction of the **City** or the **Contractor**.

20.3 The provisions of Article 20.2 are subject to the following limitations and conditions:

20.3.1 If the **Contractor** provides a payment bond for a value that is less than one hundred (100%) percent of the value of the **Contract Work**, the payment bond provided by the **Contractor** shall be primary (and non-contributing) to the payment guarantee provided under this Article 20.

20.3.2 The guarantee is made for the benefit of all beneficiaries as defined in Article 20.2 provided that those beneficiaries strictly adhere to the terms and conditions of Article 20.3.4 and 20.3.5.

20.3.3 Nothing in this Article 20 shall prevent a beneficiary providing labor, services or material for the **Work** from suing the **Contractor** for any amounts due and owing the beneficiary by the **Contractor**.

20.3.4 Every person who has furnished labor or material, to the **Contractor** or to a **Subcontractor** of the **Contractor**, in the prosecution of the **Work** and who has not been paid in full therefor before the expiration of a period of ninety (90) **Days** after the date on which the last of the labor was performed or material was furnished by him/her for which the claim is made, shall have the right to sue on this payment guarantee in his/her own name for the amount, or the balance thereof, unpaid at the time of commencement of the action; provided, however, that a person having a direct contractual relationship with a **Subcontractor** of the **Contractor** but no contractual relationship express or implied with the **Contractor** shall not have a right of action upon the guarantee unless he/she shall have given written notice to the **Contractor** within one hundred twenty (120) **Days** from the date on which the last of the labor was performed or the last of the material was furnished, for which his/her claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the material was furnished or for whom the labor was performed. The notice shall be served by delivering the same personally to the **Contractor** or by mailing the same by registered mail, postage prepaid, in an envelope addressed to the **Contractor** at any place where it maintains an office or conducts its business; provided, however, that where such notice is actually received by the **Contractor** by other means, such notice shall be deemed sufficient.

20.3.5 Except as provided in Labor Law Section 220-g, no action on this payment guarantee shall be commenced after the expiration of the one-year limitations period set forth in Section 137(4)(b) of the State Finance Law.

20.3.6 The **Contractor** shall promptly forward to the **City** any notice or demand received pursuant to Article 20.3.4. The **Contractor** shall inform the **City** of any defenses to the notice or demand and shall forward to the **City** any documents the **City** requests concerning the notice or demand.

20.3.7 All demands made against the **City** by a beneficiary of this payment guarantee shall be presented to the **Engineer** along with all written documentation concerning the demand which the **Engineer** deems reasonably appropriate or necessary, which may include, but shall not be limited to: the subcontract; any invoices presented to the **Contractor** for payment; the notarized statement of the beneficiary that the demand is due and payable, that a request for payment has been made of the **Contractor** and that the demand has not been paid by the **Contractor** within the time allowed for such payment by the subcontract; and copies of any correspondence between the beneficiary and the **Contractor** concerning such demand. The **City** shall notify the **Contractor** that a demand has been made. The **Contractor** shall inform the **City** of any defenses to the demand and shall forward to the **City** any documents the **City** requests concerning the demand.

20.3.8 The **City** shall make payment only if, after considering all defenses presented by the **Contractor**, it determines that the payment is due and owing to the beneficiary making the demand.

20.3.9 No beneficiary shall be entitled to interest from the **City**, or to any other costs, including, but not limited to, attorneys' fees, except to the extent required by State Finance Law Section 137.

20.4 Upon the receipt by the **City** of a demand pursuant to this Article 20, the **City** may withhold from any payment otherwise due and owing to the **Contractor** under this **Contract** an amount sufficient to satisfy the demand.

20.4.1 In the event the **City** determines that the demand is valid, the **City** shall notify the **Contractor** of such determination and the amount thereof and direct the **Contractor** to immediately pay such amount to the beneficiary. In the event the **Contractor**, within seven (7) **Days** of receipt of such notification from the **City**, fails to pay the beneficiary, such failure shall constitute an automatic and irrevocable assignment of payment by the **Contractor** to the beneficiary for the amount of the demand determined by the **City** to be valid. The **Contractor**, without further notification or other process, hereby gives its unconditional consent to such assignment of payment to the beneficiary and authorizes the **City**, on its behalf, to take all necessary actions to implement such assignment of payment, including without limitation the execution of any instrument or documentation necessary to effectuate such assignment.

20.4.2 In the event that the amount otherwise due and owing to the **Contractor** by the **City** is insufficient to satisfy such demand, the **City** may, at its option, require payment from the **Contractor** of an amount sufficient to cover such demand and exercise any other right to require or recover payment which the **City** may have under **Law** or **Contract**.

20.4.3 In the event the **City** determines that the demand is invalid, any amount withheld pending the **City's** review of such demand shall be paid to the **Contractor**; provided, however, no lien has been filed. In the event a claim or an action has been filed, the terms and conditions set forth in Article 23 shall apply. In the event a lien has been filed, the parties will be governed by the provisions of the Lien Law of the State of New York.

20.5 The provisions of this Article 20 shall not prevent the **City** and the **Contractor** from resolving disputes in accordance with the **PPB** Rules, where applicable.

20.6 In the event the **City** determines that the beneficiary is entitled to payment pursuant to this Article 20, such determination and any defenses and counterclaims raised by the **Contractor** shall be taken into account in evaluating the **Contractor's** performance.

20.7 Nothing in this Article 20 shall relieve the **Contractor** of the obligation to pay the claims of all persons with valid and lawful claims against the **Contractor** relating to the **Work**.

20.8 The **Contractor** shall not require any performance, payment or other bonds of any **Subcontractor** if this **Contract** does not require such bonds of the **Contractor**.

20.9 The payment guarantee made pursuant to this Article 20 shall be construed in a manner consistent with Section 137 of the State Finance Law and shall afford to persons furnishing labor or materials to the **Contractor** or its **Subcontractors** in the prosecution of the **Work** under this **Contract** all of the rights and remedies afforded to such persons by such section, including but not limited to, the right to commence an action against the **City** on the payment guarantee provided by this Article 20 within the one-year limitations period set forth in Section 137(4)(b).

ARTICLE 21. RETAINED PERCENTAGE

21.1 If this **Contract** requires one hundred (100%) percent performance and payment security, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and

retain until the substantial completion of the **Work**, five (5%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.2 If this **Contract** does not require one hundred (100%) percent performance and payment security and if the price for which this **Contract** was awarded does not exceed one million (\$1,000,000) dollars, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, five (5%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.3 If this **Contract** does not require one hundred (100%) percent performance and payment security and if the price for which this **Contract** was awarded exceeds one million (\$1,000,000) dollars, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, up to ten (10%) percent of the value of **Work** certified for payment in each partial payment voucher. The percentage to be retained is set forth in Schedule A of the General Conditions.

ARTICLE 22. INSURANCE

22.1 Types of Insurance: The **Contractor** shall procure and maintain the following types of insurance if, and as indicated, in Schedule A of the General Conditions (with the minimum limits and special conditions specified in Schedule A). Such insurance shall be maintained from the date the **Contractor** is required to provide Proof of Insurance pursuant to Article 22.3.1 through the date of completion of all required **Work** (including punch list work as certified in writing by the **Resident Engineer**), except for insurance required pursuant to Article 22.1.4, which may terminate upon **Substantial Completion** of the **Contract**. All insurance shall meet the requirements set forth in this Article 22. Wherever this Article requires that insurance coverage be “at least as broad” as a specified form (including all ISO forms), there is no obligation that the form itself be used, provided that the **Contractor** can demonstrate that the alternative form or endorsement contained in its policy provides coverage at least as broad as the specified form.

22.1.1 Commercial General Liability Insurance: The **Contractor** shall provide Commercial General Liability Insurance covering claims for property damage and/or bodily injury, including death, which may arise from any of the operations under this **Contract**. Coverage under this insurance shall be at least as broad as that provided by the latest edition of Insurance Services Office (“ISO”) Form CG 0001. Such insurance shall be “occurrence” based rather than “claims-made” and include, without limitation, the following types of coverage: premises operations; products and completed operations; contractual liability (including the tort liability of another assumed in a contract); broad form property damage; independent contractors; explosion, collapse and underground (XCU); construction means and methods; and incidental malpractice. Such insurance shall contain a “per project” aggregate limit, as specified in Schedule A, that applies separately to operations under this **Contract**.

22.1.1(a) Such Commercial General Liability Insurance shall name the **City** as an Additional Insured. Coverage for the City shall specifically include the **City’s** officials and employees, be at least as broad as the latest edition of ISO Form CG 20 10 and provide completed operations coverage at least as broad as the latest edition of ISO Form CG 20 37.

22.1.1(b) Such Commercial General Liability Insurance shall name all other entities designated as additional insureds in Schedule A but only for claims arising from the

Contractor's operations under this **Contract**, with coverage at least as broad as the latest edition of ISO Form CG 20 26.

22.1.1(c) If the **Work** requires a permit from the Department of Buildings pursuant to 1 RCNY Section 101-08, the **Contractor** shall provide Commercial General Liability Insurance with limits of at least those required by 1 RCNY section 101-08 or greater limits required by the Agency in accordance with Schedule A. If the **Work** does not require such a permit, the minimum limits shall be those provided for in Schedule A.

22.1.1(d) If any of the **Work** includes repair of a waterborne vessel owned by or to be delivered to the **City**, such Commercial General Liability shall include, or be endorsed to include, Ship Repairer's Legal Liability Coverage to protect against, without limitation, liability arising from navigation of such vessels prior to delivery to and acceptance by the **City**.

22.1.2 Workers' Compensation Insurance, Employers' Liability Insurance, and Disability Benefits Insurance: The **Contractor** shall provide, and shall cause its **Subcontractors** to provide, Workers Compensation Insurance, Employers' Liability Insurance, and Disability Benefits Insurance in accordance with the **Laws** of the State of New York on behalf of all employees providing services under this **Contract** (except for those employees, if any, for which the **Laws** require insurance only pursuant to Article 22.1.3).

22.1.3 United States Longshoremen's and Harbor Workers Act and/or Jones Act Insurance: If specified in Schedule A of the General Conditions or if required by **Law**, the **Contractor** shall provide insurance in accordance with the United States Longshoremen's and Harbor Workers Act and/or the Jones Act, on behalf of all qualifying employees providing services under this **Contract**.

22.1.4 Builders Risk Insurance: If specified in Schedule A of the General Conditions, the **Contractor** shall provide Builders Risk Insurance on a completed value form for the total value of the **Work** through **Substantial Completion** of the **Work** in its entirety. Such insurance shall be provided on an All Risk basis and include coverage, without limitation, for windstorm (including named windstorm), storm surge, flood and earth movement. Unless waived by the **Commissioner**, it shall include coverage for ordinance and law, demolition and increased costs of construction, debris removal, pollutant clean up and removal, and expediting costs. Such insurance shall cover, without limitation, (a) all buildings and/or structures involved in the **Work**, as well as temporary structures at the **Site**, and (b) any property that is intended to become a permanent part of such building or structure, whether such property is on the **Site**, in transit or in temporary storage. Policies shall name the **Contractor** as Named Insured and list the **City** as both an Additional Insured and a Loss Payee as its interest may appear.

22.1.4(a) Policies of such insurance shall specify that, in the event a loss occurs at an occupied facility, occupancy of such facility is permitted without the consent of the issuing insurance company.

22.1.4(b) Such insurance may be provided through an Installation Floater, at the **Contractor's** option, if it otherwise conforms with the requirements of this Article 22.1.4.

22.1.5 Commercial Automobile Liability Insurance: The **Contractor** shall provide Commercial Automobile Liability Insurance for liability arising out of ownership,

maintenance or use of any owned (if any), non-owned and hired vehicles to be used in connection with this **Contract**. Coverage shall be at least as broad as the latest edition of ISO Form CA0001. If vehicles are used for transporting hazardous materials, the Automobile Liability Insurance shall be endorsed to provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90.

22.1.6 Contractors Pollution Liability Insurance: If specified in Schedule A of the General Conditions, the **Contractor** shall maintain, or cause the **Subcontractor** doing such **Work** to maintain, Contractors Pollution Liability Insurance covering bodily injury and property damage. Such insurance shall provide coverage for actual, alleged or threatened emission, discharge, dispersal, seepage, release or escape of pollutants (including asbestos), including any loss, cost or expense incurred as a result of any cleanup of pollutants (including asbestos) or in the investigation, settlement or defense of any claim, action, or proceedings arising from the operations under this **Contract**. Such insurance shall be in the **Contractor's** name and list the **City** as an Additional Insured and any other entity specified in Schedule A. Coverage shall include, without limitation, (a) loss of use of damaged property or of property that has not been physically injured, (b) transportation, and (c) non-owned disposal sites.

22.1.6(a) Coverage for the **City** as Additional Insured shall specifically include the **City's** officials and employees and be at least as broad as provided to the **Contractor** for this **Project**.

22.1.6(b) If such insurance is written on a claims-made policy, such policy shall have a retroactive date on or before the effective date of this **Contract**, and continuous coverage shall be maintained, or an extended discovery period exercised, for a period of not less than three (3) years from the time the **Work** under this **Contract** is completed.

22.1.7 Marine Insurance:

22.1.7(a) Marine Protection and Indemnity Insurance: If specified in Schedule A of the General Conditions or if the **Contractor** engages in marine operations in the execution of any part of the **Work**, the **Contractor** shall maintain, or cause the **Subcontractor** doing such **Work** to maintain, Marine Protection and Indemnity Insurance with coverage at least as broad as Form SP-23. The insurance shall provide coverage for the **Contractor** or **Subcontractor** (whichever is doing this **Work**) and for the **City** (together with its officials and employees) and any other entity specified in Schedule A as an Additional Insured for bodily injury and property damage arising from marine operations under this **Contract**. Coverage shall include, without limitation, injury or death of crew members (if not fully provided through other insurance), removal of wreck, damage to piers, wharves and other fixed or floating objects and loss of or damage to any other vessel or craft, or to property on such other vessel or craft.

22.1.7(b) Hull and Machinery Insurance: If specified in Schedule A of the General Conditions or if the **Contractor** engages in marine operations in the execution of any part of the **Work**, the **Contractor** shall maintain, or cause the **Subcontractor** doing such **Work** to maintain, Hull and Machinery Insurance with coverage for the **Contractor** or **Subcontractor** (whichever is doing this **Work**) and for the **City** (together with its officials and employees) as Additional Insured at least as broad as the latest edition of American Institute Tug Form for all tugs used under this

Contract and Collision Liability at least as broad as the latest edition of American Institute Hull Clauses.

22.1.7(c) Marine Pollution Liability Insurance: If specified in Schedule A of the General Conditions or if the **Contractor** engages in marine operations in the execution of any part of the **Work**, the **Contractor** shall maintain, or cause the **Subcontractor** doing such Work to maintain, Marine Pollution Liability Insurance covering itself (or the Subcontractor doing such Work) as Named Insured and the **City** (together with its officials and employees) and any other entity specified in Schedule A as an Additional Insured. Coverage shall be at least as broad as that provided by the latest edition of Water Quality Insurance Syndicate Form and include, without limitation, liability arising from the discharge or substantial threat of a discharge of oil, or from the release or threatened release of a hazardous substance including injury to, or economic losses resulting from, the destruction of or damage to real property, personal property or natural resources.

22.1.8 The **Contractor** shall provide such other types of insurance, at such minimum limits and with such conditions, as are specified in Schedule A of the General Conditions.

22.2 General Requirements for Insurance Coverage and Policies:

22.2.1 All required insurance policies shall be maintained with companies that may lawfully issue the required policy and have an A.M. Best rating of at least A-/VII or a Standard and Poor's rating of at least A, unless prior written approval is obtained from the **City** Corporation Counsel.

22.2.2 The **Contractor** shall be solely responsible for the payment of all premiums for all required policies and all deductibles and self-insured retentions to which such policies are subject, whether or not the **City** is an insured under the policy.

22.2.3 In his/her sole discretion, the **Commissioner** may, subject to the approval of the **Comptroller** and the **City** Corporation Counsel, accept Letters of Credit and/or custodial accounts in lieu of required insurance.

22.2.4 The **City's** limits of coverage for all types of insurance required pursuant to Schedule A of the General Conditions shall be the greater of (i) the minimum limits set forth in Schedule A or (ii) the limits provided to the **Contractor** as Named Insured under all primary, excess, and umbrella policies of that type of coverage.

22.2.5 The **Contractor** may satisfy its insurance obligations under this Article 22 through primary policies or a combination of primary and excess/umbrella policies, so long as all policies provide the scope of coverage required herein.

22.2.6 Policies of insurance provided pursuant to this Article 22 shall be primary and non-contributing to any insurance or self-insurance maintained by the **City**.

22.3 Proof of Insurance:

22.3.1 For all types of insurance required by Article 22.1 and Schedule A, except for insurance required by Articles 22.1.4 and 22.1.7, the **Contractor** shall file proof of insurance in accordance with this Article 22.3 within ten (10) **Days** of award. For insurance

provided pursuant to Articles 22.1.4 and 22.1.7, proof shall be filed by a date specified by the **Commissioner** or ten (10) **Days** prior to the commencement of the portion of the **Work** covered by such policy, whichever is earlier.

22.3.2 For Workers' Compensation Insurance provided pursuant to Article 22.1.2, the **Contractor** shall submit one of the following forms: C-105.2 Certificate of Workers' Compensation Insurance; U-26.3 - State Insurance Fund Certificate of Workers' Compensation Insurance; Request for WC/DB Exemption (Form CE-200); equivalent or successor forms used by the New York State Workers' Compensation Board; or other proof of insurance in a form acceptable to the **Commissioner**. For Disability Benefits Insurance provided pursuant to Article 22.1.2, the Contractor shall submit DB-120.1 - Certificate Of Insurance Coverage Under The NYS Disability Benefits Law, Request for WC/DB Exemption (Form CE-200); equivalent or successor forms used by the New York State Workers' Compensation Board; or other proof of insurance in a form acceptable to the **Commissioner**. ACORD forms are not acceptable.

22.3.3 For policies provided pursuant to all of Article 22.1 other than Article 22.1.2, the **Contractor** shall submit one or more Certificates of Insurance on forms acceptable to the **Commissioner**. All such Certificates of Insurance shall certify (a) the issuance and effectiveness of such policies of insurance, each with the specified minimum limits (b) for insurance secured pursuant to Article 22.1.1 that the **City** and any other entity specified in Schedule A is an Additional Insured thereunder; (c) in the event insurance is required pursuant to Article 22.1.6 and/or Article 22.1.7, that the City is an Additional Insured thereunder; (d) the company code issued to the insurance company by the National Association of Insurance Commissioners (the NAIC number); and (e) the number assigned to the **Contract** by the **City**. All such Certificates of Insurance shall be accompanied by either a duly executed "Certification by Insurance Broker or Agent" in the form contained in Part III of Schedule A or copies of all policies referenced in such Certificate of Insurance as certified by an authorized representative of the issuing insurance carrier. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

22.3.4 Documentation confirming renewals of insurance shall be submitted to the **Commissioner** prior to the expiration date of coverage of policies required under this **Contract**. Such proofs of insurance shall comply with the requirements of Articles 22.3.2 and 22.3.3.

22.3.5 The **Contractor** shall be obligated to provide the **City** with a copy of any policy of insurance provided pursuant to this Article 22 upon the demand for such policy by the **Commissioner** or the **City** Corporation Counsel.

22.4 Operations of the **Contractor**:

22.4.1 The **Contractor** shall not commence the **Work** unless and until all required certificates have been submitted to and accepted by the **Commissioner**. Acceptance by the **Commissioner** of a certificate does not excuse the **Contractor** from securing insurance consistent with all provisions of this Article 22 or of any liability arising from its failure to do so.

22.4.2 The **Contractor** shall be responsible for providing continuous insurance coverage in the manner, form, and limits required by this **Contract** and shall be authorized to perform **Work** only during the effective period of all required coverage.

22.4.3 In the event that any of the required insurance policies lapse, are revoked, suspended or otherwise terminated, for whatever cause, the **Contractor** shall immediately stop all **Work**, and shall not recommence **Work** until authorized in writing to do so by the **Commissioner**. Upon quitting the **Site**, except as otherwise directed by the **Commissioner**, the **Contractor** shall leave all plant, materials, equipment, tools, and supplies on the **Site**. **Contract** time shall continue to run during such periods and no extensions of time will be granted. The **Commissioner** may also declare the **Contractor** in default for failure to maintain required insurance.

22.4.4 In the event the **Contractor** receives notice, from an insurance company or other person, that any insurance policy required under this Article 22 shall be cancelled or terminated (or has been cancelled or terminated) for any reason, the **Contractor** shall immediately forward a copy of such notice to both the **Commissioner** and the New York City Comptroller, attn: Office of Contract Administration, Municipal Building, One Centre Street, room 1005, New York, New York 10007. Notwithstanding the foregoing, the **Contractor** shall ensure that there is no interruption in any of the insurance coverage required under this Article 22.

22.4.5 Where notice of loss, damage, occurrence, accident, claim or suit is required under an insurance policy maintained in accordance with this Article 22, the **Contractor** shall notify in writing all insurance carriers that issued potentially responsive policies of any such event relating to any operations under this **Contract** (including notice to Commercial General Liability insurance carriers for events relating to the **Contractor**'s own employees) no later than 20 days after such event. For any policy where the **City** is an Additional Insured, such notice shall expressly specify that "this notice is being given on behalf of the City of New York as Insured as well as the Named Insured." Such notice shall also contain the following information: the number of the insurance policy, the name of the named insured, the date and location of the damage, occurrence, or accident, and the identity of the persons or things injured, damaged or lost. The **Contractor** shall simultaneously send a copy of such notice to the City of New York c/o Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, New York 10007.

22.4.6 In the event of any loss, accident, claim, action, or other event that does or can give rise to a claim under any insurance policy required under this Article 22, the **Contractor** shall at all times fully cooperate with the **City** with regard to such potential or actual claim.

22.5 **Subcontractor Insurance:** In the event the **Contractor** requires any **Subcontractor** to procure insurance with regard to any operations under this **Contract** and requires such **Subcontractor** to name the **Contractor** as an **Additional Insured** thereunder, the **Contractor** shall ensure that the **Subcontractor** name the **City**, including its officials and employees, as an Additional Insured with coverage at least as broad as the most recent edition of ISO Form CG 20 26.

22.6 Wherever reference is made in Article 7 or this Article 22 to documents to be sent to the **Commissioner** (e.g., notices, filings, or submissions), such documents shall be sent to the address set forth in Schedule A of the General Conditions. In the event no address is set forth in Schedule A, such documents are to be sent to the **Commissioner**'s address as provided elsewhere in this **Contract**.

22.7 Apart from damages or losses covered by insurance provided pursuant to Articles 22.1.2, 22.1.3, or 22.1.5, the **Contractor** waives all rights against the **City**, including its officials and employees, for any damages or losses that are covered under any insurance required under this Article 22 (whether or

not such insurance is actually procured or claims are paid thereunder) or any other insurance applicable to the operations of the **Contractor** and/or its employees, agents, or **Subcontractors**.

22.8 In the event the **Contractor** utilizes a self-insurance program to satisfy any of the requirements of this Article 22, the **Contractor** shall ensure that any such self-insurance program provides the **City** with all rights that would be provided by traditional insurance under this Article 22, including but not limited to the defense and indemnification obligations that insurers are required to undertake in liability policies.

22.9 Materiality/Non-Waiver: The **Contractor's** failure to secure policies in complete conformity with this Article 22, or to give an insurance company timely notice of any sort required in this **Contract** or to do anything else required by this Article 22 shall constitute a material breach of this **Contract**. Such breach shall not be waived or otherwise excused by any action or inaction by the **City** at any time.

22.10 Pursuant to General Municipal Law Section 108, this **Contract** shall be void and of no effect unless **Contractor** maintains Workers' Compensation Insurance for the term of this **Contract** to the extent required and in compliance with the New York State Workers' Compensation Law.

22.11 Other Remedies: Insurance coverage provided pursuant to this Article 22 or otherwise shall not relieve the **Contractor** of any liability under this **Contract**, nor shall it preclude the **City** from exercising any rights or taking such other actions available to it under any other provisions of this **Contract** or **Law**.

ARTICLE 23. MONEY RETAINED AGAINST CLAIMS

23.1 If any claim shall be made by any person or entity (including **Other Contractors** with the **City** on this **Project**) against the **City** or against the **Contractor** and the **City** for any of the following:

- (a) An alleged loss, damage, injury, theft or vandalism of any of the kinds referred to in Articles 7 and 12, plus the reasonable costs of defending the **City**, which in the opinion of the **Comptroller** may not be paid by an insurance company (for any reason whatsoever); or
- (b) An infringement of copyrights, patents or use of patented articles, tools, etc., as referred to in Article 57; or
- (c) Damage claimed to have been caused directly or indirectly by the failure of the **Contractor** to perform the **Work** in strict accordance with this **Contract**,

the amount of such claim, or so much thereof as the **Comptroller** may deem necessary, may be withheld by the **Comptroller**, as security against such claim, from any money due hereunder. The **Comptroller**, in his/her discretion, may permit the **Contractor** to substitute other satisfactory security in lieu of the monies so withheld.

23.2 If an action on such claim is timely commenced and the liability of the **City**, or the **Contractor**, or both, shall have been established therein by a final judgment of a court of competent jurisdiction, or if such claim shall have been admitted by the **Contractor** to be valid, the **Comptroller** shall pay such judgment or admitted claim out of the monies retained by the **Comptroller** under the provisions of this Article 23, and return the balance, if any, without interest, to the **Contractor**.

ARTICLE 24. MAINTENANCE AND GUARANTY

24.1 The **Contractor** shall promptly repair, replace, restore or rebuild, as the **Commissioner** may determine, any finished **Work** in which defects of materials or workmanship may appear or to which damage may occur because of such defects, during the one (1) year period subsequent to the date of **Substantial Completion** (or use and occupancy in accordance with Article 16), except where other periods of maintenance and guaranty are provided for in Schedule A.

24.2 As security for the faithful performance of its obligations hereunder, the **Contractor**, upon filing its requisition for payment on **Substantial Completion**, shall deposit with the **Commissioner** a sum equal to one (1%) percent of the price (or the amount fixed in Schedule A of the General Conditions) in cash or certified check upon a state or national bank and trust company or a check of such bank and trust company signed by a duly authorized officer thereof and drawn to the order of the **Comptroller**, or obligations of the **City**, which the **Comptroller** may approve as of equal value with the sum so required.

24.3 In lieu of the above, the **Contractor** may make such security payment to the **City** by authorizing the **Commissioner** in writing to deduct the amount from the **Substantial Completion** payment which shall be deemed the deposit required above.

24.4 If the **Contractor** has faithfully performed all of its obligations hereunder the **Commissioner** shall so certify to the **Comptroller** within five (5) **Days** after the expiration of one (1) year from the date of **Substantial Completion** and acceptance of the **Work** or within thirty (30) **Days** after the expiration of the guarantee period fixed in the **Specifications**. The security payment shall be repaid to the **Contractor** without interest within thirty (30) **Days** after certification by the **Commissioner** to the **Comptroller** that the **Contractor** has faithfully performed all of its obligations hereunder.

24.5 Notice by the **Commissioner** to the **Contractor** to repair, replace, rebuild or restore such defective or damaged **Work** shall be timely, pursuant to this article, if given not later than ten (10) **Days** subsequent to the expiration of the one (1) year period or other periods provided for herein.

24.6 If the **Contractor** shall fail to repair, replace, rebuild or restore such defective or damaged **Work** promptly after receiving such notice, the **Commissioner** shall have the right to have the **Work** done by others in the same manner as provided for in the completion of a defaulted **Contract**, under Article 51.

24.7 If the security payment so deposited is insufficient to cover the cost of such **Work**, the **Contractor** shall be liable to pay such deficiency on demand by the **Commissioner**.

24.8 The **Engineer's** certificate setting forth the fair and reasonable cost of repairing, replacing, rebuilding or restoring any damaged or defective **Work** when performed by one other than the **Contractor**, shall be binding and conclusive upon the **Contractor** as to the amount thereof.

24.9 The **Contractor** shall obtain all manufacturers' warranties and guaranties of all equipment and materials required by this **Contract** in the name of the **City** and shall deliver same to the **Commissioner**. All of the **City's** rights and title and interest in and to said manufacturers' warranties and guaranties may be assigned by the **City** to any subsequent purchasers of such equipment and materials or lessees of the premises into which the equipment and materials have been installed.

CHAPTER VI: CHANGES, EXTRA WORK, AND DOCUMENTATION OF CLAIM

ARTICLE 25. CHANGES

25.1 Changes may be made to this **Contract** only as duly authorized in writing by the **Commissioner** in accordance with the **Law** and this **Contract**. All such changes, modifications, and amendments will become a part of the **Contract**. **Work** so ordered shall be performed by the **Contractor**.

25.2 **Contract** changes will be made only for **Work** necessary to complete the **Work** included in the original scope of the **Contract** and/or for non-material changes to the scope of the **Contract**. Changes are not permitted for any material alteration in the scope of **Work** in the **Contract**.

25.3 The **Contractor** shall be entitled to a price adjustment for **Extra Work** performed pursuant to a written change order. Adjustments to price shall be computed in one or more of the following ways:

25.3.1 By applicable unit prices specified in the **Contract**; and/or

25.3.2 By agreement of a fixed price; and/or

25.3.3 By time and material records; and/or

25.3.4 In any other manner approved by the **CCPO**.

25.4 All payments for change orders are subject to pre-audit by the **Engineering Audit Officer** and may be post-audited by the **Comptroller** and/or the **Agency**.

ARTICLE 26. METHODS OF PAYMENT FOR OVERRUNS AND EXTRA WORK

26.1 Overrun of Unit Price Item: An overrun is any quantity of a unit price item which the **Contractor** is directed to provide which is in excess of one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule.

26.1.1 For any unit price item, the **Contractor** will be paid at the unit price bid for any quantity up to one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule. If during the progress of the **Work**, the actual quantity of any unit price item required to complete the **Work** approaches the estimated quantity for that item, and for any reason it appears that the actual quantity of any unit price item necessary to complete the **Work** will exceed the estimated quantity for that item by twenty-five (25%) percent, the **Contractor** shall immediately notify the **Engineer** of such anticipated overrun. The **Contractor** shall not be compensated for any quantity of a unit price item provided which is in excess of one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule without written authorization from the **Engineer**.

26.1.2 If the actual quantity of any unit price item necessary to complete the **Work** will exceed one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid schedule, the **City** reserves the right and the **Contractor** agrees to negotiate a new unit price for such item. In no event shall such negotiated new unit price exceed the unit bid price. If the **City** and **Contractor** cannot agree on a new unit price, then the **City** shall order the **Contractor** and the **Contractor** agrees to provide additional quantities of

the item on the basis of time and material records for the actual and reasonable cost as determined under Article 26.2, but in no event at a unit price exceeding the unit price bid.

26.2 Extra Work: For **Extra Work** where payment is by agreement on a fixed price in accordance with Article 25.3.2, the price to be paid for such **Extra Work** shall be based on the fair and reasonable estimated cost of the items set forth below. For **Extra Work** where payment is based on time and material records in accordance with Article 25.3.3, the price to be paid for such **Extra Work** shall be the actual and reasonable cost of the items set forth below, calculated in accordance with the formula specified therein, if any.

26.2.1 Necessary materials (including transportation to the **Site**); plus

26.2.2 Necessary direct labor, including payroll taxes (subject to statutory wage caps) and supplemental benefits; plus

26.2.3 Sales and personal property taxes, if any, required to be paid on materials not incorporated into such **Extra Work**; plus

26.2.4 Reasonable rental value of **Contractor**-owned (or **Subcontractor**-owned, as applicable), necessary plant and equipment other than **Small Tools**, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per operating hour: $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$. Reasonable rental value is defined as the lower of either seventy-five percent of the monthly prorated rental rates established in "The AED Green Book, Rental Rates and Specifications for Construction Equipment" published by Equipment Watch (the "Green Book"), or seventy-five percent of the monthly prorated rental rates established in the "Rental Rate Blue Book for Construction Equipment" published by Equipment Watch (the "Blue Book") (the applicable Blue Book rate being for rental only without the addition of any operational costs listed in the Blue Book). The reasonable rental value is deemed to be inclusive of all operating costs except for fuel/energy consumption and equipment operator's wages/costs. For multiple shift utilization, reimbursement shall be calculated as follows: first shift shall be seventy-five (75%) percent of such rental rates; second shift shall be sixty (60%) percent of the first shift rate; and third shift shall be forty (40%) percent of the first shift rate. Equipment on standby shall be reimbursed at one-third (1/3) the prorated monthly rental rate. **Contractor**-owned (or **Subcontractor**-owned, as applicable) equipment includes equipment from rental companies affiliated with or controlled by the **Contractor** (or **Subcontractor**, as applicable), as determined by the **Commissioner**. In establishing cost reimbursement for non-operating **Contractor**-owned (or **Subcontractor**-owned, as applicable) equipment (scaffolding, sheeting systems, road plates, etc.), the **City** may restrict reimbursement to a purchase-salvage/life cycle basis if less than the computed rental costs; plus

26.2.5 Necessary installation and dismantling of such plant and equipment, including transportation to and from the **Site**, if any, provided that, in the case of non-**Contractor**-owned (or non-**Subcontractor**-owned, as applicable) equipment rented from a third party, the cost of installation and dismantling are not allowable if such costs are included in the rental rate; plus

26.2.6 Necessary fees charged by governmental entities; plus

26.2.7 Necessary construction-related service fees charged by non-governmental entities, such as landfill tipping fees; plus

26.2.8 Reasonable rental costs of non-**Contractor**-owned (or non-**Subcontractor**-owned, as applicable) necessary plant and equipment other than **Small Tools**, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per hour of operation: $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$. In lieu of renting, the **City** reserves the right to direct the purchase of non-operating equipment (scaffolding, sheeting systems, road plates, etc.), with payment on a purchase-salvage/life cycle basis, if less than the projected rental costs; plus

26.2.9 Workers' Compensation Insurance, and any insurance coverage expressly required by the **City** for the performance of the **Extra Work** which is different than the types of insurance required by Article 22 and Schedule A of the General Conditions. The cost of Workers' Compensation Insurance is subject to applicable payroll limitation caps and shall be based upon the carrier's Manual Rate for such insurance derived from the applicable class Loss Cost ("LC") and carrier's Lost Cost Multiplier ("LCM") approved by the New York State Department of Financial Services, and with the exception of experience rating, rate modifiers as promulgated by the New York Compensation Insurance Rating Board ("NYCIRB"); plus

26.2.10 Additional costs incurred as a result of the **Extra Work** for performance and payment bonds; plus

26.2.11 Twelve percent (12%) percent of the total of items in Articles 26.2.1 through 26.2.5 as compensation for overhead, except that no percentage for overhead will be allowed on **Payroll Taxes** or on the premium portion of overtime pay or on sales and personal property taxes. Overhead shall include without limitation, all costs and expenses in connection with administration, management superintendence, small tools, and insurance required by Schedule A of the General Conditions other than Workers' Compensation Insurance; plus

26.2.12 Ten (10%) percent of the total of items in Articles 26.2.1 through 26.2.5, plus the items in Article 26.2.11, as compensation for profit, except that no percentage for profit will be allowed on **Payroll Taxes** or on the premium portion of overtime pay or on sales and personal property taxes; plus

26.2.13 Five (5%) percent of the total of items in Articles 26.2.6 through 26.2.10 as compensation for overhead and profit.

26.3 Where the **Extra Work** is performed in whole or in part by other than the **Contractor's** own forces pursuant to Article 26.2, the **Contractor** shall be paid, subject to pre-audit by the **Engineering Audit Officer**, the cost of such **Work** computed in accordance with Article 26.2 above, plus an additional allowance of five (5%) percent to cover the **Contractor's** overhead and profit.

26.4 Where a change is ordered, involving both **Extra Work** and omitted or reduced **Contract Work**, the **Contract** price shall be adjusted, subject to pre-audit by the **EAO**, in an amount based on the difference between the cost of such **Extra Work** and of the omitted or reduced **Work**.

26.5 Where the **Contractor** and the **Commissioner** can agree upon a fixed price for **Extra Work** in accordance with Article 25.3.2 or another method of payment for **Extra Work** in accordance with

Article 25.3.4, or for **Extra Work** ordered in connection with omitted **Work**, such method, subject to pre-audit by the **EAO**, may, at the option of the **Commissioner**, be substituted for the cost plus a percentage method provided in Article 26.2; provided, however, that if the **Extra Work** is performed by a **Subcontractor**, the **Contractor** shall not be entitled to receive more than an additional allowance of five (5%) percent for overhead and profit over the cost of such **Subcontractor's Work** as computed in accordance with Article 26.2.

ARTICLE 27. RESOLUTION OF DISPUTES

27.1 All disputes between the **City** and the **Contractor** of the kind delineated in this Article 27.1 that arise under, or by virtue of, this **Contract** shall be finally resolved in accordance with the provisions of this Article 27 and the **PPB Rules**. This procedure for resolving all disputes of the kind delineated herein shall be the exclusive means of resolving any such disputes.

27.1.1 This Article 27 shall not apply to disputes concerning matters dealt with in other sections of the **PPB Rules**, or to disputes involving patents, copyrights, trademarks, or trade secrets (as interpreted by the courts of New York State) relating to proprietary rights in computer software.

27.1.2 This Article 27 shall apply only to disputes about the scope of **Work** delineated by the **Contract**, the interpretation of **Contract** documents, the amount to be paid for **Extra Work** or disputed work performed in connection with the **Contract**, the conformity of the **Contractor's Work** to the **Contract**, and the acceptability and quality of the **Contractor's Work**; such disputes arise when the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** makes a determination with which the **Contractor** disagrees.

27.2 All determinations required by this Article 27 shall be made in writing clearly stated, with a reasoned explanation for the determination based on the information and evidence presented to the party making the determination. Failure to make such determination within the time required by this Article 27 shall be deemed a non-determination without prejudice that will allow application to the next level.

27.3 During such time as any dispute is being presented, heard, and considered pursuant to this Article 27, the **Contract** terms shall remain in force and the **Contractor** shall continue to perform **Work** as directed by the **ACCO** or the **Engineer**. Failure of the **Contractor** to continue **Work** as directed shall constitute a waiver by the **Contractor** of its claim.

27.4 Presentation of Disputes to **Commissioner**.

Notice of Dispute and Agency Response. The **Contractor** shall present its dispute in writing ("Notice of Dispute") to the **Commissioner** within thirty (30) Days of receiving written notice of the determination or action that is the subject of the dispute. This notice requirement shall not be read to replace any other notice requirements contained in the **Contract**. The Notice of Dispute shall include all the facts, evidence, documents, or other basis upon which the **Contractor** relies in support of its position, as well as a detailed computation demonstrating how any amount of money claimed by the **Contractor** in the dispute was arrived at. Within thirty (30) Days after receipt of the detailed written submission comprising the complete Notice of Dispute, the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** shall submit to the **Commissioner** all materials he or she deems pertinent to the dispute. Following initial submissions to the **Commissioner**, either party may demand of the other the production of any document or other material the demanding party believes may be relevant to the dispute. The requested party shall produce all relevant materials that are not otherwise

protected by a legal privilege recognized by the courts of New York State. Any question of relevancy shall be determined by the **Commissioner** whose decision shall be final. Willful failure of the **Contractor** to produce any requested material whose relevancy the **Contractor** has not disputed, or whose relevancy has been affirmatively determined, shall constitute a waiver by the **Contractor** of its claim.

27.4.1 **Commissioner Inquiry.** The **Commissioner** shall examine the material and may, in his or her discretion, convene an informal conference with the **Contractor**, the **ACCO**, and the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** to resolve the issue by mutual consent prior to reaching a determination. The **Commissioner** may seek such technical or other expertise as he or she shall deem appropriate, including the use of neutral mediators, and require any such additional material from either or both parties as he or she deems fit. The **Commissioner's** ability to render, and the effect of, a decision hereunder shall not be impaired by any negotiations in connection with the dispute presented, whether or not the **Commissioner** participated therein. The **Commissioner** may or, at the request of any party to the dispute, shall compel the participation of any **Other Contractor** with a contract related to the **Work** of this **Contract**, and that **Contractor** shall be bound by the decision of the **Commissioner**. Any **Other Contractor** thus brought into the dispute resolution proceeding shall have the same rights and obligations under this Article 27 as the **Contractor** initiating the dispute.

27.4.2 **Commissioner Determination.** Within thirty (30) **Days** after the receipt of all materials and information, or such longer time as may be agreed to by the parties, the **Commissioner** shall make his or her determination and shall deliver or send a copy of such determination to the **Contractor**, the **ACCO**, and **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner**, as applicable, together with a statement concerning how the decision may be appealed.

27.4.3 **Finality of Commissioner's Decision.** The **Commissioner's** decision shall be final and binding on all parties, unless presented to the Contract Dispute Resolution Board pursuant to this Article 27. The **City** may not take a petition to the Contract Dispute Resolution Board. However, should the **Contractor** take such a petition, the **City** may seek, and the Contract Dispute Resolution Board may render, a determination less favorable to the **Contractor** and more favorable to the **City** than the decision of the **Commissioner**.

27.5 **Presentation of Dispute to the Comptroller.** Before any dispute may be brought by the **Contractor** to the Contract Dispute Resolution Board, the **Contractor** must first present its claim to the **Comptroller** for his or her review, investigation, and possible adjustment.

27.5.1 **Time, Form, and Content of Notice.** Within thirty (30) **Days** of its receipt of a decision by the **Commissioner**, the **Contractor** shall submit to the **Comptroller** and to the **Commissioner** a Notice of Claim regarding its dispute with the **Agency**. The Notice of Claim shall consist of (i) a brief written statement of the substance of the dispute, the amount of money, if any, claimed and the reason(s) the **Contractor** contends the dispute was wrongly decided by the **Commissioner**; (ii) a copy of the written decision of the **Commissioner**; and (iii) a copy of all materials submitted by the **Contractor** to the **Agency**, including the Notice of Dispute. The **Contractor** may not present to the **Comptroller** any material not presented to the **Commissioner**, except at the request of the **Comptroller**.

27.5.2 Response. Within thirty (30) **Days** of receipt of the Notice of Claim, the **Agency** shall make available to the **Comptroller** a copy of all material submitted by the **Agency** to the **Commissioner** in connection with the dispute. The **Agency** may not present to the **Comptroller** any material not presented to the **Commissioner** except at the request of the **Comptroller**.

27.5.3 **Comptroller** Investigation. The **Comptroller** may investigate the claim in dispute and, in the course of such investigation, may exercise all powers provided in Sections 7-201 and 7-203 of the Administrative Code. In addition, the **Comptroller** may demand of either party, and such party shall provide, whatever additional material the **Comptroller** deems pertinent to the claim, including original business records of the **Contractor**. Willful failure of the **Contractor** to produce within fifteen (15) **Days** any material requested by the **Comptroller** shall constitute a waiver by the **Contractor** of its claim. The **Comptroller** may also schedule an informal conference to be attended by the **Contractor**, **Agency** representatives, and any other personnel desired by the **Comptroller**.

27.5.4 Opportunity of **Comptroller** to Compromise or Adjust Claim. The **Comptroller** shall have forty-five (45) **Days** from his or her receipt of all materials referred to in Article 27.5.3 to investigate the disputed claim. The period for investigation and compromise may be further extended by agreement between the **Contractor** and the **Comptroller**, to a maximum of ninety (90) **Days** from the **Comptroller's** receipt of all materials. The **Contractor** may not present its petition to the Contract Dispute Resolution Board until the period for investigation and compromise delineated in this Article 27.5.4 has expired. In compromising or adjusting any claim hereunder, the **Comptroller** may not revise or disregard the terms of the **Contract** between the parties.

27.6 Contract Dispute Resolution Board. There shall be a Contract Dispute Resolution Board composed of:

27.6.1 The chief administrative law judge of the Office of Administrative Trials and Hearings (OATH) or his/her designated OATH administrative law judge, who shall act as chairperson, and may adopt operational procedures and issue such orders consistent with this Article 27 as may be necessary in the execution of the Contract Dispute Resolution Board's functions, including, but not limited to, granting extensions of time to present or respond to submissions;

27.6.2 The **CCPO** or his/her designee; any designee shall have the requisite background to consider and resolve the merits of the dispute and shall not have participated personally and substantially in the particular matter that is the subject of the dispute or report to anyone who so participated; and

27.6.3 A person with appropriate expertise who is not an employee of the **City**. This person shall be selected by the presiding administrative law judge from a prequalified panel of individuals, established and administered by OATH with appropriate background to act as decision-makers in a dispute. Such individual may not have a contract or dispute with the **City** or be an officer or employee of any company or organization that does, or regularly represents persons, companies, or organizations having disputes with the **City**.

27.7 Petition to the Contract Dispute Resolution Board. In the event the claim has not been settled or adjusted by the **Comptroller** within the period provided in this Article 27, the **Contractor**,

within thirty (30) **Days** thereafter, may petition the Contract Dispute Resolution Board to review the **Commissioner's** determination.

27.7.1 **Form and Content of Petition by Contractor.** The **Contractor** shall present its dispute to the Contract Dispute Resolution Board in the form of a petition, which shall include (i) a brief written statement of the substance of the dispute, the amount of money, if any, claimed, and the reason(s) the **Contractor** contends the dispute was wrongly decided by the **Commissioner**; (ii) a copy of the written Decision of the **Commissioner**, (iii) copies of all materials submitted by the **Contractor** to the Agency; (iv) a copy of the written decision of the **Comptroller**, if any, and (v) copies of all correspondence with, or written material submitted by the **Contractor**, to the **Comptroller**. The **Contractor** shall concurrently submit four (4) complete sets of the Petition: one set to the **City Corporation Counsel** (Attn: Commercial and Real Estate Litigation Division) and three (3) sets to the Contract Dispute Resolution Board at OATH's offices with proof of service on the **City Corporation Counsel**. In addition, the **Contractor** shall submit a copy of the written statement of the substance of the dispute, cited in (i) above, to both the **Commissioner** and the **Comptroller**.

27.7.2 **Agency Response.** Within thirty (30) **Days** of its receipt of the Petition by the **City Corporation Counsel**, the **Agency** shall respond to the brief written statement of the **Contractor** and make available to the Contract Dispute Resolution Board all material it submitted to the **Commissioner** and **Comptroller**. Three (3) complete copies of the **Agency** response shall be provided to the Contract Dispute Resolution Board and one to the **Contractor**. Extensions of time for submittal of the **Agency** response shall be given as necessary upon a showing of good cause or, upon consent of the parties, for an initial period of up to thirty (30) **Days**.

27.7.3 **Further Proceedings.** The Contract Dispute Resolution Board shall permit the **Contractor** to present its case by submission of memoranda, briefs, and oral argument. The Contract Dispute Resolution Board shall also permit the **Agency** to present its case in response to the **Contractor** by submission of memoranda, briefs, and oral argument. If requested by the **City Corporation Counsel**, the **Comptroller** shall provide reasonable assistance in the preparation of the **Agency's** case. Neither the **Contractor** nor the **Agency** may support its case with any documentation or other material that was not considered by the **Comptroller**, unless requested by the Contract Dispute Resolution Board. The Contract Dispute Resolution Board, in its discretion, may seek such technical or other expert advice as it shall deem appropriate and may seek, on its own or upon application of a party, any such additional material from any party as it deems fit. The Contract Dispute Resolution Board, in its discretion, may combine more than one dispute between the parties for concurrent resolution.

27.7.4 **Contract Dispute Resolution Board Determination.** Within forty-five (45) **Days** of the conclusion of all written submissions and oral arguments, the Contract Dispute Resolution Board shall render a written decision resolving the dispute. In an unusually complex case, the Contract Dispute Resolution Board may render its decision in a longer period, not to exceed ninety (90) **Days**, and shall so advise the parties at the commencement of this period. The Contract Dispute Resolution Board's decision must be consistent with the terms of the **Contract**. Decisions of the Contract Dispute Resolution Board shall only resolve matters before the Contract Dispute Resolution Board and shall not have precedential effect with respect to matters not before the Contract Dispute Resolution Board.

27.7.5 Notification of Contract Dispute Resolution Board Decision. The Contract Dispute Resolution Board shall send a copy of its decision to the **Contractor**, the **ACCO**, the Engineer, the **Comptroller**, the **City** Corporation Counsel, the **CCPO**, and the **PPB**. A decision in favor of the **Contractor** shall be subject to the prompt payment provisions of the **PPB** Rules. The Required Payment Date shall be thirty (30) Days after the date the parties are formally notified of the Contract Dispute Resolution Board's decision.

27.7.6 Finality of Contract Dispute Resolution Board Decision. The Contract Dispute Resolution Board's decision shall be final and binding on all parties. Any party may seek review of the Contract Dispute Resolution Board's decision solely in the form of a challenge, filed within four (4) months of the date of the Contract Dispute Resolution Board's decision, in a court of competent jurisdiction of the State of New York, County of New York pursuant to Article 78 of the Civil Practice Law and Rules. Such review by the court shall be limited to the question of whether or not the Contract Dispute Resolution Board's decision was made in violation of lawful procedure, was affected by an error of **Law**, or was arbitrary and capricious or an abuse of discretion. No evidence or information shall be introduced or relied upon in such proceeding that was not presented to the Contract Dispute Resolution Board in accordance with this Article 27.

27.8 Any termination, cancellation, or alleged breach of the **Contract** prior to or during the pendency of any proceedings pursuant to this Article 27 shall not affect or impair the ability of the **Commissioner** or Contract Dispute Resolution Board to make a binding and final decision pursuant to this Article 27.

ARTICLE 28. RECORD KEEPING FOR EXTRA OR DISPUTED WORK OR WORK ON A TIME & MATERIALS BASIS

28.1 While the **Contractor** or any of its **Subcontractors** is performing **Work** on a time and material basis or **Extra Work** on a time and material basis ordered by the **Commissioner** under Article 25, or where the **Contractor** believes that it or any of its **Subcontractors** is performing **Extra Work** but a final determination by **Agency** has not been made, or the **Contractor** or any of its **Subcontractors** is performing disputed **Work** (whether on or off the **Site**), or complying with a determination or order under protest in accordance with Articles 11, 27, and 30, in each such case the **Contractor** shall furnish the **Resident Engineer** daily with three (3) copies of written statements signed by the **Contractor's** representative at the **Site** showing:

28.1.1 The name, trade, and number of each worker employed on such **Work** or engaged in complying with such determination or order, the number of hours employed, and the character of the **Work** each is doing; and

28.1.2 The nature and quantity of any materials, plant and equipment furnished or used in connection with the performance of such **Work** or compliance with such determination or order, and from whom purchased or rented.

28.2 A copy of such statement will be countersigned by the **Resident Engineer**, noting thereon any items not agreed to or questioned, and will be returned to the **Contractor** within two (2) **Days** after submission.

28.3 The **Contractor** and its **Subcontractors**, when required by the **Commissioner**, or the **Comptroller**, shall also produce for inspection, at the office of the **Contractor** or **Subcontractor**, any and all of its books, bid documents, financial statements, vouchers, records, daily job diaries and reports,

and cancelled checks, and any other documents relating to showing the nature and quantity of the labor, materials, plant and equipment actually used in the performance of such **Work**, or in complying with such determination or order, and the amounts expended therefor, and shall permit the **Commissioner** and the **Comptroller** to make such extracts therefrom, or copies thereof, as they or either of them may desire.

28.4 In connection with the examination provided for herein, the **Commissioner**, upon demand therefor, will produce for inspection by the **Contractor** such records as the **Agency** may have with respect to such **Extra Work** or disputed **Work** performed under protest pursuant to order of the **Commissioner**, except those records and reports which may have been prepared for the purpose of determining the accuracy and validity of the **Contractor's** claim.

28.5 Failure to comply strictly with these requirements shall constitute a waiver of any claim for extra compensation or damages on account of the performance of such **Work** or compliance with such determination or order.

ARTICLE 29. OMITTED WORK

29.1 If any **Contract Work** in a lump sum **Contract**, or if any part of a lump sum item in a unit price, lump sum, or percentage-bid **Contract** is omitted by the **Commissioner** pursuant to Article 33, the **Contract** price, subject to audit by the EAO, shall be reduced by a pro rata portion of the lump sum bid amount based upon the percent of **Work** omitted subject to Article 29.4. For the purpose of determining the pro rata portion of the lump sum bid amount, the bid breakdown submitted in accordance with Article 41 shall be considered, but shall not be the determining factor.

29.2 If the whole of a lump sum item or units of any other item is so omitted by the **Commissioner** in a unit price, lump sum, or percentage-bid **Contract**, then no payment will be made therefor except as provided in Article 29.4.

29.3 For units that have been ordered but are only partially completed, the unit price shall be reduced by a pro rata portion of the unit price bid based upon the percentage of **Work** omitted subject to Article 29.4.

29.4 In the event the **Contractor**, with respect to any omitted **Work**, has purchased any non-cancelable material and/or equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated into the **Work**, the **Contractor** shall be paid for such material and/or equipment in accordance with Article 64.2.1(b); provided, however, such payment is contingent upon the **Contractor's** delivery of such material and/or equipment in acceptable condition to a location designated by the **City**.

29.5 The **Contractor** agrees to make no claim for damages or for loss of overhead and profit with regard to any omitted **Work**.

ARTICLE 30. NOTICE AND DOCUMENTATION OF COSTS AND DAMAGES; PRODUCTION OF FINANCIAL RECORDS

30.1 If the **Contractor** shall claim to be sustaining damages by reason of any act or omission of the **City** or its agents, it shall submit to the **Commissioner** within forty-five (45) **Days** from the time such damages are first incurred, and every thirty (30) **Days** thereafter to the extent additional damages are being incurred for the same condition, verified statements of the details and the amounts of such

damages, together with documentary evidence of such damages. The **Contractor** may submit any of the above statements within such additional time as may be granted by the **Commissioner** in writing upon written request therefor. Failure of the **Commissioner** to respond in writing to a written request for additional time within thirty (30) **Days** shall be deemed a denial of the request. On failure of the **Contractor** to strictly comply with the foregoing provisions, such claims shall be deemed waived and no right to recover on such claims shall exist. Damages that the **Contractor** may claim in any action or dispute resolution procedure arising under or by reason of this **Contract** shall not be different from or in excess of the statements and documentation made pursuant to this Article 30. This Article 30.1 does not apply to claims submitted to the **Commissioner** pursuant to Article 11 or to claims disputing a determination under Article 27.

30.2 In addition to the foregoing statements, the **Contractor** shall, upon notice from the **Commissioner**, produce for examination at the **Contractor's** office, by the **Engineer, Architect or Project Manager**, all of its books of account, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, and cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this **Contract**, and submit itself and persons in its employment, for examination under oath by any person designated by the **Commissioner** or **Comptroller** to investigate claims made or disputes against the **City** under this **Contract**. At such examination, a duly authorized representative of the **Contractor** may be present.

30.3 In addition to the statements required under Article 28 and this Article 30, the **Contractor** and/or its **Subcontractor** shall, within thirty (30) **Days** upon notice from the **Commissioner** or **Comptroller**, produce for examination at the **Contractor's** and/or **Subcontractor's** office, by a representative of either the **Commissioner** or **Comptroller**, all of its books of account, bid documents, financial statements, accountant workpapers, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, and cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this **Contract**. Further, the **Contractor** and/or its **Subcontractor** shall submit any person in its employment, for examination under oath by any person designated by the **Commissioner** or **Comptroller** to investigate claims made or disputes against the **City** under this **Contract**. At such examination, a duly authorized representative of the **Contractor** may be present.

30.4 Unless the information and examination required under Article 30.3 is provided by the **Contractor** and/or its **Subcontractor** upon thirty (30) **Days'** notice from the **Commissioner** or **Comptroller**, or upon the **Commissioner's** or **Comptroller's** written authorization to extend the time to comply, the **City** shall be released from all claims arising under, relating to or by reason of this **Contract**, except for sums certified by the **Commissioner** to be due under the provisions of this **Contract**. It is further stipulated and agreed that no person has the power to waive any of the foregoing provisions and that in any action or dispute resolution procedure against the **City** to recover any sum in excess of the sums certified by the **Commissioner** to be due under or by reason of this **Contract**, the **Contractor** must allege in its complaint and prove, at trial or during such dispute resolution procedure, compliance with the provisions of this Article 30.

30.5 In addition, after the commencement of any action or dispute resolution procedure by the **Contractor** arising under or by reason of this **Contract**, the **City** shall have the right to require the **Contractor** to produce for examination under oath, up until the trial of the action or hearing before the Contract Dispute Resolution Board, the books and documents described in Article 30.3 and submit itself and all persons in its employ for examination under oath. If this Article 30 is not complied with as required, then the **Contractor** hereby consents to the dismissal of the action or dispute resolution procedure.

CHAPTER VII: POWERS OF THE RESIDENT ENGINEER, THE ENGINEER OR ARCHITECT AND THE COMMISSIONER

ARTICLE 31. THE RESIDENT ENGINEER

31.1 The **Resident Engineer** shall have the power to inspect, supervise, and control the performance of the **Work**, subject to review by the **Commissioner**. The **Resident Engineer** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

ARTICLE 32. THE ENGINEER OR ARCHITECT OR PROJECT MANAGER

32.1 The **Engineer** or **Architect** or **Project Manager**, in addition to those matters elsewhere herein delegated to the **Engineer** and expressly made subject to his/her determination, direction or approval, shall have the power, subject to review by the **Commissioner**:

32.1.1 To determine the amount, quality, and location of the **Work** to be paid for hereunder; and

32.1.2 To determine all questions in relation to the **Work**, to interpret the **Contract Drawings, Specifications, and Addenda**, and to resolve all patent inconsistencies or ambiguities therein; and

32.1.3 To determine how the **Work** of this **Contract** shall be coordinated with **Work** of **Other Contractors** engaged simultaneously on this **Project**, including the power to suspend any part of the **Work**, but not the whole thereof; and

32.1.4 To make minor changes in the **Work** as he/she deems necessary, provided such changes do not result in a net change in the cost to the **City** or to the **Contractor** of the **Work** to be done under the **Contract**; and

32.1.5 To amplify the **Contract Drawings**, add explanatory information and furnish additional **Specifications** and drawings, consistent with this **Contract**.

32.2 The foregoing enumeration shall not imply any limitation upon the power of the **Engineer** or **Architect** or **Project Manager**, for it is the intent of this **Contract** that all of the **Work** shall generally be subject to his/her determination, direction, and approval, except where the determination, direction or approval of someone other than the **Engineer** or **Architect** or **Project Manager** is expressly called for herein.

32.3 The **Engineer** or **Architect** or **Project Manager** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

ARTICLE 33. THE COMMISSIONER

33.1 The **Commissioner**, in addition to those matters elsewhere herein expressly made subject to his/her determination, direction or approval, shall have the power:

33.1.1 To review and make determinations on any and all questions in relation to this **Contract** and its performance; and

33.1.2 To modify or change this **Contract** so as to require the performance of **Extra Work** (subject, however, to the limitations specified in Article 25) or the omission of **Contract Work**; and

33.1.3 To suspend the whole or any part of the **Work** whenever in his/her judgment such suspension is required:

33.1.3(a) In the interest of the **City** generally; or

33.1.3(b) To coordinate the **Work** of the various contractors engaged on this **Project** pursuant to the provisions of Article 12; or

33.1.3(c) To expedite the completion of the entire **Project** even though the completion of this particular **Contract** may thereby be delayed.

ARTICLE 34. NO ESTOPPEL

34.1 Neither the **City** nor any **Agency**, official, agent or employee thereof, shall be bound, precluded or estopped by any determination, decision, approval, order, letter, payment or certificate made or given under or in connection with this **Contract** by the **City**, the **Commissioner**, the **Engineer**, the **Resident Engineer**, or any other official, agent or employee of the **City**, either before or after the final completion and acceptance of the **Work** and payment therefor:

34.1.1 From showing the true and correct classification, amount, quality or character of the **Work** actually done; or that any such determination, decision, order, letter, payment or certificate was untrue, incorrect or improperly made in any particular, or that the **Work**, or any part thereof, does not in fact conform to the requirements of this **Contract**; and

34.1.2 From demanding and recovering from the **Contractor** any overpayment made to it, or such damages as the **City** may sustain by reason of the **Contractor's** failure to perform each and every part of its **Contract**.

CHAPTER VIII: LABOR PROVISIONS

ARTICLE 35. EMPLOYEES

35.1 The **Contractor** and its **Subcontractors** shall not employ on the **Work**:

35.1.1 Anyone who is not competent, faithful and skilled in the **Work** for which he/she shall be employed; and whenever the **Commissioner** shall inform the **Contractor**, in writing, that any employee is, in his/her opinion, incompetent, unfaithful or disobedient, that employee shall be discharged from the **Work** forthwith, and shall not again be employed upon it; or

35.1.2 Any labor, materials or means whose employment, or utilization during the course of this **Contract**, may tend to or in any way cause or result in strikes, work stoppages, delays, suspension of **Work** or similar troubles by workers employed by the **Contractor** or its **Subcontractors**, or by any of the trades working in or about the buildings and premises where **Work** is being performed under this **Contract**, or by **Other Contractors** or their **Subcontractors** pursuant to other contracts, or on any other building or premises owned or operated by the **City**, its **Agencies**, departments, boards or authorities. Any violation by the **Contractor** of this requirement may, upon certification of the **Commissioner**, be considered as proper and sufficient cause for declaring the **Contractor** to be in default, and for the **City** to take action against it as set forth in Chapter X of this **Contract**, or such other article of this **Contract** as the Commissioner may deem proper; or

35.1.3 In accordance with Section 220.3-e of the Labor Law of the State of New York (hereinafter "Labor Law"), the **Contractor** and its **Subcontractors** shall not employ on the **Work** any apprentice, unless he/she is a registered individual, under a bona fide program registered with the New York State Department of Labor. The allowable ratio of apprentices to journey-level workers in any craft classification shall not be greater than the ratio permitted to the **Contractor** as to its work force on any job under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the wage rate determined by the **Comptroller** of the **City** for the classification of **Work** actually performed. The **Contractor** or **Subcontractor** will be required to furnish written evidence of the registration of its program and apprentices as well as all the appropriate ratios and wage rates, for the area of the construction prior to using any apprentices on the **Contract Work**.

35.2 If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand (\$250,000) dollars, all laborers, workers, and mechanics employed in the performance of the **Contract** on the public work site, either by the **Contractor**, **Subcontractor** or other person doing or contracting to do the whole or a part of the **Work** contemplated by the **Contract**, shall be certified prior to performing any **Work** as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least ten (10) hours in duration.

35.3 In accordance with Local Law Nos. 30-2012 and 33-2012, codified at sections 6-132 and 12-113 of the Administrative Code, respectively,

35.3.1 The **Contractor** shall not take an adverse personnel action with respect to an officer or employee in retaliation for such officer or employee making a report of information concerning conduct which such officer or employee knows or reasonably believes to involve corruption, criminal activity, conflict of interest, gross mismanagement or abuse of authority by any officer or employee relating to this **Contract** to (a) the Commissioner of the Department of Investigation, (b) a member of the New York City Council, the Public Advocate, or the **Comptroller**, or (c) the **CCPO**, **ACCO**, **Agency** head, or **Commissioner**.

35.3.2 If any of the **Contractor**'s officers or employees believes that he or she has been the subject of an adverse personnel action in violation of Article 35.3.1, he or she shall be entitled to bring a cause of action against the **Contractor** to recover all relief necessary to make him or her whole. Such relief may include but is not limited to: (a) an injunction to restrain continued retaliation, (b) reinstatement to the position such employee would have had but for the retaliation or to an equivalent position, (c) reinstatement of full fringe benefits and seniority rights, (d) payment of two times back

pay, plus interest, and (e) compensation for any special damages sustained as a result of the retaliation, including litigation costs and reasonable attorney's fees.

35.3.3 The **Contractor** shall post a notice provided by the **City** in a prominent and accessible place on any site where work pursuant to the **Contract** is performed that contains information about:

35.3.3(a) how its employees can report to the New York City Department of Investigation allegations of fraud, false claims, criminality or corruption arising out of or in connection with the **Contract**; and

35.3.3(b) the rights and remedies afforded to its employees under Administrative Code sections 7-805 (the New York City False Claims Act) and 12-113 (the Whistleblower Protection Expansion Act) for lawful acts taken in connection with the reporting of allegations of fraud, false claims, criminality or corruption in connection with the **Contract**.

35.3.4 For the purposes of this Article 35.3, "adverse personnel action" includes dismissal, demotion, suspension, disciplinary action, negative performance evaluation, any action resulting in loss of staff, office space, equipment or other benefit, failure to appoint, failure to promote, or any transfer or assignment or failure to transfer or assign against the wishes of the affected officer or employee.

35.3.5 This Article 35.3 is applicable to all of the **Contractor's** **Subcontractors** having subcontracts with a value in excess of \$100,000; accordingly, the **Contractor** shall include this rider in all subcontracts with a value a value in excess of \$100,000.

35.4 Article 35.3 is not applicable to this **Contract** if it is valued at \$100,000 or less. Articles 35.3.1, 35.3.2, 35.3.4, and 35.3.5 are not applicable to this **Contract** if it was solicited pursuant to a finding of an emergency.

35.5 Paid Sick Leave Law.

35.5.1 Introduction and General Provisions.

35.5.1(a) The Earned Sick Time Act, also known as the Paid Sick Leave Law ("PSLL"), requires covered employees who annually perform more than 80 hours of work in New York City to be provided with paid sick time.² Contractors of the **City** or of other governmental entities may be required to provide sick time pursuant to the PSLL.

35.5.1(b) The PSLL became effective on April 1, 2014, and is codified at Title 20, Chapter 8, of the New York City Administrative Code. It is administered by the City's Department of Consumer Affairs ("DCA"); DCA's rules promulgated under the PSLL are codified at Chapter 7 of Title 6 of the Rules of the City of New York ("Rules").

² Pursuant to the PSLL, if fewer than five employees work for the same employer, as determined pursuant to New York City Administrative Code § 20-912(g), such employer has the option of providing such employees uncompensated sick time.

35.5.1(c) The **Contractor** agrees to comply in all respects with the PSLL and the Rules, and as amended, if applicable, in the performance of this **Contract**. The **Contractor** further acknowledges that such compliance is a material term of this **Contract** and that failure to comply with the PSLL in performance of this **Contract** may result in its termination.

35.5.1(d) The **Contractor** must notify the **Agency Chief Contracting Officer** of the **Agency** with whom it is contracting in writing within ten (10) days of receipt of a complaint (whether oral or written) regarding the PSLL involving the performance of this **Contract**. Additionally, the **Contractor** must cooperate with DCA's education efforts and must comply with DCA's subpoenas and other document demands as set forth in the PSLL and Rules.

35.5.1(e) The PSLL is summarized below for the convenience of the **Contractor**. The **Contractor** is advised to review the PSLL and Rules in their entirety. On the website www.nyc.gov/PaidSickLeave there are links to the PSLL and the associated Rules as well as additional resources for employers, such as Frequently Asked Questions, timekeeping tools and model forms, and an event calendar of upcoming presentations and webinars at which the **Contractor** can get more information about how to comply with the PSLL. The **Contractor** acknowledges that it is responsible for compliance with the PSLL notwithstanding any inconsistent language contained herein.

35.5.2 Pursuant to the PSLL and the Rules: Applicability, Accrual, and Use.

35.5.2(a) An employee who works within the City of New York for more than eighty hours in any consecutive 12-month period designated by the employer as its "calendar year" pursuant to the PSLL ("Year") must be provided sick time. Employers must provide a minimum of one hour of sick time for every 30 hours worked by an employee and compensation for such sick time must be provided at the greater of the employee's regular hourly rate or the minimum wage. Employers are not required to provide more than 40 hours of sick time to an employee in any Year.

35.5.2(b) An employee has the right to determine how much sick time he or she will use, provided that employers may set a reasonable minimum increment for the use of sick time not to exceed four hours per **Day**. In addition, an employee may carry over up to 40 hours of unused sick time to the following Year, provided that no employer is required to allow the use of more than forty hours of sick time in a Year or carry over unused paid sick time if the employee is paid for such unused sick time and the employer provides the employee with at least the legally required amount of paid sick time for such employee for the immediately subsequent Year on the first **Day** of such Year.

35.5.2(c) An employee entitled to sick time pursuant to the PSLL may use sick time for any of the following:

- i. such employee's mental illness, physical illness, injury, or health condition or the care of such illness, injury, or condition or such employee's need for medical diagnosis or preventive medical care;
- ii. such employee's care of a family member (an employee's child, spouse, domestic partner, parent, sibling, grandchild or grandparent, or the child or parent of an employee's spouse or domestic partner) who has a mental

- illness, physical illness, injury or health condition or who has a need for medical diagnosis or preventive medical care;
- iii. closure of such employee's place of business by order of a public official due to a public health emergency; or
 - iv. such employee's need to care for a child whose school or childcare provider has been closed due to a public health emergency.

35.5.2(d) An employer must not require an employee, as a condition of taking sick time, to search for a replacement. However, an employer may require an employee to provide: reasonable notice of the need to use sick time; reasonable documentation that the use of sick time was needed for a reason above if for an absence of more than three consecutive work days; and/or written confirmation that an employee used sick time pursuant to the PSLL. However, an employer may not require documentation specifying the nature of a medical condition or otherwise require disclosure of the details of a medical condition as a condition of providing sick time and health information obtained solely due to an employee's use of sick time pursuant to the PSLL must be treated by the employer as confidential.

35.5.2(e) If an employer chooses to impose any permissible discretionary requirement as a condition of using sick time, it must provide to all employees a written policy containing those requirements, using a delivery method that reasonably ensures that employees receive the policy. If such employer has not provided its written policy, it may not deny sick time to an employee because of non-compliance with such a policy.

35.5.2(f) Sick time to which an employee is entitled must be paid no later than the payday for the next regular payroll period beginning after the sick time was used.

35.5.3 Exemptions and Exceptions. Notwithstanding the above, the PSLL does not apply to any of the following:

35.5.3(a) an independent contractor who does not meet the definition of employee under section 190(2) of the New York State Labor Law;

35.5.3(b) an employee covered by a valid collective bargaining agreement in effect on April 1, 2014, until the termination of such agreement;

35.5.3(c) an employee in the construction or grocery industry covered by a valid collective bargaining agreement if the provisions of the PSLL are expressly waived in such collective bargaining agreement;

35.5.3(d) an employee covered by another valid collective bargaining agreement if such provisions are expressly waived in such agreement and such agreement provides a benefit comparable to that provided by the PSLL for such employee;

35.5.3(e) an audiologist, occupational therapist, physical therapist, or speech language pathologist who is licensed by the New York State Department of Education and who calls in for work assignments at will, determines his or her own schedule, has the ability to reject or accept any assignment referred to him or her, and is paid an average hourly wage that is at least four times the federal minimum wage;

35.5.3(f) an employee in a work study program under Section 2753 of Chapter 42 of the United States Code;

35.5.3(g) an employee whose work is compensated by a qualified scholarship program as that term is defined in the Internal Revenue Code, Section 117 of Chapter 20 of the United States Code; or

35.5.3(h) a participant in a Work Experience Program (WEP) under section 336-c of the New York State Social Services Law.

35.5.4 Retaliation Prohibited. An employer may not threaten or engage in retaliation against an employee for exercising or attempting in good faith to exercise any right provided by the PSL. In addition, an employer may not interfere with any investigation, proceeding, or hearing pursuant to the PSL.

35.5.5 Notice of Rights.

35.5.5(a) An employer must provide its employees with written notice of their rights pursuant to the PSL. Such notice must be in English and the primary language spoken by an employee, provided that DCA has made available a translation into such language. Downloadable notices are available on DCA's website at <http://www.nyc.gov/html/dca/html/law/PaidSickLeave.shtml>.

35.5.5(b) Any person or entity that willfully violates these notice requirements is subject to a civil penalty in an amount not to exceed fifty dollars for each employee who was not given appropriate notice.

35.5.6 Records. An employer must retain records documenting its compliance with the PSL for a period of at least three years, and must allow DCA to access such records in furtherance of an investigation related to an alleged violation of the PSL.

35.5.7 Enforcement and Penalties.

35.5.7(a) Upon receiving a complaint alleging a violation of the PSL, DCA has the right to investigate such complaint and attempt to resolve it through mediation. Within **30 Days** of written notification of a complaint by DCA, or sooner in certain circumstances, the employer must provide DCA with a written response and such other information as DCA may request. If DCA believes that a violation of the PSL has occurred, it has the right to issue a notice of violation to the employer.

35.5.7(b) DCA has the power to grant an employee or former employee all appropriate relief as set forth in New York City Administrative Code § 20-924(d). Such relief may include, among other remedies, treble damages for the wages that should have been paid, damages for unlawful retaliation, and damages and reinstatement for unlawful discharge. In addition, DCA may impose on an employer found to have violated the PSL civil penalties not to exceed \$500 for a first violation, \$750 for a second violation within two years of the first violation, and \$1,000 for each succeeding violation within two years of the previous violation.

35.5.8 More Generous Policies and Other Legal Requirements. Nothing in the PSL is intended to discourage, prohibit, diminish, or impair the adoption or retention of a more generous sick time policy, or the obligation of an employer to comply with any contract,

collective bargaining agreement, employment benefit plan or other agreement providing more generous sick time. The PSLL provides minimum requirements pertaining to sick time and does not preempt, limit or otherwise affect the applicability of any other law, regulation, rule, requirement, policy or standard that provides for greater accrual or use by employees of sick leave or time, whether paid or unpaid, or that extends other protections to employees. The PSLL may not be construed as creating or imposing any requirement in conflict with any federal or state law, rule or regulation.

35.6 HireNYC: Hiring and Reporting Requirements. This Article 35.6 applies to construction contracts of \$1,000,000 or more. The **Contractor** shall comply with the requirements of Articles 35.6.1-35.6.5 for all non-trades jobs (e.g., for an administrative position arising out of **Work** ant located in New York City). The **Contractor** shall reasonably cooperate with SBS and the **City** on specific outreach events, including “Hire-on-the-Spot” events, for the hiring of trades workers in connection with the **Work**. If provided elsewhere in this **Contract**, this **Contract** is subject to a project labor agreement.

35.6.1 Enrollment. The **Contractor** shall enroll with the HireNYC system, found at www.nyc.gov/sbs, within thirty (30) days after the registration of this **Contract** pursuant to Section 328 of the New York City Charter. The **Contractor** shall provide information about the business, designate a primary contact and say whether it intends to hire for any entry to mid-level job opportunities arising from this **Contract** and located in New York City, and, if so, the approximate start date of the first hire.

35.6.2 Job Posting Requirements.

35.6.2(a) Once enrolled in HireNYC, the **Contractor** agrees to update the HireNYC portal with all entry to mid-level job opportunities arising from this **Contract** and located in New York City, if any, which shall be defined as jobs requiring no more than an associate degree, as provided by the New York State Department of Labor (see Column F of <https://labor.ny.gov/stats/2012-2022-NYS-Employment-Prospects.xls>). The information to be updated includes the types of entry and mid-level positions made available from the work arising from the **Contract** and located in New York City, the number of positions, the anticipated schedule of initiating the hiring process for these positions, and the contact information for the **Contractor’s** representative charged with overseeing hiring. The **Contractor** must update the HireNYC portal with any hiring needs arising from the contract and located in New York City, and the requirements of the jobs to be filled, no less than three weeks prior to the intended first day of employment for each new position, except with the permission of SBS, not to be unreasonably withheld, and must also update the HireNYC portal as set forth below.

35.6.2(b) After enrollment through HireNYC and submission of relevant information, SBS will work with the **Contractor** to develop a recruitment plan which will outline the candidate screening process, and will provide clear instructions as to when, where, and how interviews will take place. HireNYC will screen applicants based on employer requirements and refer applicants whom it believes are qualified to the **Contractor** for interviews. The **Contractor** must interview referred applicants whom it believes are qualified.

35.6.2(c) After completing an interview of a candidate referred by HireNYC, the **Contractor** must provide feedback via the portal within twenty (20) business days to indicate which candidates were interviewed and hired, if any. In addition, the **Contractor** shall provide the start date of new hires, and additional information

reasonably related to such hires, within twenty (20) business days after the start date. In the event the **Contractor** does not have any job openings covered by this Rider in any given year, the **Contractor** shall be required to provide an annual update to HireNYC to that effect. For this purpose, the reporting year shall run from the date of the registration of the **Contract** pursuant to Charter section 328 and each anniversary date.

35.6.2(d) These requirements do not limit the **Contractor's** ability to assess the qualifications of prospective workers, and to make final hiring and retention decisions. No provision of this Article 35.6 shall be interpreted so as to require the **Contractor** to employ any particular worker.

35.6.2(e) In addition, the provisions of this Article 35.6 shall not apply to positions that the **Contractor** intends to fill with employees employed pursuant to the job retention provision of Section 22-505 of the Administrative Code of the City of New York. The **Contractor** shall not be required to report such openings with HireNYC. However, the **Contractor** shall enroll with the HireNYC system pursuant to Article 35.6.1, above, and, if such positions subsequently become open, then the remaining provisions of this Article 35.6 will apply.

35.6.3 Breach and Liquidated Damages. If the **Contractor** fails to comply with the terms of the **Contract** and this Article 35.6 (1) by not enrolling its business with HireNYC; (2) by not informing HireNYC, as required, of open positions; or (3) by failing to interview a qualified candidate, the **Agency** may assess liquidated damages in the amount of two-thousand five hundred dollars (\$2,500) per breach. For all other events of noncompliance with the terms of this Article 35.6, the **Agency** may assess liquidated damages in the amount of five hundred dollars (\$500) per breach. Furthermore, in the event the **Contractor** breaches the requirements of this Article 35.6 during the term of the **Contract**, the **City** may hold the **Contractor** in default of this **Contract**.

35.6.4 Audit Compliance. In addition to the auditing requirements set forth in other parts of the **Contract**, the **Contractor** shall permit SBS and the **City** to inspect any and all records concerning or relating to job openings or the hiring of individuals for work arising from the **Contract** and located in New York City. The **Contractor** shall permit an inspection within seven (7) business days of the request.

35.6.5 Other Reporting Requirements. The **Contractor** shall report to the **City**, on a monthly basis, all information reasonably requested by the **City** that is necessary for the **City** to comply with any reporting requirements imposed by **Law**, including any requirement that the **City** maintain a publicly accessible database. In addition, the **Contractor** agrees to comply with all reporting requirements imposed by **Law**, or as otherwise requested by the **City**.

35.6.6 Federal Hiring Requirements. If this **Contract** is federally funded (as indicated elsewhere in this **Contract**), the **Contractor** shall comply with all federal hiring requirements as may be set forth in this **Contract**, including, as applicable: (a) Section 3 of the HUD Act of 1968, which requires, to the greatest extent feasible, economic opportunities for 30 percent of new hires be given to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing and Executive Order 11246, which prohibits discrimination in employment due to race, color, religion, sex or national origin, and requires the implementation of goals for minority and female participation for work involving any construction trade.

ARTICLE 36. NO DISCRIMINATION

36.1 The **Contractor** specifically agrees, as required by Labor Law Section 220-e, as amended, that:

36.1.1 In the hiring of employees for the performance of **Work** under this **Contract** or any subcontract hereunder, neither the **Contractor**, **Subcontractor**, nor any person acting on behalf of such **Contractor** or **Subcontractor**, shall by reason of race, creed, color or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the **Work** to which the employment relates;

36.1.2 Neither the **Contractor**, **Subcontractor**, nor any person on its behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of **Work** under this **Contract** on account of race, creed, color or national origin;

36.1.3 There may be deducted from the amount payable to the **Contractor** by the **City** under this **Contract** a penalty of fifty (\$50.00) dollars for each person for each **Day** during which such person was discriminated against or intimidated in violation of the provisions of this **Contract**; and

36.1.4 This **Contract** may be cancelled or terminated by the **City** and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this Article 36.

36.1.5 This Article 36 covers all construction, alteration and repair of any public building or public work occurring in the State of New York and the manufacture, sale, and distribution of materials, equipment, and supplies to the extent that such operations are performed within the State of New York pursuant to this **Contract**.

36.2 The **Contractor** specifically agrees, as required by Section 6-108 of the Administrative Code, as amended, that:

36.2.1 It shall be unlawful for any person engaged in the construction, alteration or repair of buildings or engaged in the construction or repair of streets or highways pursuant to a **Contract** with the **City** or engaged in the manufacture, sale or distribution of materials, equipment or supplies pursuant to a **Contract** with the **City** to refuse to employ or to refuse to continue in any employment any person on account of the race, color or creed of such person.

36.2.2 It shall be unlawful for any person or any servant, agent or employee of any person, described in Article 36.1.2, to ask, indicate or transmit, orally or in writing, directly or indirectly, the race, color or creed or religious affiliation of any person employed or seeking employment from such person, firm or corporation.

36.2.3 Breach of the foregoing provisions shall be deemed a violation of a material provision of this **Contract**.

36.2.4 Any person, or the employee, manager or owner of or officer of such firm or corporation who shall violate any of the provisions of this Article 36.2 shall, upon

conviction thereof, be punished by a fine of not more than one hundred (\$100.00) dollars or by imprisonment for not more than thirty (30) **Days**, or both.

36.3 This **Contract** is subject to the requirements of Executive Order No. 50 (1980) (“E.O. 50”), as revised, and the rules and regulations promulgated thereunder. No contract will be awarded unless and until these requirements have been complied with in their entirety. By signing this **Contract**, the **Contractor** agrees that it:

36.3.1 Will not engage in any unlawful discrimination against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability, marital status or sexual orientation with respect to all employment decisions including, but not limited to, recruitment, hiring, upgrading, demotion, downgrading, transfer, training, rates of pay or other forms of compensation, layoff, termination, and all other terms and conditions of employment; and

36.3.2 Will not engage in any unlawful discrimination in the selection of **Subcontractors** on the basis of the owner’s race, color, creed, national origin, sex, age, disability, marital status or sexual orientation; and

36.3.3 Will state in all solicitations or advertisements for employees placed by or on behalf of the **Contractor** that all qualified applicants will receive consideration for employment without unlawful discrimination based on race, creed, color, national origin, sex, age, citizens status, disability, marital status, sexual orientation, or that it is an equal employment opportunity employer; and

36.3.4 Will send to each labor organization or representative of workers with which it has a collective bargaining agreement or other contract or memorandum of understanding, written notification of its equal employment opportunity commitments under E.O. 50 and the rules and regulations promulgated thereunder; and

36.3.5 Will furnish, before the award of the **Contract**, all information and reports, including an employment report, that are required by E.O. 50, the rules and regulations promulgated thereunder, and orders of the **City** Department of Business Services, Division of Labor Services (**DLS**) and will permit access to its books, records, and accounts by the **DLS** for the purposes of investigation to ascertain compliance with such rules, regulations, and orders.

36.4 The **Contractor** understands that in the event of its noncompliance with the nondiscrimination clauses of this **Contract** or with any of such rules, regulations, or orders, such noncompliance shall constitute a material breach of this **Contract** and noncompliance with E.O. 50 and the rules and regulations promulgated thereunder. After a hearing held pursuant to the rules of the **DLS**, the Director of the **DLS** may direct the **Commissioner** to impose any or all of the following sanctions:

36.4.1 Disapproval of the **Contractor**; and/or

36.4.2 Suspension or termination of the **Contract**; and/or

36.4.3 Declaring the **Contractor** in default; and/or

36.4.4 In lieu of any of the foregoing sanctions, the Director of the **DLS** may impose an employment program.

In addition to any actions taken under this **Contract**, failure to comply with E.O. 50 and the rules and regulations promulgated thereunder, in one or more instances, may result in a **City Agency** declaring the **Contractor** to be non-responsible in future procurements. The **Contractor** further agrees that it will refrain from entering into any **Contract** or **Contract** modification subject to E.O. 50 and the rules and regulations promulgated thereunder with a **Subcontractor** who is not in compliance with the requirements of E.O. 50 and the rules and regulations promulgated thereunder.

36.5 The **Contractor** specifically agrees, as required by Section 6-123 of the Administrative Code, that:

36.5.1 The **Contractor** will not engage in any unlawful discriminatory practice in violation of Title 8 of the Administrative Code; and

36.5.2 Any failure to comply with this Article 36.5 may subject the **Contractor** to the remedies set forth in Section 6-123 of the Administrative Code, including, where appropriate, sanctions such as withholding of payment, imposition of an employment program, finding the **Contractor** to be in default, cancellation of the **Contract**, or any other sanction or remedy provided by **Law** or **Contract**.

ARTICLE 37. LABOR LAW REQUIREMENTS

37.1 The **Contractor** shall strictly comply with all applicable provisions of the Labor Law, as amended. Such compliance is a material term of this **Contract**.

37.2 The **Contractor** specifically agrees, as required by Labor Law Sections 220 and 220-d, as amended, that:

37.2.1 Hours of **Work**: No laborer, worker, or mechanic in the employ of the **Contractor**, **Subcontractor** or other person doing or contracting to do the whole or a part of the **Work** contemplated by this **Contract** shall be permitted or required to work more than eight (8) hours in any one (1) **Day**, or more than five (5) **Days** in any one (1) week, except as provided in the Labor Law and in cases of extraordinary emergency including fire, flood, or danger to life or property, or in the case of national emergency when so proclaimed by the President of the United States of America.

37.2.2 In situations in which there are not sufficient laborers, workers, and mechanics who may be employed to carry on expeditiously the **Work** contemplated by this **Contract** as a result of such restrictions upon the number of hours and **Days** of labor, and the immediate commencement or prosecution or completion without undue delay of the **Work** is necessary for the preservation of the **Site** and/or for the protection of the life and limb of the persons using the same, such laborers, workers, and mechanics shall be permitted or required to work more than eight (8) hours in any one (1) **Day**; or five (5) **Days** in any one (1) week; provided, however, that upon application of any **Contractor**, the **Commissioner** shall have first certified to the Commissioner of Labor of the State of New York (hereinafter "Commissioner of Labor") that such public **Work** is of an important nature and that a delay in carrying it to completion would result in serious disadvantage to the public; and provided, further, that such Commissioner of Labor shall have determined that such an emergency does in fact exist as provided in Labor Law Section 220.2.

37.2.3 Failure of the **Commissioner** to make such a certification to the Commissioner of Labor shall not entitle the **Contractor** to damages for delay or for any cause whatsoever.

37.2.4 Prevailing Rate of Wages: The wages to be paid for a legal day's **Work** to laborers, workers, or mechanics employed upon the **Work** contemplated by this **Contract** or upon any materials to be used thereon shall not be less than the "prevailing rate of wage" as defined in Labor Law Section 220, and as fixed by the **Comptroller** in the attached Schedule of Wage Rates and in updated schedules thereof. The prevailing wage rates and supplemental benefits to be paid are those in effect at the time the **Work** is being performed.

37.2.5 Requests for interpretation or correction in the Information for Bidders includes all requests for clarification of the classification of trades to be employed in the performance of the **Work** under this **Contract**. In the event that a trade not listed in the **Contract** is in fact employed during the performance of this **Contract**, the **Contractor** shall be required to obtain from the **Agency** the prevailing wage rates and supplementary benefits for the trades used and to complete the performance of this **Contract** at the price at which the **Contract** was awarded.

37.2.6 Minimum Wages: Except for employees whose wage is required to be fixed pursuant to Labor Law Section 220, all persons employed by the **Contractor** and any **Subcontractor** in the manufacture or furnishing of the supplies, materials, or equipment, or the furnishing of work, labor, or services, used in the performance of this **Contract**, shall be paid, without subsequent deduction or rebate unless expressly authorized by **Law**, not less than the sum mandated by **Law**.

37.3 Working Conditions: No part of the **Work**, labor or services shall be performed or rendered by the **Contractor** in any plants, factories, buildings or surroundings or under working conditions which are unsanitary or hazardous or dangerous to the health and safety of employees engaged in the performance of this **Contract**. Compliance with the safety, sanitary, and factory inspection **Laws** of the state in which the **Work** is to be performed shall be prima facie evidence of compliance with this Article 37.3.

37.4 Prevailing Wage Enforcement: The **Contractor** agrees to pay for all costs incurred by the **City** in enforcing prevailing wage requirements, including the cost of any investigation conducted by or on behalf of the **Agency** or the **Comptroller**, where the **City** discovers a failure to comply with any of the requirements of this Article 37 by the **Contractor** or its **Subcontractor(s)**. The **Contractor** also agrees that, should it fail or refuse to pay for any such investigation, the **Agency** is hereby authorized to deduct from a **Contractor's** account an amount equal to the cost of such investigation.

37.4.1 The Labor Law Section 220 and Section 220-d, as amended, provide that this **Contract** shall be forfeited and no sum paid for any **Work** done hereunder on a second conviction for willfully paying less than:

37.4.1(a) The stipulated prevailing wage scale as provided in Labor Law section 220, as amended, or

37.4.1(b) The stipulated minimum hourly wage scale as provided in Labor Law section 220-d, as amended.

37.4.2 For any breach or violation of either working conditions (Article 37.3) or minimum wages (Article 37.2.6) provisions, the party responsible therefor shall be liable to the **City** for liquidated damages, which may be withheld from any amounts due on any contracts with the **City** of such party responsible, or may be recovered in actions brought by the **City**

Corporation Counsel in the name of the **City**, in addition to damages for any other breach of this **Contract**, for a sum equal to the amount of any underpayment of wages due to any employee engaged in the performance of this **Contract**. In addition, the **Commissioner** shall have the right to cancel contracts and enter into other contracts for the completion of the original contract, with or without public letting, and the original **Contractor** shall be liable for any additional cost. All sums withheld or recovered as deductions, rebates, refunds, or underpayment of wages hereunder, shall be held in a special deposit account and shall be paid without interest, on order of the **Comptroller**, directly to the employees who have been paid less than minimum rates of pay as set forth herein and on whose account such sums were withheld or recovered, provided that no claims by employees for such payments shall be entertained unless made within two (2) years from the date of actual notice to the **Contractor** of the withholding or recovery of such sums by the **City**.

37.4.3 A determination by the **Comptroller** that a **Contractor** and/or its **Subcontractor** willfully violated Labor Law Section 220 will be forwarded to the **City's** five District Attorneys for review.

37.4.4 The **Contractor's** or **Subcontractor's** noncompliance with this Article 37.4 and Labor Law Section 220 may result in an unsatisfactory performance evaluation and the **Comptroller** may also find and determine that the **Contractor** or **Subcontractor** willfully violated the New York Labor **Law**.

37.4.4(a) An unsatisfactory performance evaluation for noncompliance with this Article 37.4 may result in a determination that the **Contractor** is a non-responsible bidder on subsequent procurements with the **City** and thus a rejection of a future award of a contract with the **City**, as well as any other sanctions provided for by **Law**.

37.4.4(b) Labor Law Section 220-b, as amended, provides that when two (2) final determinations have been rendered against a **Contractor** or **Subcontractor** within any consecutive six (6) year period determining that such **Contractor** or **Subcontractor** has willfully failed to pay the prevailing rate of wages or to provide supplements in accordance with the Labor Law and this Article 37.4, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public works projects are rendered simultaneously, such **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public works contract with the **City** for a period of five (5) years from the second final determination. If the final determination involves the falsification of payroll records or the kickback of wages or supplements, the **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public works contract with the **City** for a period of five (5) years from the first final determination.

37.4.4(c) Labor Law Section 220, as amended, provides that the **Contractor** or **Subcontractor** found to have violated this Article 37.4 may be directed to make payment of wages or supplements including interest found to be due, and the **Contractor** or **Subcontractor** may be directed to make payment of a further sum as a civil penalty in an amount not exceeding twenty-five (25%) percent of the total amount found to be due.

37.5 The **Contractor** and its **Subcontractors** shall within ten (10) **Days** after mailing of a Notice of Award or written order, post in prominent and conspicuous places in each and every plant, factory, building, and structure where employees of the **Contractor** and its **Subcontractors** engaged in the

performance of this **Contract** are employed, notices furnished by the **City**, in relation to prevailing wages and supplements, minimum wages, and other stipulations contained in Sections 220 and 220-h of the Labor Law, and the **Contractor** and its **Subcontractors** shall continue to keep such notices posted in such prominent and conspicuous places until **Final Acceptance** of the supplies, materials, equipment, or **Work**, labor, or services required to be furnished or rendered under this **Contract**.

37.6 The **Contractor** shall strictly comply with all of the provisions of Articles 37.6.1 through 37.6.5, and provide for all workers, laborers or mechanics in its employ, the following:

37.6.1 Notices Posted At **Site**: Post, in a location designated by the **City**, schedules of prevailing wages and supplements for this **Project**, a copy of all re-determinations of such schedules for the **Project**, the Workers' Compensation **Law** Section 51 notice, all other notices required by **Law** to be posted at the **Site**, the **City** notice that this **Project** is a public works project on which each worker is entitled to receive the prevailing wages and supplements for the occupation at which he or she is working, and all other notices which the **City** directs the **Contractor** to post. The **Contractor** shall provide a surface for such notices which is satisfactory to the **City**. The **Contractor** shall maintain and keep current such notices in a legible manner and shall replace any notice or schedule which is damaged, defaced, illegible or removed for any reason. The **Contractor** shall post such notices before commencing any **Work** on the **Site** and shall maintain such notices until all **Work** on the **Site** is complete; and

37.6.2 Daily **Site** Sign-in Sheets: Maintain daily **Site** sign-in sheets, and require that **Subcontractors** maintain daily **Site** sign-in sheets for its employees, which include blank spaces for an employee's name to be both printed and signed, job title, date started and Social Security number, the time the employee began work and the time the employee left work, until **Final Acceptance** of the supplies, materials, equipment, or **Work**, labor, or services to be furnished or rendered under this **Contract** unless exception is granted by the **Comptroller** upon application by the **Agency**. In the alternative, subject to the approval of the **CCPO**, the **Contractor** and **Subcontractor** may maintain an electronic or biometric sign-in system, which provides the information required by this Article 37.6.2; and

37.6.3 Individual Employee Information Notices: Distribute a notice to each worker, laborer or mechanic employed under this **Contract**, in a form provided by the **Agency**, that this **Project** is a public works project on which each worker, laborer or mechanic is entitled to receive the prevailing rate of wages and supplements for the occupation at which he or she is working. If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand (\$250,000) dollars, such notice shall also include a statement that each worker, laborer or mechanic must be certified prior to performing any **Work** as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least ten (10) hours in duration. Such notice shall be distributed to each worker before he or she starts performing any **Work** of this **Contract** and with the first paycheck after July first of each year. "Worker, laborer or mechanic" includes employees of the **Contractor** and all **Subcontractors** and all employees of suppliers entering the **Site**. At the time of distribution, the **Contractor** shall have each worker, laborer or mechanic sign a statement, in a form provided by the **Agency**, certifying that the worker has received the notice required by this Article 37.6.3, which signed statement shall be maintained with the payroll records required by this **Contract**; and

37.6.3(a) The **Contractor** and each **Subcontractor** shall notify each worker, laborer or mechanic employed under this **Contract** in writing of the prevailing rate of

wages for their particular job classification. Such notification shall be given to every worker, laborer, and mechanic on their first pay stub and with every pay stub thereafter; and

37.6.4 **Site Laminated Identification Badges:** The **Contractor** shall provide laminated identification badges which include a photograph of the worker's, laborer's or mechanic's face and indicate the worker's, laborer's or mechanic's name, trade, employer's name, and employment starting date (month/day/year). Further, the **Contractor** shall require as a condition of employment on the **Site**, that each and every worker, laborer or mechanic wear the laminated identification badge at all times and that it may be seen by any representative of the **City**. The **Commissioner** may grant a written waiver from the requirement that the laminated identification badge include a photograph if the **Contractor** demonstrates that the identity of an individual wearing a laminated identification badge can be easily verified by another method; and

37.6.5 **Language Other Than English Used On Site:** Provide the **ACCO** notice when three (3) or more employees (worker and/or laborer and/or mechanic) on the **Site**, at any time, speak a language other than English. The **ACCO** will then provide the **Contractor** the notices described in Article 37.6.1 in that language or languages as may be required. The **Contractor** is responsible for all distributions under this Article 37; and

37.6.6 **Provision of Records:** The **Contractor** and **Subcontractor(s)** shall produce within five (5) **Days** on the **Site** of the **Work** and upon a written order of the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, or the **Comptroller**, such records as are required to be kept by this Article 37.6; and

37.6.7 The **Contractor** and **Subcontractor(s)** shall pay employees by check or direct deposit. If this **Contract** is for an amount greater than one million (\$1,000,000) dollars, checks issued by the **Contractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**). For any subcontract for an amount greater than seven hundred fifty thousand (\$750,000) dollars, checks issued by a **Subcontractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**); and

37.6.8 The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of Articles 37.6.1 through 37.6.7 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.

37.7 The **Contractor** and its **Subcontractors** shall keep such employment and payroll records as are required by Section 220 of the Labor Law. The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of this Article 37.7 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.

37.8 At the time the **Contractor** makes application for each partial payment and for final payment, the **Contractor** shall submit to the **Commissioner** a written payroll certification, in the form provided by this **Contract**, of compliance with the prevailing wage, minimum wage, and other provisions and stipulations required by Labor Law Section 220 and of compliance with the training requirements of Labor Law Section 220-h set forth in Article 35.2. This certification of compliance shall be a condition precedent to payment and no payment shall be made to the **Contractor** unless and until each such certification shall have been submitted to and received by the **Commissioner**.

37.9 This **Contract** is executed by the **Contractor** with the express warranty and representation that the **Contractor** is not disqualified under the provisions of Section 220 of the Labor Law from the award of the **Contract**.

37.10 Any breach or violation of any of the foregoing shall be deemed a breach or violation of a material provision of this **Contract**, and grounds for cancellation thereof by the **City**.

ARTICLE 38. PAYROLL REPORTS

38.1 The **Contractor** and its **Subcontractor(s)** shall maintain on the **Site** during the performance of the **Work** the original payrolls or transcripts thereof which the **Contractor** and its **Subcontractor(s)** are required to maintain and shall submit such original payrolls or transcripts, subscribed and affirmed by it as true, within thirty (30) **Days** after issuance of its first payroll, and every thirty (30) **Days** thereafter, pursuant to Labor Law Section 220(3-a)(a)(iii). The **Contractor** and **Subcontractor(s)** shall submit such original payrolls or transcripts along with each and every payment requisition. If payment requisitions are not submitted at least once a month, the **Contractor** and its **Subcontractor(s)** shall submit original payrolls and transcripts both along with its payment requisitions and independently of its payment requisitions.

38.2 The **Contractor** shall maintain payrolls or transcripts thereof for six (6) years from the date of completion of the **Work** on this **Contract**. If such payrolls and transcripts are maintained outside of New York City after the completion of the **Work** and their production is required pursuant to this Article 38, the **Contractor** shall produce such records in New York City upon request by the **City**.

38.3 The **Contractor** and **Subcontractor(s)** shall comply with any written order, direction, or request made by the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, the **Agency Labor Law Investigator(s)**, or the **Comptroller**, to provide to the requesting party any of the following information and/or records within five (5) **Days** of such written order, direction, or request:

38.3.1 Such original payrolls or transcripts thereof subscribed and affirmed by it as true and the statements signed by each worker pursuant to this Chapter VIII; and/or

38.3.2 Attendance sheets for each **Day** on which any employee of the **Contractor** and/or any of the **Subcontractor(s)** performed **Work** on the **Site**, which attendance sheet shall be in a form acceptable to the **Agency** and shall provide information acceptable to the **Agency** to identify each such employee; and/or

38.3.3 Any other information to satisfy the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, the **Agency Labor Law Investigator(s)** or the **Comptroller**, that this Chapter VIII and the Labor Law, as to the hours of employment and prevailing rates of wages and/or supplemental benefits, are being observed.

38.4 The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of Articles 38.1 and/or 38.2 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.

ARTICLE 39. DUST HAZARDS

39.1 Should a harmful dust hazard be created in performing the **Work** of this **Contract**, for the elimination of which appliances or methods have been approved by the Board of Standards and Appeals

of the City of New York, such appliances and methods shall be installed, maintained, and effectively operated during the continuance of such harmful dust hazard. Failure to comply with this provision after notice shall make this **Contract** voidable at the sole discretion of the **City**.

CHAPTER IX: PARTIAL AND FINAL PAYMENTS

ARTICLE 40. CONTRACT PRICE

40.1 The **City** shall pay, and the **Contractor** agrees to accept, in full consideration for the **Contractor's** performance of the **Work** subject to the terms and conditions hereof, the lump sum price or unit prices for which this **Contract** was awarded, plus the amount required to be paid for any **Extra Work** ordered by the **Commissioner** under Article 25, less credit for any **Work** omitted pursuant to Article 29.

ARTICLE 41. BID BREAKDOWN ON LUMP SUM

41.1 Within fifteen (15) **Days** after the commencement date specified in the **Notice to Proceed** or **Order to Work**, unless otherwise directed by the **Resident Engineer**, the **Contractor** shall submit to the **Resident Engineer** a breakdown of its bid price, or of lump sums bid for items of the **Contract**, showing the various operations to be performed under the **Contract**, as directed in the progress schedule required under Article 9, and the value of each of such operations, the total of such items to equal the lump sum price bid. Said breakdown must be approved in writing by the **Resident Engineer**.

41.2 No partial payment will be approved until the **Contractor** submits a bid breakdown that is acceptable to the **Resident Engineer**.

41.3 The **Contractor** shall also submit such other information relating to the bid breakdown as directed by the **Resident Engineer**. Thereafter, the breakdown may be used only for checking the **Contractor's** applications for partial payments hereunder, but shall not be binding upon the **City**, the **Commissioner**, or the **Engineer** for any purpose whatsoever.

ARTICLE 42. PARTIAL PAYMENTS

42.1 From time to time as the **Work** progresses satisfactorily, but not more often than once each calendar month (except where the **Commissioner** approves in writing the submission of invoices on a more frequent basis and for invoices relating to **Work** performed pursuant to a change order), the **Contractor** may submit to the **Engineer** a requisition for a partial payment in the prescribed form, which shall contain an estimate of the quantity and the fair value of the **Work** done during the payment period.

42.2 Partial payments may be made for materials, fixtures, and equipment in advance of their actual incorporation in the **Work**, as the **Commissioner** may approve, and upon the terms and conditions set forth in the General Conditions.

42.3 The **Contractor** shall also submit to the **Commissioner** in connection with every application for partial payment a verified statement in the form prescribed by the **Comptroller** setting forth the information required under Labor Law Section 220-a.

42.4 Within thirty (30) **Days** after receipt of a satisfactory payment application, and within sixty (60) **Days** after receipt of a satisfactory payment application in relation to **Work** performed pursuant to a change order, the **Engineer** will prepare and certify, and the **Commissioner** will approve, a voucher for a partial payment in the amount of such approved estimate, less any and all deductions authorized to be made by the **Commissioner** under the terms of this **Contract** or by **Law**.

ARTICLE 43. PROMPT PAYMENT

43.1 The Prompt Payment provisions of the **PPB** Rules in effect at the time of the bid will be applicable to payments made under this **Contract**. The provisions require the payment to the **Contractor** of interest on payments made after the required payment date, except as set forth in the **PPB** Rules.

43.2 The **Contractor** shall submit a proper invoice to receive payment, except where the **Contract** provides that the **Contractor** will be paid at predetermined intervals without having to submit an invoice for each scheduled payment.

43.3 Determination of interest due will be made in accordance with the **PPB** Rules.

43.4 If the **Contractor** is paid interest, the proportionate share(s) of that interest shall be forwarded by the **Contractor** to its **Subcontractor(s)**.

43.5 The **Contractor** shall pay each **Subcontractor** or **Materialman** not later than seven (7) **Days** after receipt of payment out of amounts paid to the **Contractor** by the **City** for **Work** performed by the **Subcontractor** or **Materialman** under this **Contract**.

43.5.1 If **Contractor** fails to make any payment to any **Subcontractor** or **Materialman** within seven (7) **Days** after receipt of payment by the **City** pursuant to this Article 43.5, then the **Contractor** shall pay interest on amounts due to such **Subcontractor** or **Materialman** at the rate of interest in effect on the date such payment is made by the **Contractor** computed in accordance with Section 756-b (1)(b) of the New York General Business Law. Accrual of interest shall commence on the **Day** immediately following the expiration of the seventh **Day** following receipt of payment by the **Contractor** from the **City** and shall end on the date on which payment is made.

43.6 The **Contractor** shall include in each of its subcontracts a provision requiring each **Subcontractor** to make payment to each of its **Subcontractors** or **Materialmen** for **Work** performed under this **Contract** in the same manner and within the same time period set forth above.

ARTICLE 44. SUBSTANTIAL COMPLETION PAYMENT

44.1 The **Contractor** shall submit with the **Substantial Completion** requisition:

44.1.1 A final verified statement of any pending Article 27 disputes in accordance with the **PPB** Rules and this **Contract** and any and all alleged claims against the **City**, in any way connected with or arising out of this **Contract** (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30) setting forth with respect to each such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the

Contractor claims the performance of the **Work** or a particular part thereof was delayed, and an itemized statement and breakdown of the amount claimed for each such delay.

44.1.1(a) With respect to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the **City Corporation Counsel** shall have the same right to inspect, and to make extracts or copies of, the **Contractor's** books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this Article 44.1.1(a) is intended to or shall relieve the **Contractor** from the obligation of complying strictly with Articles 11, 27, 28, and 30. The **Contractor** is warned that unless such claims are completely set forth as herein required, the **Contractor** upon acceptance of the **Substantial Completion** payment pursuant to this Article 44, will have waived any such claims.

44.1.2 **A Final Approved Punch List.**

44.1.3 Where required, a request for an extension of time to achieve **Substantial Completion** or final extension of time.

44.2 The **Commissioner** shall issue a voucher calling for payment of any part or all of the balance due for **Work** performed under the **Contract**, including monies retained under Article 21, less any and all deductions authorized to be made by the **Commissioner**, under this **Contract** or by **Law**, and less twice the amount the **Commissioner** considers necessary to ensure the completion of the balance of the **Work** by the **Contractor**. Such a payment shall be considered a partial and not a final payment. No **Substantial Completion** payment shall be made under this Article 44 where the **Contractor** failed to complete the **Work** within the time fixed for such completion in the Schedule A of the General Conditions, or within the time to which completion may have been extended, until an extension or extensions of time for the completion of **Work** have been acted upon pursuant to Article 13.

44.3 No further partial payments shall be made to the **Contractor** after **Substantial Completion**, except the **Substantial Completion** payment and payment pursuant to any **Contractor's** requisition that were properly filed with the **Commissioner** prior to the date of **Substantial Completion**; however, the **Commissioner** may grant a waiver for further partial payments after the date of **Substantial Completion** to permit payments for change order **Work** and/or release of retainage and deposits pursuant to Articles 21 and 24. Such waiver shall be in writing.

44.4 The **Contractor** acknowledges that nothing contained in this Article 44 is intended to or shall in any way diminish the force and effect of Article 13.

ARTICLE 45. FINAL PAYMENT

45.1 After completion and **Final Acceptance** of the **Work**, the **Contractor** shall submit all required certificates and documents, together with a requisition for the balance claimed to be due under the **Contract**, less the amount authorized to be retained for maintenance under Article 24. Such submission shall be within 90 days of the date of the **Commissioner's** written determination of **Final Acceptance**, or within such additional time as may be granted by the **Commissioner** in writing. If the **Contractor** fails to submit all required certificates and documents within the time allowed, no payment of the balance claimed shall be made to the **Contractor** and the **Contractor** shall be deemed to have forfeited its right to payment of any balance claimed. A verified statement similar to that required in connection with applications for partial payments shall also be submitted to the **Commissioner**.

45.2 Amended Verified Statement of Claims: The **Contractor** shall also submit with the final requisition any amendments to the final verified statement of any pending dispute resolution procedures in accordance with the **PPB** Rules and this **Contract** and any and all alleged claims against the **City**, in any way connected with or arising out of this **Contract** (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30) that have occurred subsequent to **Substantial Completion**, setting forth with respect to each such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each such item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the **Contractor** claims the performance of the **Work** or a particular part thereof was delayed, and an itemized statement and breakdown of the amount claimed for each such delay. With reference to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the **City** Corporation Counsel shall have the same right to inspect, and to make extracts or copies of, the **Contractor's** books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this Article 45.2, is intended to or shall relieve the **Contractor** from the obligation of complying strictly with Articles 11, 27, 28, and 30. The **Contractor** is warned that unless such claims are completely set forth as herein required, the **Contractor**, upon acceptance of the Final Payment pursuant to Article 46, will have waived any such claims.

45.3 Preparation of Final Voucher: Upon determining the balance due hereunder other than on account of claims, the **Engineer** will prepare and certify, for the Commissioner's approval, a voucher for final payment in that amount less any and all deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**. In the case of a lump sum **Contract**, the **Commissioner** shall certify the voucher for final payment within thirty (30) **Days** from the date of completion and acceptance of the **Work**, provided all requests for extensions of time have been acted upon.

45.3.1 All prior certificates and vouchers upon which partial payments were made, being merely estimates made to enable the **Contractor** to prosecute the **Work** more advantageously, shall be subject to correction in the final voucher, and the certification of the **Engineer** thereon and the approval of the **Commissioner** thereof, shall be conditions precedent to the right of the **Contractor** to receive any money hereunder. Such final voucher shall be binding and conclusive upon the **Contractor**.

45.3.2 Payment pursuant to such final voucher, less any deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**, shall constitute the final payment, and shall be made by the **Comptroller** within thirty (30) **Days** after the filing of such voucher in his/her office.

45.4 The **Contractor** acknowledges that nothing contained in this Article 45 is intended to or shall in any way diminish the force and effect of Article 13.

ARTICLE 46. ACCEPTANCE OF FINAL PAYMENT

46.1 The acceptance by the **Contractor**, or by anyone claiming by or through it, of the final payment, whether such payment be made pursuant to any judgment of any court, or otherwise, shall constitute and operate as a release of the **City** from any and all claims of and liability to the **Contractor** for anything heretofore done or furnished for the **Contractor** relating to or arising out of this **Contract** and the **Work** done hereunder, and for any prior act, neglect or default on the part of the **City** or any of its officials, agents or employees, excepting only a claim against the **City** for the amounts deducted or retained in accordance with the terms and provisions of this **Contract** or by **Law**, and excepting any claims, not otherwise waived, or any pending dispute resolution procedures which are contained in the

verified statement filed with the **Contractor's** substantial and final requisitions pursuant to Articles 44 and 45.

46.2 The **Contractor** is warned that the execution by it of a release, in connection with the acceptance of the final payment, containing language purporting to reserve claims other than those herein specifically excepted from the operation of this Article 46, or those for amounts deducted by the **Commissioner** from the final requisition or from the final payment as certified by the **Engineer** and approved by the **Commissioner**, shall not be effective to reserve such claims, anything stated to the **Contractor** orally or in writing by any official, agent or employee of the **City** to the contrary notwithstanding.

46.3 Should the **Contractor** refuse to accept the final payment as tendered by the **Comptroller**, it shall constitute a waiver of any right to interest thereon.

46.4 The **Contractor**, however, shall not be barred by this Article 46 from commencing an action for breach of **Contract** to the extent permitted by **Law** and by the terms of the **Contract** for any claims that are contained in the verified statement filed with the **Contractor's** substantial and final requisitions pursuant to Articles 44 and 45 or that arose after submission of the final payment requisition, provided that a detailed and verified statement of claim is served upon the contracting **Agency** and **Comptroller** not later than forty (40) **Days** after the making of such final payment by electronic funds transfer (EFT) or the mailing of such final payment. The statement shall specify the items upon which the claim will be based and any such claim shall be limited to such items.

ARTICLE 47. APPROVAL BY PUBLIC DESIGN COMMISSION

47.1 All works of art, including paintings, mural decorations, stained glass, statues, bas-reliefs, and other sculptures, monuments, fountains, arches, and other structures of a permanent character intended for ornament or commemoration, and every design of the same to be used in the performance of this **Contract**, and the design of all bridges, approaches, buildings, gates, fences, lamps, or structures to be erected, pursuant to the terms of this **Contract**, shall be submitted to the Art Commission, d/b/a the Public Design Commission of the City of New York, and shall be approved by the Public Design Commission prior to the erection or placing in position of the same. The final payment shall not become due or payable under this **Contract** unless and until the Public Design Commission shall certify that the design for the **Work** herein contracted for has been approved by the said Public Design Commission, and that the same has been executed in substantial accordance with the design so approved, pursuant to the provisions of Chapter 37, Section 854 of the **City** Charter, as amended.

CHAPTER X: CONTRACTOR'S DEFAULT

ARTICLE 48. COMMISSIONER'S RIGHT TO DECLARE CONTRACTOR IN DEFAULT

48.1 In addition to those instances specifically referred to in other Articles herein, the **Commissioner** shall have the right to declare the **Contractor** in default of this **Contract** if:

48.1.1 The **Contractor** fails to commence **Work** when notified to do so by the **Commissioner**; or if

48.1.2 The **Contractor** shall abandon the **Work**; or if

48.1.3 The **Contractor** shall refuse to proceed with the **Work** when and as directed by the **Commissioner**; or if

48.1.4 The **Contractor** shall, without just cause, reduce its working force to a number which, if maintained, would be insufficient, in the opinion of the **Commissioner**, to complete the **Work** in accordance with the progress schedule; or if

48.1.5 The **Contractor** shall fail or refuse to increase sufficiently such working force when ordered to do so by the **Commissioner**; or if

48.1.6 The **Contractor** shall sublet, assign, transfer, convert or otherwise dispose of this **Contract** other than as herein specified; or sell or assign a majority interest in the **Contractor**; or if

48.1.7 The **Contractor** fails to secure and maintain all required insurance; or if

48.1.8 A receiver or receivers are appointed to take charge of the **Contractor's** property or affairs; or if

48.1.9 The **Commissioner** shall be of the opinion that the **Contractor** is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the **Work**, or the award of necessary subcontracts, or the placing of necessary material and equipment orders; or if

48.1.10 The **Commissioner** shall be of the opinion that the **Contractor** is or has been willfully or in bad faith violating any of the provisions of this **Contract**; or if

48.1.11 The **Commissioner** shall be of the opinion that the **Work** cannot be completed within the time herein provided therefor or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the **Commissioner's** opinion, attributable to conditions within the **Contractor's** control; or if

48.1.12 The **Work** is not completed within the time herein provided therefor or within the time to which the **Contractor** may be entitled to have such completion extended; or if

48.1.13 Any statement or representation of the **Contractor** in the **Contract** or in any document submitted by the **Contractor** with respect to the **Work**, the **Project**, or the **Contract** (or for purposes of securing the **Contract**) was untrue or incorrect when made; or if

48.1.14 The **Contractor** or any of its officers, directors, partners, five (5%) percent shareholders, principals, or other persons substantially involved in its activities, commits any of the acts or omissions specified as the grounds for debarment in the **PPB Rules**.

48.2 Before the **Commissioner** shall exercise his/her right to declare the **Contractor** in default, the **Commissioner** shall give the **Contractor** an opportunity to be heard, upon not less than two (2) **Days'** notice.

ARTICLE 49. EXERCISE OF THE RIGHT TO DECLARE DEFAULT

49.1 The right to declare the **Contractor** in default for any of the grounds specified or referred to in Article 48 shall be exercised by sending the **Contractor** a notice, signed by the **Commissioner**, setting forth the ground or grounds upon which such default is declared (hereinafter referred to as a “Notice of Default”).

49.2 The **Commissioner’s** determination that the **Contractor** is in default shall be conclusive, final, and binding on the parties and such a finding shall preclude the **Contractor** from commencing a plenary action for any damages relating to the **Contract**. If the **Contractor** protests the determination of the **Commissioner**, the **Contractor** may commence an action in a court of competent jurisdiction of the State of New York under Article 78 of the New York Civil Practice Law and Rules.

ARTICLE 50. QUITTING THE SITE

50.1 Upon receipt of such notice the **Contractor** shall immediately discontinue all further operations under this **Contract** and shall immediately quit the **Site**, leaving untouched all plant, materials, equipment, tools, and supplies then on the **Site**.

ARTICLE 51. COMPLETION OF THE WORK

51.1 The **Commissioner**, after declaring the **Contractor** in default, may then have the **Work** completed by such means and in such manner, by contract with or without public letting, or otherwise, as he/she may deem advisable, utilizing for such purpose such of the **Contractor’s** plant, materials, equipment, tools, and supplies remaining on the **Site**, and also such **Subcontractors**, as he/she may deem advisable.

51.2 After such completion, the **Commissioner** shall make a certificate stating the expense incurred in such completion, which shall include the cost of re-letting and also the total amount of liquidated damages (at the rate provided for in the **Contract**) from the date when the **Work** should have been completed by the **Contractor** in accordance with the terms hereof to the date of actual completion of the **Work**. Such certificate shall be binding and conclusive upon the **Contractor**, its sureties, and any person claiming under the **Contractor**, as to the amount thereof.

51.3 The expense of such completion, including any and all related and incidental costs, as so certified by the **Commissioner**, and any liquidated damages assessed against the **Contractor**, shall be charged against and deducted out of monies which are earned by the **Contractor** prior to the date of default. Should the expense of such completion, as certified by the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.

ARTICLE 52. PARTIAL DEFAULT

52.1 In case the **Commissioner** shall declare the **Contractor** in default as to a part of the **Work** only, the **Contractor** shall discontinue such part, shall continue performing the remainder of the **Work** in strict conformity with the terms of this **Contract**, and shall in no way hinder or interfere with any **Other Contractor(s)** or persons whom the **Commissioner** may engage to complete the **Work** as to which the **Contractor** was declared in default.

52.2 The provisions of this Chapter relating to declaring the **Contractor** in default as to the entire **Work** shall be equally applicable to a declaration of partial default, except that the **Commissioner** shall be entitled to utilize for completion of the part of the **Work** as to which the **Contractor** was declared in default only such plant, materials, equipment, tools, and supplies as had been previously used by the **Contractor** on such part.

ARTICLE 53. PERFORMANCE OF UNCOMPLETED WORK

53.1 In completing the whole or any part of the **Work** under the provisions of this Chapter X, the **Commissioner** shall have the power to depart from or change or vary the terms and provisions of this **Contract**, provided, however, that such departure, change or variation is made for the purpose of reducing the time or expense of such completion. Such departure, change or variation, even to the extent of accepting a lesser or different performance, shall not affect the conclusiveness of the **Commissioner's** certificate of the cost of completion referred to in Article 51, nor shall it constitute a defense to an action to recover the amount by which such certificate exceeds the amount which would have been payable to the **Contractor** hereunder but for its default.

ARTICLE 54. OTHER REMEDIES

54.1 In addition to the right to declare the **Contractor** in default pursuant to this Chapter X, the **Commissioner** shall have the absolute right, in his/her sole discretion and without a hearing, to complete or cause to be completed in the same manner as described in Articles 51 and 53, any or all unsatisfactory or uncompleted punch list **Work** that remains after the completion date specified in the **Final Approved Punch List**. A written notice of the exercise of this right shall be sent to the **Contractor** who shall immediately quit the **Site** in accordance with the provisions of Article 50.

54.2 The expense of completion permitted under Article 54.1, including any and all related and incidental costs, as so certified by the **Commissioner**, shall be charged against and deducted out of monies which have been earned by the **Contractor** prior to the date of the exercise of the right set forth in Article 54.1; the balance of such monies, if any, subject to the other provisions of this **Contract**, to be paid to the **Contractor** without interest after such completion. Should the expense of such completion, as certified by the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.

54.3 The previous provisions of this Chapter X shall be in addition to any and all other remedies available under **Law** or in equity.

54.4 The exercise by the **City** of any remedy set forth herein shall not be deemed a waiver by the **City** of any other legal or equitable remedy contained in this **Contract** or provided under **Law**.

CHAPTER XI: MISCELLANEOUS PROVISIONS

ARTICLE 55. CONTRACTOR'S WARRANTIES

55.1 In consideration of, and to induce, the award of this **Contract** to the **Contractor**, the **Contractor** represents and warrants:

55.1.1 That it is financially solvent, sufficiently experienced and competent to perform the **Work**; and

55.1.2 That the facts stated in its bid and the information given by it pursuant to the Information for Bidders is true and correct in all respects; and

55.1.3 That it has read and complied with all requirements set forth in the **Contract**.

ARTICLE 56. CLAIMS AND ACTIONS THEREON

56.1 Any claim, that is not subject to dispute resolution under the **PPB** Rules or this **Contract**, against the **City** for damages for breach of **Contract** shall not be made or asserted in any action, unless the **Contractor** shall have strictly complied with all requirements relating to the giving of notice and of information with respect to such claims, as herein before provided.

56.2 Nor shall any action be instituted or maintained on any such claims unless such action is commenced within six (6) months after **Substantial Completion**; except that:

56.2.1 Any claims arising out of events occurring after **Substantial Completion** and before **Final Acceptance** of the **Work** shall be asserted within six (6) months of **Final Acceptance** of the **Work**;

56.2.2 If the **Commissioner** exercises his/her right to complete or cause to complete any or all unsatisfactory or uncompleted punch list **Work** that remains after the completion date specified in the **Final Approved Punch List** pursuant to Article 54, any such action shall be commenced within six (6) months from the date the **Commissioner** notifies the **Contractor** in writing that he/she has exercised such right. Any claims for monies deducted, retained or withheld under the provisions of this **Contract** shall be asserted within six (6) months after the date when such monies otherwise become due and payable hereunder; and

56.2.3 If the **Commissioner** exercises his/her right to terminate the **Contract** pursuant to Article 64, any such action shall be commenced within six (6) months of the date the **Commissioner** exercises said right.

ARTICLE 57. INFRINGEMENT

57.1 The **Contractor** shall be solely responsible for and shall defend, indemnify, and hold the **City** harmless from any and all claims (even if the allegations of the lawsuit are without merit) and judgments for damages and from costs and expenses to which the **City** may be subject to or which it may suffer or incur allegedly arising out of or in connection with any infringement by the **Contractor** of any copyright, trade secrets, trademark or patent rights or any other property or personal right of any third party by the **Contractor** and/or its **Subcontractors** in the performance or completion of the **Work**. Insofar as the facts or **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent permitted by **Law**.

ARTICLE 58. NO CLAIM AGAINST OFFICIALS, AGENTS OR EMPLOYEES

58.1 No claim whatsoever shall be made by the **Contractor** against any official, agent or employee of the **City** for, or on account of, anything done or omitted to be done in connection with this **Contract**.

ARTICLE 59. SERVICE OF NOTICES

59.1 The **Contractor** hereby designates the business address, fax number, and email address specified in its bid, as the place where all notices, directions or other communications to the **Contractor** may be delivered, or to which they may be mailed. Any notice, direction, or communication from either party to the other shall be in writing and shall be deemed to have been given when (i) delivered personally; (ii) sent by certified mail, return receipt requested; (iii) delivered by overnight or same day courier service in a properly addressed envelope with confirmation; or (iv) sent by fax or email and, unless receipt of the fax or e-mail is acknowledged by the recipient by fax or e-mail, deposited in a post office box regularly maintained by the United States Postal Service in a properly addressed, postage pre-paid envelope.

59.2 **Contractor's** notice address, email address, or fax number may be changed at any time by an instrument in writing, executed and acknowledged by the **Contractor**, and delivered to the **Commissioner**.

59.3 Nothing herein contained shall, however, be deemed to preclude or render inoperative the service of any notice, direction or other communication upon the **Contractor** personally, or, if the **Contractor** is a corporation, upon any officer thereof.

ARTICLE 60. UNLAWFUL PROVISIONS DEEMED STRICKEN FROM CONTRACT

60.1 If this **Contract** contains any unlawful provision not an essential part of the **Contract** and which shall not appear to have been a controlling or material inducement to the making thereof, the same shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the **Contract** without affecting the binding force of the remainder.

ARTICLE 61. ALL LEGAL PROVISIONS DEEMED INCLUDED

61.1 It is the intent and understanding of the parties to this **Contract** that each and every provision of **Law** required to be inserted in this **Contract** shall be and is inserted herein. Furthermore, it is hereby stipulated that every such provision is to be deemed to be inserted herein, and if, through mistake or otherwise, any such provision is not inserted, or is not inserted in correct form, then this **Contract** shall forthwith upon the application of either party be amended by such insertion so as to comply strictly with the **Law** and without prejudice to the rights of either party hereunder.

ARTICLE 62. TAX EXEMPTION

62.1 The **City** is exempt from payment of Federal, State, and local taxes, including sales and compensating use taxes of the State of New York and its cities and counties on all tangible personal property sold to the **City** pursuant to the provisions of this **Contract**. These taxes are not to be included in bids. However, this exemption does not apply to tools, machinery, equipment or other property leased by or to the **Contractor**, **Subcontractor** or **Materialman** or to tangible personal property which, even

though it is consumed, is not incorporated into the completed **Work** (consumable supplies) and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**. The **Contractor** and its **Subcontractors** and **Materialmen** shall be responsible for and pay any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property and upon all such consumable supplies and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**.

62.2 The **Contractor** agrees to sell and the **City** agrees to purchase all tangible personal property, other than consumable supplies and other tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**, that is required, necessary or proper for or incidental to the construction of the **Project** covered by this **Contract**. The sum paid under this **Contract** for such tangible personal property shall be in full payment and consideration for the sale of such tangible personal property.

62.2.1 The **Contractor** agrees to construct the **Project** and to perform all **Work**, labor and services rendered, necessary, proper or incidental thereto for the sum shown in the bid for the performance of such **Work**, labor, and services, and the sum so paid pursuant to this **Contract** for such **Work**, labor, and services, shall be in full consideration for the performance by the **Contractor** of all its duties and obligations under this **Contract** in connection with said **Work**, labor, and services.

62.3 20 NYCRR Section 541.3(d) provides that a **Contractor's** purchases of tangible personal property that is either incorporated into real property owned by a governmental entity or purchased for and sold to a governmental entity are exempt from sales and use tax. The **City** shall not pay sales tax for any such tangible personal property that it purchases from the **Contractor** pursuant to the **Contract**. With respect to such tangible personal property, the **Contractor**, at the request of the **City**, shall furnish to the **City** such bills of sale and other instruments as may be required by the **City**, properly executed, acknowledged and delivered assuring to the **City** title to such tangible personal property, free of liens and/or encumbrances, and the **Contractor** shall mark or otherwise identify all such tangible personal property as the property of the **City**.

62.4 Title to all tangible personal property to be sold by the **Contractor** to the **City** pursuant to the provisions of the **Contract** shall immediately vest in and become the sole property of the **City** upon delivery of such tangible personal property to the **Site**. Notwithstanding such transfer of title, the **Contractor** shall have the full and continuing responsibility to install such tangible personal property in accordance with the provisions of this **Contract**, protect it, maintain it in a proper condition and forthwith repair, replace and make good any damage thereto, theft or disappearance thereof, and furnish additional tangible personal property in place of any that may be lost, stolen or rendered unusable, without cost to the **City**, until such time as the **Work** covered by the **Contract** is fully accepted by the **City**. Such transfer of title shall in no way affect any of the **Contractor's** obligations hereunder. In the event that, after title has passed to the **City**, any of the tangible personal property is rejected as being defective or otherwise unsatisfactory, title to all such tangible personal property shall be deemed to have been transferred back to the **Contractor**.

62.5 The purchase by **Subcontractors** or **Materialmen** of tangible personal property to be sold hereunder shall be a purchase or procurement for resale to the **Contractor** (either directly or through other **Subcontractors**) and therefore not subject to the aforesaid sales and compensating use taxes, provided that the subcontracts and purchase agreements provide for the resale of such tangible personal property and that such subcontracts and purchase agreements are in a form similar to this **Contract** with respect to the separation of the sale of consumable supplies and tangible personal property that the

Contractor is required to remove from the **Site** during or upon completion of the **Work** from the **Work** and labor, services, and any other matters to be provided, and provided further that the subcontracts and purchase agreements provide separate prices for tangible personal property and all other services and matters. Such separation shall actually be followed in practice, including the separation of payments for tangible personal property from the payments for other **Work** and labor and other things to be provided.

62.6 The **Contractor** and its **Subcontractors** and **Materialmen** shall furnish a **Contractor** Exempt Purchase Certificate to all persons, firms or corporations from which they purchase tangible personal property for the performance of the **Work** covered by this **Contract**.

62.7 In the event any of the provisions of this Article 62 shall be deemed to be in conflict with any other provisions of this **Contract** or create any ambiguity, then the provisions of this Article 62 shall control.

ARTICLE 63. INVESTIGATION(S) CLAUSE

63.1 The parties to this **Contract** agree to cooperate fully and faithfully with any investigation, audit or inquiry conducted by a United States, a State of New York (State) or a **City** governmental agency or authority that is empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath, or conducted by the Inspector General of a governmental agency that is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit or license that is the subject of the investigation, audit or inquiry.

63.2 If any person who has been advised that his/her statement, and any information from such statement, will not be used against him/her in any subsequent criminal proceeding refuses to testify before a grand jury or other governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath concerning the award of or performance under any transaction, agreement, lease, permit, contract, or license entered into with the **City**, the State, or any political subdivision or public authority thereof, or the Port Authority of New York and New Jersey, or any local development corporation within the **City**, or any public benefit corporation organized under the **Laws** of the State of New York, or;

63.3 If any person refuses to testify for a reason other than the assertion of his/her privilege against self incrimination in an investigation, audit or inquiry conducted by a **City** or State governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to take testimony under oath, or by the Inspector General of the governmental agency that is a party in interest in, and is seeking testimony concerning the award of, or performance under any transaction, agreement, lease, permit, contract, or license entered into with the **City**, the State, or any political subdivision thereof or any local development corporation within the **City**, then;

63.4 The **Commissioner** whose **Agency** is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit, or license shall convene a hearing, upon not less than five (5) **Days**' written notice to the parties involved to determine if any penalties should attach for the failure of a person to testify.

63.5 If any non-governmental party to the hearing requests an adjournment, the **Commissioner** who convened the hearing may, upon granting the adjournment, suspend any contract, lease, permit, or license, pending the final determination pursuant to Article 63.7 without the **City** incurring any penalty or damages for delay or otherwise.

63.6 The penalties which may attach after a final determination by the **Commissioner** may include but shall not exceed:

63.6.1 The disqualification for a period not to exceed five (5) years from the date of an adverse determination for any person, or any entity of which such person was a member at the time the testimony was sought, from submitting bids for, or transacting business with, or entering into or obtaining any contract, lease, permit or license with or from the **City**; and/or

63.6.2 The cancellation or termination of any and all such existing **City** contracts, leases, permits or licenses that the refusal to testify concerns and that have not been assigned as permitted under this **Contract**, nor the proceeds of which pledged, to an unaffiliated and unrelated institutional lender for fair value prior to the issuance of the notice scheduling the hearing, without the **City** incurring any penalty or damages on account of such cancellation or termination; monies lawfully due for goods delivered, work done, rentals, or fees accrued prior to the cancellation or termination shall be paid by the **City**.

63.7 The **Commissioner** shall consider and address in reaching his/her determination and in assessing an appropriate penalty the factors in Articles 63.7.1 and 63.7.2. The **Commissioner** may also consider, if relevant and appropriate, the criteria established in Articles 63.7.3 and 63.7.4, in addition to any other information which may be relevant and appropriate:

63.7.1 The party's good faith endeavors or lack thereof to cooperate fully and faithfully with any governmental investigation or audit, including but not limited to the discipline, discharge, or disassociation of any person failing to testify, the production of accurate and complete books and records, and the forthcoming testimony of all other members, agents, assignees or fiduciaries whose testimony is sought.

63.7.2 The relationship of the person who refused to testify to any entity that is a party to the hearing, including but not limited to, whether the person whose testimony is sought has an ownership interest in the entity and/or the degree of authority and responsibility the person has within the entity.

63.7.3 The nexus of the testimony sought to the subject entity and its contracts, leases, permits or licenses with the **City**.

63.7.4 The effect a penalty may have on an unaffiliated and unrelated party or entity that has a significant interest in an entity subject to penalties under Article 63.6, provided that the party or entity has given actual notice to the **Commissioner** upon the acquisition of the interest, or at the hearing called for in Article 63.4, gives notice and proves that such interest was previously acquired. Under either circumstance the party or entity shall present evidence at the hearing demonstrating the potential adverse impact a penalty will have on such person or entity.

63.8 Definitions:

63.8.1 The term "license" or "permit" as used in this Article 63 shall be defined as a license, permit, franchise or concession not granted as a matter of right.

63.8.2 The term "person" as used in this Article 63 shall be defined as any natural person doing business alone or associated with another person or entity as a partner, director, officer, principal or employee.

63.8.3 The term “entity” as used in this Article 63 shall be defined as any firm, partnership, corporation, association, joint venture, or person that receives monies, benefits, licenses, leases, or permits from or through the **City** or otherwise transacts business with the **City**.

63.8.4 The term “member” as used in this Article 63 shall be defined as any person associated with another person or entity as a partner, director, officer, principal or employee.

63.9 In addition to and notwithstanding any other provision of this **Contract**, the **Commissioner** may in his/her sole discretion terminate this **Contract** upon not less than three (3) **Days**’ written notice in the event the **Contractor** fails to promptly report in writing to the **Commissioner** of the Department of Investigations (“DOI”) of the **City** any solicitation of money, goods, requests for future employment or other benefit or thing of value, by or on behalf of any employee of the **City** or other person, firm, corporation or entity for any purpose which may be related to the procurement or obtaining of this **Contract** by the **Contractor**, or affecting the performance of this **Contract**.

ARTICLE 64. TERMINATION BY THE CITY

64.1 In addition to termination pursuant to any other article of this **Contract**, the **Commissioner** may, at any time, terminate this **Contract** by written notice to the **Contractor**. In the event of termination, the **Contractor** shall, upon receipt of such notice, unless otherwise directed by the **Commissioner**:

64.1.1 Stop **Work** on the date specified in the notice;

64.1.2 Take such action as may be necessary for the protection and preservation of the **City**’s materials and property;

64.1.3 Cancel all cancelable orders for material and equipment;

64.1.4 Assign to the **City** and deliver to the **Site** or another location designated by the **Commissioner**, any non-cancelable orders for material and equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract** and not incorporated in the **Work**;

64.1.5 Take no action which will increase the amounts payable by the **City** under this **Contract**.

64.2 In the event of termination by the **City** pursuant to this Article 64, payment to the **Contractor** shall be in accordance with Articles 64.2.1, 64.2.2 or 64.2.3, to the extent that each respective article applies.

64.2.1 Lump Sum Contracts or Items: On all lump sum **Contracts**, or on lump sum items in a **Contract**, the **City** will pay the **Contractor** the sum of the amounts described in Articles 64.2.1(a) and 64.2.1(b), less all payments previously made pursuant to this **Contract**. On lump sum **Contracts** only, the **City** will also pay the **Contractor** an additional sum as provided in Article 64.2.1(c).

64.2.1(a) For **Work** completed prior to the notice of termination, the **Contractor** shall be paid a pro rata portion of the lump sum bid amount, plus approved change orders, based upon the percent completion of the **Work**, as determined by the

Commissioner. For the purpose of determining the pro rata portion of the lump sum bid amount to which the **Contractor** is entitled, the bid breakdown submitted in accordance with Article 41 shall be considered, but shall not be dispositive. The **Commissioner's** determination hereunder shall be final, binding, and conclusive.

64.2.1(b) For non-cancelable material and equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated in the **Work**, the **Contractor** shall be paid the lesser of the following, less salvage value:

64.2.1(b)(i) The Direct Cost, as defined in Article 64.2.4; or

64.2.1(b)(ii) The fair and reasonable value, if less than Direct Cost, of such material and equipment, plus necessary and reasonable delivery costs.

64.2.1(b)(iii) In addition, the **Contractor** shall be paid five (5%) percent of the amount described in Article 64.2.1(b)(i) or Article 64.2.1(b)(ii), whichever applies.

64.2.1(c) Except as otherwise provided in Article 64.2.1(d), on all lump sum **Contracts**, the **Contractor** shall be paid the percentage indicated below applied to the difference between the total lump sum bid amount and the total of all payments made prior to the notice of termination plus all payments allowed pursuant to Articles 64.2.1(a) and 64.2.1(b):

64.2.1(c)(i) Five (5%) percent of the first five million (\$5,000,000) dollars; and

64.2.1(c)(ii) Three (3%) percent of any amount between five million (\$5,000,000) dollars and fifteen million (\$15,000,000) dollars; plus

64.2.1(c)(iii) One (1%) percent of any amount over fifteen million (\$15,000,000) dollars.

64.2.1(d) In the event the **City** terminates a lump sum **Contract** pursuant to this Article 64 within ninety (90) **Days** after registration of the **Contract** with the **Comptroller**, the **Contractor** shall be paid one (1%) percent of the difference between the lump sum bid amount and the total of all payments made pursuant to this Article 64.2.

64.2.2 Unit Price Contracts or Items: On all unit price **Contracts**, or on unit price items in a **Contract**, the **City** will pay the **Contractor** the sum of the amounts described in Articles 64.2.2(a) and 64.2.2(b), less all payments previously made pursuant to this **Contract**:

64.2.2(a) For all completed units, the unit price stated in the **Contract**, and

64.2.2(b) For units that have been ordered but are only partially completed, the **Contractor** will be paid:

64.2.2(b)(i) A pro rata portion of the unit price stated in the **Contract** based upon the percent completion of the unit and

64.2.2(b)(ii) For non-cancelable material and equipment, payment will be made pursuant to Article 64.2.1(b).

64.2.3 Time and Materials Contracts or Items Based on Time and Material Records: On all **Contracts** or items in a **Contract** where payment for the **Work** is based on time and material records, the **Contractor** shall be paid in accordance with Article 26, less all payments previously made pursuant to this **Contract**.

64.2.4 Direct Costs: Direct Costs as used in this Article 64.2 shall mean:

64.2.4(a) The actual purchase price of material and equipment, plus necessary and reasonable delivery costs,

64.2.4(b) The actual cost of labor involved in construction and installation at the **Site**, and

64.2.4(c) The actual cost of necessary bonds and insurance purchased pursuant to requirements of this **Contract** less any amounts that have been or should be refunded by the **Contractor's** sureties or insurance carriers.

64.2.4(d) Direct Costs shall not include overhead.

64.3 In no event shall any payments under this Article 64 exceed the **Contract** price for such items.

64.4 All payments pursuant to Article 64 shall be in the nature of liquidated damages and shall be accepted by the **Contractor** in full satisfaction of all claims against the **City**.

64.5 The **City** may deduct or set off against any sums due and payable pursuant to this Article 64, any deductions authorized by this **Contract** or by **Law** (including but not limited to liquidated damages) and any claims it may have against the **Contractor**. The **City's** exercise of the right to terminate the **Contract** pursuant to this Article 64 shall not impair or otherwise effect the **City's** right to assert any claims it may have against the **Contractor** in a plenary action.

64.6 Where the **Work** covered by the **Contract** has been substantially completed, as determined in writing by the **Commissioner**, termination of the **Work** shall be handled as an omission of **Work** pursuant to Articles 29 and 33, in which case a change order will be issued to reflect an appropriate reduction in the **Contract** sum, or if the amount is determined after final payment, such amount shall be paid by the **Contractor**.

ARTICLE 65. CHOICE OF LAW, CONSENT TO JURISDICTION AND VENUE

65.1 This **Contract** shall be deemed to be executed in the **City** regardless of the domicile of the **Contractor**, and shall be governed by and construed in accordance with the **Laws** of the State of New York and the **Laws** of the United States, where applicable.

65.2 The parties agree that any and all claims asserted against the **City** arising under this **Contract** or related thereto shall be heard and determined in the courts of the State of New York ("New York State Courts") located in the **City** and County of New York. To effect this **Contract** and intent, the **Contractor** agrees:

65.2.1 If the **City** initiates any action against the **Contractor** in Federal court or in a New York State Court, service of process may be made on the **Contractor** either in person, wherever such **Contractor** may be found, or by registered mail addressed to the **Contractor** at its address as set forth in this **Contract**, or to such other address as the **Contractor** may provide to the **City** in writing; and

65.2.2 With respect to any action between the **City** and the **Contractor** in a New York State Court, the **Contractor** hereby expressly waives and relinquishes any rights it might otherwise have:

65.2.2(a) To move to dismiss on grounds of forum non conveniens;

65.2.2(b) To remove to Federal Court; and

65.2.2(c) To move for a change of venue to a New York State Court outside New York County.

65.2.3 With respect to any action brought by the **City** against the **Contractor** in a Federal Court located in the **City**, the **Contractor** expressly waives and relinquishes any right it might otherwise have to move to transfer the action to a Federal Court outside the **City**.

65.2.4 If the **Contractor** commences any action against the **City** in a court located other than in the **City** and County of New York, upon request of the **City**, the **Contractor** shall either consent to a transfer of the action to a New York State Court of competent jurisdiction located in the **City** and County of New York or, if the Court where the action is initially brought will not or cannot transfer the action, the **Contractor** shall consent to dismiss such action without prejudice and may thereafter reinstate the action in a New York State Court of competent jurisdiction in New York County.

65.3 If any provision(s) of this Article 65 is held unenforceable for any reason, each and all other provision(s) shall nevertheless remain in full force and effect.

ARTICLE 66. PARTICIPATION IN AN INTERNATIONAL BOYCOTT

66.1 The **Contractor** agrees that neither the **Contractor** nor any substantially owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the Federal Export Administration Act of 1979, as amended, or the regulations of the United States Department of Commerce (Commerce Department) promulgated thereunder.

66.2 Upon the final determination by the Commerce Department or any other agency of the United States as to, or conviction of the **Contractor** or a substantially-owned affiliated company thereof for participation in an international boycott in violation of the provisions of the Export Administration Act of 1979, as amended, or the regulations promulgated thereunder, the **Comptroller** may, at his/her option, render forfeit and void this **Contract**.

66.3 The **Contractor** shall comply in all respects, with the provisions of Section 6-114 of the Administrative Code and the rules and regulations issued by the **Comptroller** thereunder.

ARTICLE 67. LOCALLY BASED ENTERPRISE PROGRAM

67.1 This **Contract** is subject to the requirements of Section 6-108.1 of the Administrative Code and regulations promulgated thereunder. No construction contract shall be awarded unless and until these requirements have been complied with in their entirety; however, compliance with this Article 67 is not required if the Agency sets Subcontractor Participation Goals for Minority- and Women-Owned Business Enterprises (M/WBEs).

67.2 Unless specifically waived by the **Commissioner** with the approval of the Division of Economic and Financial Opportunity of the **City** Department of Business Services, if any portion of the **Contract** is subcontracted, not less than ten (10%) percent of the total dollar amount of the **Contract** shall be awarded to locally based enterprises (LBEs); except that where less than ten (10%) percent of the total dollar amount of the **Contract** is subcontracted, such lesser percentage shall be so awarded.

67.3 The **Contractor** shall not require performance and payment bonds from LBE **Subcontractors**.

67.4 If the **Contractor** has indicated prior to award that no **Work** will be subcontracted, no **Work** shall be subcontracted without the prior approval of the **Commissioner**, which shall be granted only if the **Contractor** makes a good faith effort beginning at least six (6) weeks before the **Work** is to be performed to obtain LBE **Subcontractors** to perform the **Work**.

67.5 If the **Contractor** has not identified sufficient LBE **Subcontractors** prior to award, it shall sign a letter of compliance stating that it complies with Section 6-108.1 of the Administrative Code, recognizes that achieving the LBE requirement is a condition of its **Contract**, and shall submit documentation demonstrating its good faith efforts to obtain LBEs. After award, the **Contractor** shall begin to solicit LBE's to perform subcontracted **Work** at least six (6) weeks before the date such **Work** is to be performed and shall demonstrate that a good faith effort has been made to obtain LBEs on each subcontract until it meets the required percentage.

67.6 Failure of the **Contractor** to comply with the requirements of Section 6-108.1 of the Administrative Code and the regulations promulgated thereunder shall constitute a material breach of this **Contract**. Remedy for such breach may include the imposition of any or all of the following sanctions:

67.6.1 Reducing the **Contractor's** compensation by an amount equal to the dollar value of the percentage of the LBE subcontracting requirement not complied with;

67.6.2 Declaring the **Contractor** in default;

67.6.3 If the **Contractor** is an LBE, de-certifying and declaring the **Contractor** ineligible to participate in the LBE program for a period of up to three (3) years.

ARTICLE 68. ANTITRUST

68.1 The **Contractor** hereby assigns, sells, and transfers to the **City** all right, title, and interest in and to any claims and causes of action arising under the antitrust **Laws** of New York State or of the United States relating to the particular goods or services purchased or procured by the **City** under this **Contract**.

ARTICLE 69. MacBRIDE PRINCIPLES PROVISIONS

69.1 Notice To All Prospective **Contractors**:

69.1.1 Local Law No. 34 of 1991 became effective on September 10, 1991 and added Section 6-115.1 of the Administrative Code. The local **Law** provides for certain restrictions on **City Contracts** to express the opposition of the people of the **City** to employment discrimination practices in Northern Ireland to promote freedom of work-place opportunity.

69.1.2 Pursuant to Section 6-115.1, prospective **Contractors** for **Contracts** to provide goods or services involving an expenditure of an amount greater than ten thousand (\$10,000.) dollars, or for construction involving an amount greater than fifteen thousand (\$15,000.) dollars, are asked to sign a rider in which they covenant and represent, as a material condition of their **Contract**, that any business operations in Northern Ireland conducted by the **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** will be conducted in accordance with the MacBride Principles of nondiscrimination in employment.

69.1.3 Prospective **Contractors** are not required to agree to these conditions. However, in the case of **Contracts** let by competitive sealed bidding, whenever the lowest responsible bidder has not agreed to stipulate to the conditions set forth in this notice and another bidder who has agreed to stipulate to such conditions has submitted a bid within five (5%) percent of the lowest responsible bid for a **Contract** to supply goods, services or contraction of comparable quality, the **Agency** shall refer such bids to the Mayor, the Speaker or other officials, as appropriate, who may determine, in accordance with applicable **Law**, that it is in the best interest of the **City** that the **Contract** be awarded to other than the lowest responsible pursuant to Section 313(b)(2) of the **City** Charter.

69.1.4 In the case of **Contracts** let by other than competitive sealed bidding, if a prospective **Contractor** does not agree to these conditions, no **Agency**, elected official or the **City** Council shall award the **Contract** to that bidder unless the **Agency** seeking to use the goods, services or construction certifies in writing that the **Contract** is necessary for the **Agency** to perform its functions and there is no other responsible **Contractor** who will supply goods, services or construction of comparable quality at a comparable price.

69.2 In accordance with Section 6-115.1 of the Administrative Code, the **Contractor** stipulates that such **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** either:

69.2.1 Have no business operations in Northern Ireland, or

69.2.2 Shall take lawful steps in good faith to conduct any business operations they have in Northern Ireland in accordance with the MacBride Principles, and shall permit independent monitoring of their compliance with such principles.

69.3 For purposes of this Article, the following terms shall have the following meanings:

69.3.1 “MacBride Principles” shall mean those principles relating to nondiscrimination in employment and freedom of work-place opportunity which require employers doing business in Northern Ireland to:

69.3.1(a) increase the representation of individuals from under-represented religious groups in the workforce, including managerial, supervisory, administrative, clerical and technical jobs;

69.3.1(b) take steps to promote adequate security for the protection of employees from under-represented religious groups both at the work-place and while traveling to and from **Work**;

69.3.1(c) ban provocative religious or political emblems from the workplace;

69.3.1(d) publicly advertise all job openings and make special recruitment efforts to attract applicants from under-represented religious groups;

69.3.1(e) establish layoff, recall, and termination procedures which do not in practice favor a particular religious group;

69.3.1(f) abolish all job reservations, apprenticeship restrictions and different employment criteria which discriminate on the basis of religion;

69.3.1(g) develop training programs that will prepare substantial numbers of current employees from under-represented religious groups for skilled jobs, including the expansion of existing programs and the creation of new programs to train, upgrade, and improve the skills of workers from under-represented religious groups;

69.3.1(h) establish procedures to assess, identify, and actively recruit employees from under-represented religious groups with potential for further advancement; and

69.3.1(i) appoint a senior management staff member to oversee affirmative action efforts and develop a timetable to ensure their full implementation.

69.4 The **Contractor** agrees that the covenants and representations in Article 69.2 are material conditions to this **Contract**. In the event the **Agency** receives information that the **Contractor** who made the stipulation required by this Article 69 is in violation thereof, the **Agency** shall review such information and give the **Contractor** an opportunity to respond. If the **Agency** finds that a violation has occurred, the **Agency** shall have the right to declare the **Contractor** in default and/or terminate this **Contract** for cause and procure supplies, services or **Work** from another source in the manner the **Agency** deems proper. In the event of such termination, the **Contractor** shall pay to the **Agency**, or the **Agency** in its sole discretion may withhold from any amounts otherwise payable to the **Contractor**, the difference between the **Contract** price for the uncompleted portion of this **Contract** and the cost to the **Agency** of completing performance of this **Contract** either itself or by engaging another **Contractor** or **Contractors**. In the case of a requirement **Contract**, the **Contractor** shall be liable for such difference in price for the entire amount of supplies required by the **Agency** for the uncompleted term of **Contractor's Contract**. In the case of a construction **Contract**, the **Agency** shall also have the right to hold the **Contractor** in partial or total default in accordance with the default provisions of this **Contract**, and/or may seek debarment or suspension of the **Contractor**. The rights and remedies of the **Agency** hereunder shall be in addition to, and not in lieu of, any rights and remedies the **Agency** has pursuant to this **Contract** or by operation of **Law**.

ARTICLE 70. ELECTRONIC FILING/NYC DEVELOPMENT HUB

70.1 The **Contractor** shall electronically file all alteration type-2 and alteration type-3 applications via the New York City Development Hub Web site, except applications for the following types of minor alterations: enlargements, curb cuts, legalizations, fire alarms, builders pavement plans, and jobs filed on Landmark Preservation Commission calendared properties. All such filings must be professionally certified. Information about electronic filing via the New York City Development Hub is available on the **City** Department of Buildings Web site at www.nyc.gov/buildings.

ARTICLE 71. PROHIBITION OF TROPICAL HARDWOODS

71.1 Tropical hardwoods, as defined in Section 165 of the New York State Finance Law (Finance Law), shall not be utilized in the performance of this **Contract** except as expressly permitted by Section 165 of the Finance Law.

ARTICLE 72. CONFLICTS OF INTEREST

72.1 Section 2604 of the **City** Charter and other related provisions of the **City** Charter, the Administrative Code, and the Penal Law are applicable under the terms of this **Contract** in relation to conflicts of interest and shall be extended to **Subcontractors** authorized to perform **Work**, labor and services pursuant to this **Contract** and further, it shall be the duty and responsibility of the **Contractor** to so inform its respective **Subcontractors**. Notice is hereby given that, under certain circumstances, penalties may be invoked against the donor as well as the recipient of any form of valuable gift.

ARTICLE 73. MERGER CLAUSE

73.1 The written **Contract** herein, contains all the terms and conditions agreed upon by the parties hereto, and no other agreement, oral or otherwise, regarding the subject matter of this **Contract** shall be deemed to exist or to bind any of the parties hereto, or to vary any of the terms contained herein.

ARTICLE 74. STATEMENT OF WORK

74.1 The **Contractor** shall furnish all labor and materials and perform all **Work** in strict accordance with the **Specifications** and **Addenda** thereto, numbered as shown in Schedule A.

ARTICLE 75. COMPENSATION TO BE PAID TO CONTRACTOR

75.1 The **City** will pay and the **Contractor** will accept in full consideration for the performance of the **Contract**, subject to additions and deductions as provided herein, the total sum shown in Schedule A, this said sum being the amount at which the **Contract** was awarded to the **Contractor** at a public letting thereof, based upon the **Contractor's** bid for the **Contract**.

ARTICLE 76. ELECTRONIC FUNDS TRANSFER

76.1 In accordance with Section 6-107.1 of the Administrative Code, the **Contractor** agrees to accept payments under this **Contract** from the **City** by electronic funds transfer (EFT). An EFT is any

transfer of funds, other than a transaction originated by check, draft or similar paper instrument, which is initiated through an electronic terminal, telephonic instrument or computer or magnetic tape so as to order, instruct or authorize a financial institution to debit or credit an account. Prior to the first payment made under this **Contract**, the **Contractor** shall designate one financial institution or other authorized payment agent and shall complete the attached “EFT Vendor Payment Enrollment Form” in order to provide the Commissioner of the **City** Department of Finance with information necessary for the **Contractor** to receive electronic funds transfer payments through a designated financial institution or authorized payment agent. The crediting of the amount of a payment to the appropriate account on the books of a financial institution or other authorized payment agent designated by the **Contractor** shall constitute full satisfaction by the **City** for the amount of the payment under this **Contract**. The account information supplied by the **Contractor** to facilitate the electronic funds transfer shall remain confidential to the fullest extent provided by **Law**.

76.2 The **Commissioner** may waive the application of the requirements of this Article 76 to payments on contracts entered into pursuant to Section 315 of the **City** Charter. In addition, the Commissioner of the Department of Finance and the Comptroller may jointly issue standards pursuant to which the **Agency** may waive the requirements of this Article 76 for payments in the following circumstances: (i) for individuals or classes of individuals for whom compliance imposes a hardship; (ii) for classifications or types of checks; or (iii) in other circumstances as may be necessary in the interest of the **City**.

ARTICLE 77. RECORDS RETENTION

77.1 The **Contractor** agrees to retain all books, records, and other documents relevant to this **Contract** for six years after the final payment or termination of this **Contract**, whichever is later. **City**, state, and federal auditors and any other persons duly authorized by the **City** shall have full access to and the right to examine any such books, records, and other documents during the retention period.

ARTICLE 78. EXAMINATION AND VIEWING OF SITE, CONSIDERATION OF OTHER SOURCES OF INFORMATION AND CHANGED SITE CONDITIONS

78.1 Pre-Bidding (Investigation) Viewing of Site – Bidders must carefully view and examine the **Site** of the proposed **Work**, as well as its adjacent area, and seek other usual sources of information, for they will be conclusively presumed to have full knowledge of any and all conditions and hazards on, about or above the **Site** relating to or affecting in any way the performance of the **Work** to be done under the **Contract** that were or should have been known by a reasonably prudent bidder. To arrange a date for visiting the **Site**, bidders are to contact the **Agency** contact person specified in the bid documents.

78.2 Should the **Contractor** encounter during the progress of the **Work** site conditions or environmental hazards at the **Site** materially differing from any shown on the **Contract Drawings** or indicated in the **Specifications** or such conditions or environmental hazards as could not reasonably have been anticipated by the **Contractor**, which conditions or hazards will materially affect the cost of the **Work** to be done under the **Contract**, the attention of the **Commissioner** must be called immediately to such conditions or hazards before they are disturbed. The **Commissioner** shall thereupon promptly investigate the conditions or hazards. If the **Commissioner** finds that they do so materially differ, and that they could not have been reasonably anticipated by the **Contractor**, the **Contract** may be modified with the **Commissioner**'s written approval.

SIGNATURE OF THE CONTRACT

IN WITNESS WHEREOF, the Commissioner, on behalf of the City of New York and the Contractor, have executed **FIVE COPIES** of this contract, **three parts of which are to remain with the Commissioner, one other to be filed with the Comptroller of the City, and the fifth to be delivered to the Contractor.**

THE CITY OF NEW YORK

BY _____
COMMISSIONER

NAME OF CONTRACTOR

BY _____
AUTHORIZED OFFICER OF THE FIRM OR CORPORATION

(Where Contractor is a Corporation, add):
Attest:

SECRETARY (Seal)

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ACKNOWLEDGMENT BY CORPORATION

State of _____, County of _____ ss:

On this _____ day of _____,

before me personally came _____

who affirms or being by me duly sworn, did depose and say that he/she resides in

the City of _____; that he/she is the _____

of the _____ the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation, that the seal affixed to the said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; and that he/she signed his name thereto by like order.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT BY COMMISSIONER

State of New York, County of Queens ss:

On this _____ day of _____,

before me personally came _____

to me known and known to me to be the _____ Commissioner of the Department Environmental Protection of the City of New York, the person described as such in and who as such executed the foregoing instrument and he/she acknowledged to me that he/she executed the same as Commissioner for the purposes therein mentioned.

Notary Public or Commissioner of Deeds

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ACKNOWLEDGMENT BY PARTNERSHIP

State of _____, County of _____ ss:

On this _____ day of _____, _____

before me personally came _____, to be known

and known to me to be a member of _____, the firm described in and which executed the foregoing instrument and he/she acknowledged to me that he/she subscribed the name of said firm thereto on behalf of said firm for the purposes therein mentioned.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT BY INDIVIDUAL

State of _____, County of _____ ss:

On this _____ day of _____, _____

before me personally came _____

to me known and known to me to be the same person described and who executed the foregoing instrument and he/she acknowledged to me that he/she executed the same for the purposes therein mentioned

Notary Public or Commissioner of Deeds

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AUTHORITY

MAYOR'S CERTIFICATE NO. CBX _____ DATED _____

BUDGET DIRECTOR'S CERTIFICATE NO. CP/CAS _____ DATED _____

APPROPRIATION

COMMISSIONER'S CERTIFICATE

In conformity with the provisions of Section 6-101 of the Administrative Code of the City of New York, it is hereby certified that the estimated cost of the work, materials and supplies required by the within Contract, amounting to:

\$ _____

is chargeable to the fund of the Department of Environmental Protection Budget Code(s):

I hereby certify that the specifications contained herein comply with the terms and conditions of the FY _____ BUDGET.

Commissioner of the Department of Environmental Protection

COMPTROLLER'S CERTIFICATE

The City of New York _____,

In pursuance of the provisions of Section 6-101 of the Administrative Code of the City of New York, I hereby certify that there remains unapplied and unexpended a balance of the above mentioned fund applicable to this Contract sufficient to pay the estimated expense of executing the same, viz.:

\$ _____.

Comptroller

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Performance Bond Greater Than \$5 Million

PERFORMANCE BOND

KNOW ALL PEOPLE BY THESE PRESENTS:,

That we, _____

hereinafter referred to as the "Principal,"

and, _____

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns in the penal sum of _____

(\$ _____) Dollars, lawful money of the United States for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, The Principal is about to enter, or has entered, into a Contract in writing with the City for

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making

Performance Bond Greater Than \$5 Million

good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to either (1) pay the full amount of the above penal sum in complete discharge and exoneration of this bond and of all the liabilities of the Surety relating to this bond, or (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof. The Surety (Sureties) further agrees, at its option, either to tender the penal sum or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to commence and to complete all Work as provided herein.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any Work to be performed or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal.

IN WITNESS WHEREOF, The Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this

_____ day of _____ 20_____.
(Seal)

_____ (L.S.)

Principal

By _____.

(Seal)

Surety

By _____.

Performance Bond Greater Than \$5 Million

(Seal) _____
Surety

By _____

(Seal) _____
Surety

By _____

(Seal) _____
Surety

By _____

(Seal) _____
Surety

By _____

Bond Premium Rate _____.

Bond Premium Cost _____.

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

Performance Bond Greater Than \$5 Million

ACKNOWLEDGMENT OF PRINCIPAL IF A CORPORATION

State of _____ County of _____ ss:

On this _____ day of _____ 20 _____ before me personally came _____, to me known, who, being by me duly sworn did depose and say that he/she resides at _____

_____ ; that he/she is the _____ of _____ the corporation described in and which executed the foregoing instrument; and that he signed his name to the foregoing instrument by order of the directors of said corporation as the duly authorized and binding act thereof.

Notary Public or Commissioner of Deeds.

ACKNOWLEDGMENT OF PRINCIPAL IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____ 20 _____ before me personally came _____, to me known, who, being by me duly sworn did depose and say that he/she resides at _____

_____ ; that he/she is _____ partner of _____, a limited/general partnership existing under the laws of the State of _____, the partnership described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said partnership.

Notary Public or Commissioner of Deeds.

Performance Bond Greater Than \$5 Million

ACKNOWLEDGMENT OF PRINCIPAL IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____ 20 _____ before me personally
came _____
to me known, who, being by me duly sworn did depose and say that he/she resides
at _____

_____, and that he/she is the individual whose name is
subscribed to the within instrument and acknowledged to me that by his/her signature on the
instrument, said individual executed the instrument.

Notary Public or Commissioner of Deeds.

Affix Acknowledgments and justification of Sureties

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PERFORMANCE BOND

KNOW ALL PEOPLE BY THESE PRESENTS:;

That we, _____

hereinafter referred to as the "Principal,"
and, _____

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns in the penal sum of _____

(\$ _____) Dollars, lawful money of the United States for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, The Principal is about to enter, or has entered, into a Contract in writing with the City for

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making

good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to (1) pay the City the cost to complete the contract as determined by the City in excess of the balance of the Contract held by the City, plus any damages or costs to which the City is entitled, up to the full amount of the above penal sum, (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof, or (3) tender a completion Contractor that is acceptable to the City. The Surety (Sureties) further agrees, at its option, either to notify the City that it elects to pay the city the cost of completion plus any applicable damages and costs under option (1) above, or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and, if the Surety elects to fully perform and complete the Work, then to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. If the Surety elects to tender payment pursuant to (1) above, then the Surety shall tender such amount within fifteen (15) business days notification from the City of the cost of completion. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and complete all Work as provided herein, or to tender a completion contractor.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, and waivers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to subcontractors shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal. Notwithstanding the above, if the City makes payments to the Principal before the time required by the contract that in the aggregate exceed \$100,000 or 10% of the Contract price, whichever is less, and that have not become earned prior to the Principal being found to be in default, then all payments made to the Principal before the time required by the Contract shall be added to the remaining contract value available to be paid for the completion of the Contract as if such sums had not been paid to the Principal, but shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and to complete all Work as provided herein, or to tender a completion contractor

IN WITNESS WHEREOF, The Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this

_____ day of _____ 20 _____ .
(Seal)

Principal (L.S.)

(Seal) By _____
Surety

(Seal) By _____
Surety

(Seal) By _____
Surety

(Seal) By _____
Surety

(Seal) By _____
Surety

By _____

Bond Premium Rate _____

Bond Premium Cost _____

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

ACKNOWLEDGMENT OF PRINCIPAL IF A CORPORATION

State of _____ County of _____ ss:

On this _____ day of _____ 20 _____ before me personally came _____, to me known, who, being by me duly sworn did depose and say that he/she resides at _____

_____ ; that he/she is the _____ of _____ the corporation described in and which executed the foregoing instrument; and that he signed his name to the foregoing instrument by order of the directors of said corporation as the duly authorized and binding act thereof.

Notary Public or Commissioner of Deeds.

ACKNOWLEDGMENT OF PRINCIPAL IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____ 20 _____ before me personally came _____, to me known, who, being by me duly sworn did depose and say that he/she resides at _____

_____ ; that he/she is _____ partner of _____, a limited/general partnership existing under the laws of the State of _____, the partnership described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said partnership.

Notary Public or Commissioner of Deeds.

ACKNOWLEDGMENT OF PRINCIPAL IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____ 20 _____ before me personally came _____ to me known, who, being by me duly sworn did depose and say that he/she resides at _____, and that he/she is the individual whose name is subscribed to the within instrument and acknowledged to me that by his/her signature on the instrument, said individual executed the instrument.

Notary Public or Commissioner of Deeds.

Affix Acknowledgments and justification of Sureties

BLANK PAGE

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we,

hereinafter referred to as the "Principal" and

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of:

\$ _____ .

lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for:

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full.

PAYMENT BOND

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns and other Subcontractors to whom Work under this Contract is sublet and his or their successors and assigns shall promptly pay or cause to be paid all lawful claims for:

- a) Wages and compensation for labor performed and services rendered by all persons engaged in the prosecution of the Work under said Contract, and any amendment or extension thereof or addition thereto, whether such persons be agents, servants or employees of the Principal or of any such Subcontractors, including all persons so engaged who perform the work of laborers or mechanics at or in the vicinity of the site of the Project regardless of any Contractual relationship between the Principal or such Subcontractors, or his or their successors or assigns, on the one hand and such laborers or mechanics on the other, but not including office employees not regularly stationed at the site of the Project, and**
- b) Materials and supplies (whether incorporated in the permanent (construction or not), as well as teams, fuels, oils, implements or machinery furnished, used or consumed by said Principal or any Subcontractors at or in the vicinity of the site of the Project in the prosecution of the Work under said Contract and any amendment or extension thereof or addition thereto; then this obligation shall be null and void; otherwise to remain in full force and effect. This bond is subject to the following additional conditions, limitations and agreements:**
- c) The Principal and Surety (Sureties) agree that this bond shall be for the benefit of any materialman or laborer having a just claim, as well as the City itself.**
- d) All persons who have performed labor, rendered services or furnished materials and supplies, as aforesaid, shall have a direct right of action against the Principal and his, its or their successors and assigns, and the Surety (Sureties) herein, or against either or both or any of them and their successors and assigns. Such persons may sue in their own name, and may prosecute the suit to judgment and execution without the necessity of joining with any other person as party plaintiff.**
- e) The Principal and Surety (Sureties) agree that neither of them will hold the City liable for any judgment for costs or otherwise, obtained against either or both of them by a laborer or materialman in a suit brought by either a laborer or materialman under this bond for moneys allegedly due for performing work or furnishing material.**
- f) The Surety (Sureties) or its successors and assigns shall not be liable for any compensation recoverable by an employee or laborer under the Workmen's Compensation Law.**

PAYMENT BOND

g) In no event shall the Surety (Sureties), or its successors or assigns, be liable for a greater sum than the penalty of this bond or be subject to any suit, action or proceeding hereon that is instituted by any person, firm, or corporation hereunder later than two years after the complete performance of said Contract and final settlement thereof.

The Principal, for himself/herself and his successors and assigns, and the Surety (Sureties), for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the City to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm or corporation, including Subcontractors, MATERIALMAN and third persons, for work, labor, services, supplies or material performed, rendered, or furnished as aforesaid upon the ground that there is no law authorizing the City to require the foregoing provisions to be placed in this bond.

And the Surety (Sureties) for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or of the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, Subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal.

PAYMENT BOND

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this _____ day of _____, _____.

(SEAL) _____ (L.S.)
Principal
By: _____

(SEAL) _____
Surety
By: _____

(SEAL) _____
Surety
By: _____

(SEAL) _____
Surety
By: _____

(SEAL) _____
Surety
By: _____

BOND PREMIUM RATE: _____

BOND PREMIUM COST: _____

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners. If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact. There should be executed an appropriate member of counterparts of the bond corresponding to the number of counterparts of the Contract.

PAYMENT BOND

ACKNOWLEDGMENT OF PRINCIPAL - IF A CORPORATION

State of _____ County of _____ ss:

On this _____ day of _____, _____

before me personally came _____

to me known, who, affirms or being by me duly sworn did depose and say that he/she resides

at _____

that he/she is the _____ of _____
the corporation described in and which executed the foregoing instrument; that he/she knows the
seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was
so affixed by order of the directors of said corporation, and that he/she signed his name thereto
by like order.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL - IF A PARTNERSHIP

State of _____ County of _____ ss.:

On this _____ day of _____, _____

before me personally appeared _____

to me known and known to me to be one of the members of the firm

of: _____
described in and who executed the foregoing instrument and he/she acknowledged to me that
he/she executed the same as and for the act and deed of said firm.

Notary Public or Commissioner of Deeds

PAYMENT BOND

ACKNOWLEDGMENT OF PRINCIPAL - IF AN INDIVIDUAL

State of _____ County of _____ SS.:

On this _____ day of _____ , _____

before me personally appeared _____ me known and known to me to be the

person described in and who executed the foregoing instrument and acknowledged that he/she executed

the same.

Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by:

- a) appropriate acknowledgments of the respective parties;
- b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety;
- c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued; and
- d) duly certified copy of latest published financial statement of assets and liabilities of Surety.

AFFIX ACKNOWLEDGMENTS AND JUSTIFICATIONS OF SURETIES

GENERAL CONDITIONS

ARTICLE 1 - SCOPE AND INTENT

Work Described. The Contractor shall furnish all labor, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies and other means of construction necessary or proper for performing and completing the Work in accordance with the Contract. The Contractor shall also obtain and pay for all required permits to complete the Work. Any labor, materials and equipment that have been omitted in the description of the Work, but that are necessary or proper for the completion of the Work, shall be furnished by the Contractor at its sole cost and expense. The Contractor shall protect the Work during construction, clean up the Site and maintain the Work until Final Acceptance.

Incidental work. The Contractor shall perform all tasks and pay all costs of cutting, protecting, supporting, maintaining, relocating and restoring all surface, sub-surface, and/or overhead structures, and all other property, including, but not limited to, pipes, conduits, ducts, tubes, chambers, and appurtenances, public or private, in the vicinity of and at the Site of the Work (except that which by law, franchise, permit, contract, consent or other agreement, the owner thereof is required to protect, support, maintain, relocate or restore), repair the same if damaged and restore to their original condition all areas disturbed. The Contractor shall perform all tasks and pay all costs of protecting, supporting, maintaining, relocating, replacing and restoring street equipment owned by the City and under the jurisdiction of the New York City Department of Transportation (“NYCDOT”), whether attached to utility company structures or connected to the underground electrical distribution system, including installing suitable temporary lighting equipment when the maintenance of permanent equipment is not feasible. All work done in connection with street lighting shall be in accordance with the requirements of NYCDOT or, for projects outside the City of New York, a local Authority Having Jurisdiction (“AHJ”) over such work.

Duties of the Contractor. The Contractor shall ensure that the requirements of the Contract, including but not limited to, the Contract Drawings and Specifications, are fully and faithfully complied with by all subcontractors, materialmen and workmen at all times, that all of this Work is prosecuted with the utmost diligence, and that all materials are provided promptly in sufficient quantities in order not to delay the Work. The Contractor shall exercise the closest inspection of all materials delivered, promptly returning defective materials without waiting for their rejection by the Engineer. The Contractor shall also become thoroughly familiar with the Contract Drawings and Specifications and shall promptly report to the Engineer all errors, discrepancies or omissions discovered therein. The Contractor shall abide by the decisions and explanations of the Engineer made in regard to such matters.

Contractor Assumes Risk of Loss or Damage. The Contractor agrees to assume the risk and to make no claim on account of any and all loss or damage arising out of the nature of the Work to be done under this Contract, or for any unforeseen obstructions or difficulties which may be encountered in the prosecution of the same, or from the effect of the elements, or from encumbrances on or near the line of the Work.

Local Laws. All materials, appliances and types or methods of construction shall be in accordance with the Contract and shall in no event be less than that necessary to conform to the requirements of the New York City Administrative Code, the Charter of the City of

New York (the “City Charter”), the Rules of the City of New York, and/or the applicable laws and rules of AHJs if the Work occurs outside the City of New York.

Ample quantities. The Contractor shall deliver materials in ample quantities to ensure speedy and uninterrupted progress of the Work in order to complete the Work within the Contract term.

Work and materials. All Work and materials mentioned in the Specifications and not shown on the Contract Drawings, and all Work and materials shown on the Contract Drawings and not mentioned in the Specifications, are to be furnished and performed as if the same were both mentioned in the Specifications and shown on the Contract Drawings.

Necessary and essential Work deemed included. In case any Work or materials shall be required for the more perfect performance of the Work, which are not specifically mentioned, specified or indicated on the Contract Drawings, in the Specifications, or other parts of this Contract, and which in the opinion of the Engineer are necessary and essential to a complete performance of this Contract, such Work or materials shall be deemed included within the requirements of this Contract. The Contractor hereby specifically promises, covenants and agrees to do and perform any and all such Work and to supply any and all such materials as if specifically provided for in this Contract.

Purport of schedules. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind and quality of materials and equipment included in Work to be performed under this Contract.

Order of Precedence. In the event of an actual conflict among the City of New York Standard Construction Contract, General Conditions, and the Contract Drawings and Specifications, the City of New York Standard Construction Contract will control, followed by the General Conditions, followed by the Contract Drawings and Specifications.

Conflicts between Contract Drawings and Specifications. If the Contract Drawings and/or the Specifications are in conflict, or, if the Contract Drawings or the Specifications, or both the Contract Drawings and the Specifications are not clear as to (a) the method of performing any part of the Work; (b) the types of materials or equipment necessary to perform the Work; or (c) the quantities required, the Contractor shall be deemed to have based its bid upon performing the Work and furnishing materials or equipment in the manner most expensive to the Contractor. If DEP determines that such conflict(s) exist or that a clarification is needed, the DEP will furnish the Contractor with supplementary drawings and/or specifications to address such conflict(s) or necessary clarification. In such event, the Contractor agrees to execute the Work in accordance with such interpretation, and to make no charge or claim for any extra or additional work or damage on account of such interpretation.

Understanding of the Contract Drawings and Specifications. The Contractor expressly declares and acknowledges that, before the signing of this Contract, it has carefully read the entire Contract, together and in connection with the Contract Drawings and Specifications, and that through such reading, the Contractor can determine the Work required pursuant to this Contract. The Contractor agrees that it will not hereafter make any claim or demand upon the City based upon or arising out of any alleged

misunderstanding or misconception of the said requirements, covenants, stipulations and restrictions of the Contract.

Deviations from Contract Drawings and Specifications. No deviation from the Contract Drawings and Specifications will be allowed, unless the same has been previously authorized in writing by the Commissioner or his/her designee.

ARTICLE 2 - PROVISIONS REFERENCED WITH INFORMATION FOR BIDDERS AND THE CITY OF NEW YORK STANDARD CONSTRUCTION CONTRACT

(A) SCHEDULE "A" AND LIQUIDATED DAMAGES

1. Schedule "A" requirements for the Contract follow these General Conditions.
2. In view of the difficulty of accurately ascertaining the loss(es) which the City will suffer because of the Contractor exceeding substantial completion time for the Work, or failing to complete a designated milestone within the scheduled time for completion of such milestone, or failing to meet other requirements for which liquidated damages have been provided, the amounts set forth in Schedule A are hereby fixed and agreed to as liquidated damages that the City will suffer by reason of any such failure, and not as a penalty. The City of New York Standard Construction Contract, incorporated herein, shall govern with respect to assessment of all liquidated damages provided for in this Contract, not just those for failure to timely achieve substantial completion, unless specifically detailed in a Specification where any individual liquidated damages are specified.

(B) FEDERAL EXCISE TAXES

Pursuant to Section 37 of the "Information for Bidders", the Contractor may be exempted from the payment of Federal Excise Taxes in accord with the following:

1. An Excise Tax Exemption Certificate will be provided by DEP where requested by the Contractor, for items that fall within the scope of the Contract and may be exempt from the Federal Excise Tax.

(C) LABOR

Where labor is used under the Contract for intermediate skills and for which no prevailing rate of wages is herein certified, and where there is in existence at the time the Contract is entered into a labor agreement between the Contractor and a duly recognized labor union recognizing the existence of such skills, the Contractor shall pay not less than the rate so agreed upon between the Contractor and such labor organization for such skills.

(D) PARTIAL PAYMENTS FOR MATERIALS IN ADVANCE OF THEIR INCORPORATION IN THE WORK PURSUANT TO ARTICLE 42 OF THE CITY OF NEW YORK STANDARD CONSTRUCTION CONTRACT

In order to better ensure the availability of materials, fixtures and equipment when needed for the Work, the Commissioner may authorize partial payment for certain materials, fixtures and equipment, prior to their incorporation in the Work, but only in

strict accordance with and subject to all the terms and conditions set forth in the following subdivisions numbered 1 to 15, unless another method of payment is elsewhere provided in the Specifications for specified materials, fixtures or equipment. For purposes of this Article 2(D), when the term "materials" is used, it shall also apply to fixtures and/or equipment.

1. The Contractor shall submit to the Commissioner a written request for payment for materials purchased or to be purchased for which the Contractor desires to be paid prior to their actual incorporation in the Work. The request shall be accompanied by a schedule of the types and quantities of materials, and shall state whether such materials are to be stored on or off the Site.
2. Where the materials are to be stored off the Site, they shall be stored at a place other than the Contractor's premises (except with the written consent of the Commissioner) and under the conditions prescribed or approved by the Commissioner. The Contractor shall set apart and separately store at the place or places of storage all materials and shall clearly mark same "Property of the City of New York", and shall not at any time move any of said materials to another off-site place of storage without the prior written consent of the Commissioner. Materials may be removed from their place of storage off the Site for incorporation in the Work upon approval of the Resident Engineer.
3. Where materials are to be stored at the Site, they shall be stored at such locations as shall be designated by the Resident Engineer and only in such quantities as, in the opinion of the Resident Engineer, will not interfere with the proper performance of the Work by the Contractor or by other contractors then engaged in performing Work on the Site. Such materials shall not be removed from their place of storage on the Site except for incorporation in the Work, without the approval of the Resident Engineer.
4. All costs, charges and expenses arising out of the storage of such materials shall be borne by the Contractor and the City hereby reserves the right to retain out of any partial or final payment made under the Contract an amount sufficient to cover such costs, charges and expenses. There shall be no increase in the Contract price for such costs, charges and expenses and the Contractor shall not make any claim or demand for compensation for provision of such storage.
5. The Contractor shall pay any and all costs of handling and delivery of materials to the place of storage, to any approved other place of storage, and from the place of storage to the Site of the Work and the City shall have the right to retain from any partial or final payment an amount sufficient to cover the cost of such handling and delivery.
6. In the event that the whole or any part of these materials are lost, damaged or destroyed in advance of their satisfactory incorporation in the Work, the Contractor, at its sole cost and expense, shall promptly replace such lost, damaged or destroyed materials with materials of the same character and quality.
7. Should any of the materials paid for by the City hereunder be subsequently rejected or incorporated in the Work in a manner not in accordance with the Contract, the Contractor shall remove and replace such rejected or improperly incorporated material with materials complying with the Contract. Until such materials are replaced, the City will deduct from the value of the materials or from

any other money due to the Contractor, the amount paid by the City for such rejected or improperly incorporated materials.

8. Payment for the cost of materials made hereunder shall not be deemed to be an acceptance of such materials in accordance with the Contract, and the Contractor always retains and must comply with its duty to deliver to the Site and properly incorporate into the Work only materials which comply with the Contract.

9. The Contractor shall retain any and all risks in connection with the damage, destruction or loss of the materials paid for hereunder to the time of delivery of the same to the Site of the Work and their proper incorporation in the Work in accordance with the Contract.

10. The Contractor shall comply with all applicable laws, rules and regulations of any governmental body or agency pertaining to the purchase, allocation and use of materials.

11. When requesting payment for such materials, the Contractor shall submit with the partial payment request, duly authenticated documents of title, such as bills of sale, invoices or warehouse receipts, all in quadruplicate. The Contractor shall provide along with its partial payment request for such materials, appropriate documentation transferring title to such materials from the Contractor to the City. In the event that the invoices state that the material has been purchased by a subcontractor, the Contractor shall also provide appropriate documentation demonstrating transfer of title to such materials from the subcontractor to the Contractor.

12. Where the Contractor, with the approval of the Commissioner, has purchased unusually large quantities of materials in order to assure their availability for the Work, the Commissioner, at his or her option, may waive the requirements of subdivision 11, provided the Contractor furnishes evidence in the form of an affidavit of the Contractor, and such other proof as the Commissioner may require, that it is the sole owner of such materials and has purchased them free and clear of all liens and other encumbrances. In such event, the Contractor shall pay for such materials and submit proof thereof, in the same manner as provided in subdivision 11 hereof, within seven (7) days after receipt of payment therefor. Failure on the part of the Contractor to submit satisfactory evidence that it has paid in full for all such materials shall preclude it from any payments under the Contract.

13. The Contractor shall include in any succeeding partial payment requisition a summary of materials stored which shall set forth the quantity and value of materials in storage, on or off the Site, at the end of each preceding payment period; the amount removed for incorporation in the Work; the quantity and value of materials delivered during the current period and the total value of materials on hand for which payment thereof will be included in the current payment requisition.

14. Upon proof to the satisfaction of the Commissioner of the actual cost of such materials and upon submission of proper proof of title as required under subdivisions 11 and/or 12 hereof, DEP will pay the Contractor Eighty Five Percent (85%) of the value of such materials, however, in no event shall the Eighty Five Percent (85%) payment exceed the estimated cost of such materials included in the approved detailed estimate breakdown submitted in accordance with Article 41 of the City of New York Standard Construction Contract; if the value exceeds such

estimated cost, the City will pay only Eighty Five Percent (85%) of such approved estimated cost.

15. Upon the incorporation in the Work of any such materials which have been paid for in advance of such incorporation in accordance with the foregoing provisions, payment will be made for such materials incorporated in the Work pursuant to Article 42 or Article 45 of the City of New York Standard Construction Contract, less any sums paid pursuant to subdivision 14 herein.

(E) CONFLICTS OF INTEREST

The City Charter in relation to conflicts of interest (Chapter 68, Section 2604) provides, among a number of safeguards, that:

(1) No employee or person whose salary is payable in whole or in part from the City treasury shall accept any valuable gift, whether in the form of service, loan, thing or promise, or any other form from any person, firm or corporation which to his or her knowledge is interested, directly or indirectly, in any manner whatsoever in business dealings with the City; and

(2) Any violation of any of the provisions of this section shall, at the option of the Comptroller, render forfeit and void the Contract, work, business, sale or transaction affected.

Other sections of the City Charter, the New York City Administrative Code and the New York State Penal Law are applicable in implementing the basic conflicts of interest section and under certain circumstances penalties may be invoked against the donor as well as the recipient of any form of valuable gift.

Notice is hereby given that sections of the City Charter, the New York City Administrative Code and the New York State Penal Law alluded to herein shall apply under the terms of this Contract to circumstances relevant to conflicts of interest and shall be extended in application to subcontractors authorized to perform Work, labor and services pursuant to this Contract and further it shall be the duty and responsibility of the Contractor to so inform its subcontractors.

ARTICLE 3 – CONTRACT DRAWINGS AND SPECIFICATIONS

Related contracts. The Contractor shall study the requirements of any related contracts insofar as they affect the Work or as the Work may affect that of the related contracts and the Contractor will be required to coordinate its Work with that of all other related contractors performing work on such related contracts. The Contractor shall coordinate deliveries in order to avoid delaying or impeding the progress of the Work of any related contractor.

Contract Drawings and Specifications furnished to Contractor. After the Contract has been executed, the Contractor will be furnished with four sets of paper prints of the Contract Drawings and four set of Specifications of the Contract. The Contractor will also be furnished with one set of paper prints and Specifications of any related contracts.

Additional copies. Additional sets of Contract Drawings and Specifications may be issued provided such documents are available in sufficient quantity.

Supplementary drawings. When the Engineer decides to show more fully the Work to be done, or to show required changes, or to rectify errors which may have been discovered, drawings to be known as supplementary drawings and revision sheets with Specifications pertaining thereto will be provided to the Contractor. Changes of a minor nature may be made on the Contract Drawings, in which case the revised Contract Drawings will be issued to the Contractor. The supplementary drawings and revised Contract Drawings shall be as fully binding as the original Contract Drawings, and if such supplementary or revised Contract Drawings require either less or more than the estimated quantities of work, credit to the City or compensation therefor to the Contractor shall be subject to the terms of the City of New York Standard Construction Contract.

Information to subcontractors, manufacturers and others. The Contractor shall furnish each of its subcontractors and materialmen copies of such portions of the Contract, together with all necessary drawings and copies of Specifications, as may be required for the portion of the Work that the respective subcontractors or materialmen shall be responsible for.

Contractor to check drawings and other data. The Contractor shall verify all dimensions, quantities and details shown on Contract Drawings, plans, sketches, schedules, or on any other data received from the Engineer and shall notify the Engineer of all errors, omissions, conflicts and discrepancies found therein.

Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at its sole cost and expense. Figures shall be used in preference to scaled dimensions and large scale drawings in preference to small scale drawings.

"Directed", etc. Whenever reference is made in the Contract to the Work or its performance, the terms "directed", "required", "permitted", "ordered", "designated", "prescribed", "determined", and words of similar import shall imply the direction, requirement, permission, order, designation, or prescription of the Commissioner.

"Approved", etc. "Approved", "acceptable", "satisfactory", and words of similar import shall mean approved, acceptable or satisfactory to the Commissioner.

ARTICLE 4 - TEMPORARY STRUCTURES

Contractor's Field Office. The Contractor shall, during the period of construction, erect or provide for its own use a temporary field office in which readily accessible copies of all Contract Documents and approved Shop and Working Drawings shall be kept. The field office shall be located at the Site, where directed by the Engineer, and shall be provided with the equipment necessary for a functional field office, as approved by the Engineer.

Material Sheds. Material sheds used by the Contractor for the storage of tools, materials and equipment shall be kept at all locations so as not to interfere at any time with the progress of the Work, the location of which shall be subject to the absolute discretion of the Engineer.

Construction of Temporary Structures. All of the Contractor's temporary structures shall be fully constructed and have a neat appearance and shall be painted a uniform gray, unless another color is ordered by the Engineer.

Contractor's Sign. The Contractor shall post and keep posted at the Site, outside of the field office, exterior fence or wall, a legible sign with the full name and address of the Contractor, and the telephone numbers of responsible representatives of the Contractor who can be reached in the event of an emergency.

Private property. When the Contractor temporarily occupies property adjacent to the Work, it shall provide the Engineer with certified copies of agreements which permit the use of such land, unless such permission has been obtained by DEP prior to bidding.

Land for Contractor's use. The Engineer shall in all cases determine the portion of the Site to be used by the Contractor for storage, plant or other purposes.

Obstructions, access. The Contractor shall not obstruct any highway or access thereto from private property except as otherwise specified in the Specifications. The necessary facilities and safeguards to comply with this requirement shall be provided and maintained at the sole cost and expense of the Contractor. If it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the Work or interfering with the work to be done by any other contractor, the Contractor shall remove and restack such materials at no additional cost to the City.

Trespassing prohibited. All employees and subcontractors of the Contractor are prohibited from trespassing on private or public property except where the law permits such entrance for a purpose such as underpinning or otherwise protecting adjoining structures. If it becomes necessary for employees of the Contractor or its subcontractor(s) to enter onto private property for the above stated reasons, the Contractor shall advise DEP of such need. Employees of the Contractor or subcontractor may not enter onto the property until the requisite permission has been obtained and proper notice furnished to the property owner.

ARTICLE 5 - CONTRACTOR'S SUPERINTENDENT

The Contractor shall employ and retain at the Site of the Work, from the commencement until the completion of the Work, a superintendent competent and capable of maintaining proper supervision and care of the Work and acceptable to the Engineer, and who, in the

absence of the Contractor and irrespective of any superintendent or foreman employed by any subcontractor, shall carry out the directions of the Engineer.

ARTICLE 6 - SURVEYS

Lines and grades. All Work shall be constructed according to the lines and grades shown on the Contract Drawings and approved by the Engineer. The Engineer will establish a baseline and benchmark. The Contractor shall establish all other lines, elevations and grades required for the Work and be solely responsible for the accuracy thereof. The Engineer shall be notified prior to the establishment of any line, elevation or grade.

Safeguarding marks. The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the Work, re-establish same if disturbed and bear the entire expense of rectifying work improperly installed due to not maintaining, not protecting or removing without authorization such established points, stakes, marks and monuments.

Survey before completion of structure. The Contractor for general construction work shall file with the New York City Department of Buildings in the borough where Work is being done or with the New York City Department of Small Business Services, or the local AHJ, a survey by a duly licensed surveyor showing the location of the new structure before completion of the structure, pursuant to Section 28.118.4 of the New York City Building Code or applicable local codes or regulations for projects outside the City. This survey shall show the location of the structure, the elevation of the first tier of beams or of the first floor, the finished grades of the open spaces on the plot, the established curb level and the location of all other structures on the plot, together with the location and boundaries of the lot or plot upon which the structure is constructed. One copy of the application and the survey shall be furnished to the Resident Engineer.

ARTICLE 7 - CONTRACTOR'S DAILY REPORTS

As soon as the Contractor has started Work on the Project, it shall submit to the Engineer written daily reports of the Work performed the previous day by any of its employees, including the employees of its subcontractors.

The reports shall be prepared by the Contractor's Superintendent and shall bear his or her signature. Each report shall contain the following information:

1. The type of materials and/or major equipment being installed by the Contractor and the total number of employees working in each category on that particular day.
2. The names of the subcontractors working and the type of materials and/or major equipment being installed by each together with the total number of employees working for each subcontractor on that particular day.
3. The major construction equipment being used by the Contractor and/or any subcontractor.

ARTICLE 8 – CONTRACTOR'S PLANT

The Contractor shall ensure that it obtains, provides and maintains a sufficient construction plant in close proximity to the Work all times during the progress of the Work in order to meet the demands of the Work, with ample margin for emergencies or

overload. The plant shall be of such capacity conducive to ensure the completion of the Work within the time stipulated in the Contract.

The Contractor may occupy any unused location within the area controlled by DEP with its construction plant, subject to the approval of the Engineer. If the Contractor desires to use additional area outside of that controlled by DEP, the Contractor shall arrange for the use of such area at its sole cost and expense. The location of the Contractor's stationary and mobile equipment shall be subject to the Engineer's approval.

The Engineer shall have the right to reject or condemn any construction plant, staging area, which, in his/her opinion, is unsafe, improper or inadequate. Whether or not the Engineer exercises this right, the Contractor shall not be relieved from its sole responsibility for the safe, proper and lawful construction, maintenance and use of such construction plant, staging area, or for the adequacy of such plant.

The Contractor shall, at its sole cost and expense, stack and restack as needed, all Project materials at locations that are easily accessible and convenient to the Project Site and that do not impede the progress of the Work, or as directed by the Engineer. The Contractor shall also take appropriate measures required to secure and protect all such materials from loss. Should the Contractor wish to stack any project materials on publicly mapped streets, it shall comply with all applicable local, state and federal laws, rules and regulations.

ARTICLE 9 - SECURITY GUARDS AND FIRE GUARDS ON THE SITE

The requirements of the Contract for security guard services and the responsibilities of the Contractor for safeguarding and protecting the Work and Site shall be in accordance with, but not limited to, the respective Division 01 Specifications.

The Contractor will be responsible for safeguarding and protecting its own Work, materials, tools, and equipment. When the provision of security guards is required, each Security Guard shall be required to possess a "Certificate of Fitness" issued by the Fire Department to qualify and serve as a Fire Guard whenever the structure under construction, alteration, or demolition exceeds the prescribed area and height requirements specified in Rule 2.4.1 of the "Rules for Erection, Alteration, Repair, Excavation for and Demolition of Buildings" adopted by the New York City Board of Standards and Appeals under Calendar Number 784-41SR. Each Security Guard shall, during his or her tour of duty, perform the duties of Fire Guards in addition to his or her security obligations.

The use of watchdogs requires the express written approval of DEP and at DEP's sole discretion.

ARTICLE 10 - CERTIFICATES OF OCCUPANCY AND/OR COMPLETION

If the project structure is a building that is subject to the jurisdiction of the New York City Department of Buildings or similar local AHJ, before substantial completion of the project structure, the Commissioner will file an application for a Certificate of Occupancy or Certificate of Completion with the New York City Department of Buildings or New York City Department of Small Business Services or the local AHJ for project locations outside New York City, as applicable.

In connection with the application for Certificate of Occupancy or Certificate of Completion and before final payment is issued, the Contractor shall arrange for all final inspections by the inspection staffs of the New York City Department of Buildings, New York City Department of Small Business Services and other local AHJs for project locations outside New York City, as applicable, and shall do such remedial work and construction as is required and obtain all reports by such inspection staffs in order that the Certificate of Occupancy and/or Certificate of Completion or other similar certificate if occurring outside the City of New York be procured without delay.

ARTICLE 11 - COORDINATION AMONG CONTRACTORS

The Contractor is alerted to the importance of coordination and cooperation if other contractors are operating at or near the project Site. It is essential to the expeditious completion of this Project that the Contractor meet with any such other contractors at an early stage in the Work, to determine respective space requirements in areas where their operations or installations are in close proximity or are likely to be in conflict or interfere with each other, and to set up regular meetings as Shop Drawings are developed.

The Engineer will provide written notice of the time, place, and agenda of each such scheduled meeting.

The Contractor may also request a meeting by submitting a request for meeting to the Engineer.

Attendance at Coordination Meetings. To allow an orderly sequence of operations agreeable to all contractors, regular meetings shall be scheduled for the purpose of modifying work schedules and to address potential conflicts in work arrangements so that work stoppages and delays may be avoided. Coordination Meetings shall also be opportunities to prepare and circulate coordination drawings for the use and guidance of each contractor.

The Coordination Meetings will be arranged through the Engineer and shall be separate from and in addition to the regular job progress meetings. If it is desired that the architectural or engineering consultants be present at such meeting, this request should be directed to the Engineer.

The Contractor shall only send representatives to the meeting who have the competence and authority to make necessary decisions. Their statements shall commit the Contractor to the procedures, sequence of operations, and time schedules agreed upon.

The requirement to attend and effectively participate in all Progress and Coordination Meetings is subject to strict enforcement by the Commissioner. Failure to be represented at any of these meetings, when scheduled or approved by the Engineer, shall subject the Contractor to liability for any and all damages, delays, costs of alterations, etc., arising from the fact that it or its representatives were not present to coordinate its Work with the work that was scheduled, arrangements on or procedures developed at the meeting or meetings in question.

If, for compelling reasons, Contractor finds that its representative cannot attend a scheduled meeting, it shall give timely notice to the Engineer so that the meeting may be rescheduled.

Where procedures have been agreed upon and coordination drawings accepted by all contractors concerned, Contractor shall adhere to such drawings and procedures, both as to time and performance. No claim of delay or damages by a contractor, if it fails to comply, will be entertained by the Commissioner.

Contractor shall maintain at the Site sufficient competent personnel for the purpose of preparing layout and coordination drawings. Where such drawings are to be prepared by subcontractors, the subcontractor shall have the required personnel on Site in order to measure and assess proper, practical solutions found for problems arising from interferences, etc. and so that proper coordination among trades can be achieved.

ARTICLE 12 - PUBLIC DISSEMINATION OF INFORMATION

The Contractor agrees to hold confidential, both during and after the completion or termination of this Contract, all of the reports, information, or data, furnished to, or prepared, assembled or used by, the Contractor under this Contract. The Contractor agrees to maintain the confidentiality of such reports, information, or data by using a reasonable degree of care, and using at least the same degree of care that the Contractor uses to preserve the confidentiality of its own confidential information. The Contractor agrees that such reports, information, or data shall not be made available to any person or entity without the prior written approval of DEP. The obligation under this Article to hold reports, information or data confidential shall not apply where the Contractor is legally required to disclose such reports, information or data by virtue of a subpoena, court order or otherwise (“disclosure demand”), provided that the Contractor complies with the following: (1) the Contractor shall provide advance notice to the Commissioner, in writing or by e-mail, that it received a disclosure demand for such reports, information or data and (2) if requested by DEP, the Contractor shall not disclose such reports, information or data until the City has exhausted its legal rights, if any, to prevent disclosure of all or a portion of such reports, information, or data. The previous sentence shall not apply if the Contractor is prohibited by law from disclosing to DEP the disclosure demand for such reports, information or data.

The Contractor shall restrict access to confidential information to persons who have a legitimate work-related purpose to access such information. The Contractor agrees that it will instruct its officers, employees, and agents to maintain the confidentiality of any and all information required to be kept confidential by this Contract.

The Contractor, and its officers, employees, and agents shall notify DEP, at any time either during or after completion or termination of this Contract, of any intended statement to the press or any intended issuing of any material for publication in any media of communication (print, news, television, radio, Internet, etc.) regarding the services provided or the data collected pursuant to this Contract at least twenty-four (24) hours prior to any statement to the press or at least five (5) business days prior to the submission of the material for publication, or such shorter periods as are reasonable under the circumstances. The Contractor may not issue any statement or submit any material for publication that includes confidential information as prohibited by this Article.

SCHEDULE A

GENERAL CONDITIONS TO CONSTRUCTION CONTRACT
(INCLUDING GENERAL CONDITIONS RELATING TO ARTICLE 22 -- INSURANCE)

CONTRACT KENS-EAST-2

PART I. REQUIRED INFORMATION

<u>INFORMATION FOR BIDDERS</u> <u>BID BOND</u>	5 % of Bid
The Contractor shall obtain a bid bond in the amount indicated to the right.	
<u>INFORMATION FOR BIDDERS</u> <u>PERFORMANCE AND PAYMENT BONDS</u>	100 % of Bid
The Contractor shall obtain performance and payment bonds in the amount indicated to the right.	
<u>CONTRACT ARTICLE 14.</u> <u>DATE FOR SUBSTANTIAL COMPLETION</u>	940 consecutive calendar days
The Contractor shall substantially complete the Work in the number of calendar days indicated to the right.	
<u>CONTRACT ARTICLE 15.</u> <u>LIQUIDATED DAMAGES</u>	\$ 10,000 for each consecutive calendar day over substantial completion time
If the Contractor fails to substantially complete the Work within the time fixed for substantial completion plus authorized time extensions or if the Contractor , in the sole determination of the Commissioner , has abandoned the Work , the Contractor shall pay to the City the amount indicated to the right.	\$ 10,000 for each consecutive calendar day over Milestone 1 per Section 01 27 10.
	\$ 10,000 for each consecutive calendar day over Milestone 2 per Section 01 27 10.
	\$ 10,000 for each consecutive calendar day over Milestone 3
Section 01 32 10 – Progress Schedule <u>Liquidated Damages</u>	\$ 500 per day for delay of submittals
Section 01 33 00 - Submittal Procedures <u>Liquidated Damages</u>	\$1,500 per each additional submission of a Shop Drawing after the third submission.

<p style="text-align: center;"><u>CONTRACT ARTICLE 17.</u> <u>SUB-CONTRACTOR</u></p> <p>The Contractor shall not make subcontracts totaling an amount more than the percentage of the total Contract price indicated to the right.</p>	<p>Not to exceed <u> 40 </u> % of the Contract price</p>
<p style="text-align: center;"><u>CONTRACT ARTICLE 21.</u> <u>RETAINAGE</u></p> <p>The Commissioner shall deduct and retain until the substantial completion of the Work the percent value of the Work indicated to the right.</p>	<p><u> 5 </u> % of the value of the Work</p>
<p style="text-align: center;"><u>CONTRACT ARTICLE 22.</u></p> <p style="text-align: center;"><u>(Per Directions Below)</u></p>	
<p style="text-align: center;"><u>CONTRACT ARTICLE 24.</u> <u>DEPOSIT GUARANTEE</u></p> <p>As security for the faithful performance of its obligations, the Contractor, upon filing its requisition for payment on Substantial Completion, shall deposit with the Commissioner a sum equal to the percentage of the Contract price indicated to the right.</p>	<p>1% of Contract price</p>
<p style="text-align: center;"><u>CONTRACT ARTICLE 24.</u> <u>PERIOD OF GUARANTEE</u></p> <p>Periods of maintenance and guarantee other than the period set forth in Article 24.1 are indicated to the right.</p>	
<p style="text-align: center;"><u>CONTRACT ARTICLE 74.</u> <u>STATEMENT OF WORK</u></p> <p>The Contractor shall furnish all labor and materials and perform all Work in strict accordance with the Contract Drawings, Specifications, and all Addenda thereto.</p>	<p>Insert the Required Information Below.</p>

CONTRACT ARTICLE 75.
COMPENSATION TO BE PAID TO CONTRACTOR

The **City** shall pay and the **Contractor** shall accept in full consideration for the performance of the **Contract**, subject to additions and deductions as provided herein, the total sum **shown in the column to the right**, this said sum being the amount at which the **Contract** was awarded to the **Contractor** at a public letting thereof, based upon the **Contractor's** bid for the **Contract**.

Amount for which the **Contract** was awarded:

\$ _____
[Agency: If the Bid Price, or any portion thereof, is based on unit prices, insert the words "Not to Exceed" before the amount.]

(GENERAL CONDITIONS RELATING TO ARTICLE 22 -- INSURANCE)

PART II. TYPES OF INSURANCE, MINIMUM LIMITS AND SPECIAL CONDITIONS

Note: All certificate(s) of insurance submitted pursuant to Contract Article 22.3.3 must be accompanied by a Certification by Broker consistent with Part III below and include the following information:

- For each insurance policy, the name and NAIC number of issuing company, number of policy, and effective dates;
- Policy limits consistent with the requirements listed below;
- Additional insureds or loss payees consistent with the requirements listed below; and
- The number assigned to the Contract by the City (in the “Description of Operations” field).

Insurance indicated by a blackened box (■) or by X in a □ to left will be required under this contract

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
■ Commercial General Liability Art. 22.1.1	<p>The minimum limits shall be \$ <u>5,000,000</u> per occurrence, \$ <u>5,000,000</u> for personal and advertising injury, and \$ <u>10,000,000</u> per project aggregate applicable to this Contract and greater limits of Commercial General Liability Insurance are required pursuant to 1 RCNY section 101-08.</p> <p>Additional Insureds:</p> <p>1. City of New York, including its officials and employees, with coverage at least as broad as ISO Forms CG 20 10 and CG 20 37, and</p> <p>2. All person(s) or organization(s), if any, that Article 22.1.1(b) of the Contract requires to be named as Additional Insured(s), with coverage at least as broad as ISO Form CG 20 26. The Additional Insured endorsement shall either specify the entity's name, if known, or the entity's title (e.g., Project Manager).</p> <p>3. <i>[Agency: If appropriate, insert names of other entities to be covered as Additional Insureds.]</i></p>
■ Workers' Compensation Art. 22.1.2 ■ Disability Benefits Insurance Art. 22.1.2	Workers' Compensation, Employers' Liability, and Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction.

<input checked="" type="checkbox"/> Employers' Liability Art. 22.1.2 <input type="checkbox"/> Jones Act Art. 22.1.3 <input type="checkbox"/> U.S. Longshoremen's and Harbor Workers Compensation Act Art. 22.1.3	<p>Note: The following forms are acceptable: (1) New York State Workers' Compensation Board Form No. C-105.2, (2) State Insurance Fund Form No. U-26.3, (3) New York State Workers' Compensation Board Form No. DB-120.1 and (3) Request for WC/DB Exemption Form No. CE-200. The City will not accept an ACORD form as proof of Workers' Compensation or Disability Insurance.</p> <p>Jones Act and U.S. Longshoremen's and Harbor Workers' Compensation Act: Statutory per U.S. law.</p>
<input type="checkbox"/> Builders Risk Art. 22.1.4	<p>100 % of total value of Work</p> <p>Contractor the Named Insured; the City both an Additional Insured and one of the loss payees as its interests may appear.</p> <p>If the Work does not involve construction of a new building or gut renovation work, the Contractor may provide an installation floater in lieu of Builders Risk insurance.</p> <p>Note: Builders Risk Insurance may terminate upon Substantial Completion of the Work in its entirety.</p>
<input checked="" type="checkbox"/> Commercial Auto Liability Art. 22.1.5	<p>\$<u>2,000,000</u> per accident combined single limit</p> <p>If vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90</p>

<input checked="" type="checkbox"/> Contractors Pollution Liability Art. 22.1.6	<p>\$ <u>1,000,000</u> per occurrence</p> <p>\$ <u>2,000,000</u> aggregate</p> <p>Additional Insureds:</p> <p>1. City of New York, including its officials and employees, and</p> <p>2. _____</p> <p>3. _____</p>
<input type="checkbox"/> Marine Protection and Indemnity Art. 22.1.7(a)	<p>\$ _____ per occurrence</p> <p>\$ _____ aggregate</p> <p>Additional Insureds:</p> <p>1. City of New York, including its officials and employees, and</p> <p>2. _____</p> <p>3. _____</p>
<input type="checkbox"/> Hull and Machinery Insurance Art. 22.1.7(b)	<p>\$ _____ per occurrence</p> <p>\$ _____ aggregate</p> <p>Additional Insureds:</p> <p>1. City of New York, including its officials and employees, and</p> <p>2. _____</p> <p>3. _____</p>
<input type="checkbox"/> Marine Pollution Liability Art. 22.1.7(c)	<p>\$ _____ each occurrence</p> <p>Additional Insureds:</p> <p>1. City of New York, including its officials and employees, and</p> <p>2. _____</p> <p>3. _____</p>

<p>[OTHER] Art. 22.1.8</p> <p><input type="checkbox"/> _____</p>	<p><i>[If other type(s) of insurance need to be required under the Contract, the Contracting Agency should (a) check the box and fill in the type of insurance in left-hand column, and (b) in this right-hand column, specify appropriate limit(s) and appropriate Named Insured and Additional Insured(s). Note that if Railroad Protective Liability Insurance is required, the appropriate Named Insured is the owner of the railroad and there are no additional insureds.]</i></p>
<p>[OTHER] Art. 22.1.8</p> <p><input type="checkbox"/> _____</p>	<p><i>[See directly above.]</i></p>

SCHEDULE A

GENERAL CONDITIONS TO CONSTRUCTION CONTRACT

PART III. BROKER'S CERTIFICATION

CERTIFICATES OF INSURANCE

Instructions to New York City Agencies, Departments, and Offices

All certificates of insurance (except certificates of insurance solely evidencing Workers' Compensation Insurance, Employer's Liability Insurance, and/or Disability Benefits Insurance) must be accompanied by one of the following:

- (1) the Certification by Insurance Broker or Agent on the following page setting forth the required information and signatures;

-- OR --

- (2) copies of all policies as certified by an authorized representative of the issuing insurance carrier that are referenced in such certificate of insurance. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

SCHEDULE A

CITY OF NEW YORK
CERTIFICATION BY INSURANCE BROKER OR AGENT

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

[Name of broker or agent (typewritten)]

[Address of broker or agent (typewritten)]

[Email address of broker or agent (typewritten)]

[Phone number/Fax number of broker or agent (typewritten)]

[Signature of authorized official, broker, or agent]

[Name and title of authorized official, broker, or agent (typewritten)]

State of)

) ss.:

County of)

Sworn to before me this ____ day of _____ 20__

NOTARY PUBLIC FOR THE STATE OF _____

SCHEDULE A
(GENERAL CONDITIONS TO CONSTRUCTION CONTRACT)

PART IV. ADDRESS OF COMMISSIONER

Wherever reference is made in Article 7 or Article 22 to documents to be sent to the **Commissioner** (e.g., notices, filings, or submissions), such documents shall be sent to the address set forth below or, in the absence of such address, to the **Commissioner's** address as provided elsewhere in this **Contract**.

[**Note to Contracting Agency:** Fill in Risk Manager, ACCO or other person responsible for insurance]

NYC Department of Environmental Protection
Office of the Agency Chief Contracting Officer
59-17 Junction Blvd., 17th Floor Bid Room
Flushing NY, 11373
Email: insurance@dep.nyc.gov

WESTCHESTER COUNTY

SCHEDULE OF PREVAILING WAGES

Note: This Contract is funded under the New York State Revolving Loan Program (SRF), and is subject to the prevailing wages under NYS Labor Law and the prevailing wages under United States Davis-Bacon Act. If there is a conflict between the wage rate set forth by the Davis Bacon Act or the wage rate established pursuant to NYS Labor Law, the contractor shall pay the higher rate.

The Contractor and its subcontractors shall pay the applicable and lawful prevailing wages and supplements to workers at the time work is performed. Changes in wage rates and supplements resulting from changes to the applicable and lawful prevailing wage schedules shall not be the basis for a change in the contract price.

NO TEXT FOR THIS PAGE

Note: The following is a listing of those trades expected to utilized on this project. If a Contractor proposes to use an alternative trade, he must notify the DEP Contract Compliance Office at 718-595-3211.

: **Contract(s):** _____

 Description: _____

SCHEDULE OF WORKMEN, MECHANICS AND LABORERS
(Listed by Individual Contract)

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Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12240

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-932-2419	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4902
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

Westchester County General Construction

Boilermaker **03/01/2023**

JOB DESCRIPTION Boilermaker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per Hour: 07/01/2022

Boilermaker	\$ 63.38
Repairs & Renovations	63.38

SUPPLEMENTAL BENEFITS

Per Hour:

Boilermaker	32% of hourly
Repair \$ Renovations	Wage Paid
	+ \$ 25.38

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay.

Repairs & Renovation Includes replacement of parts and repairs & renovation of existing unit.

OVERTIME PAY

See (D, O) on OVERTIME PAGE
 Repairs & Renovation see (B,E,Q)

HOLIDAY

Paid: See (8, 16, 23, 24) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 12, 15, 16, 22, 23, 24, 25) on HOLIDAY PAGE

NOTE: *Employee must work in pay week to receive Holiday Pay.
 **Employee gets 4 times the hourly wage rate for working Labor Day.

REGISTERED APPRENTICES

Wage per hour:
 (1/2) Year Terms at the following percentage of Boilermaker's Wage

1st	2nd	3rd	4th	5th	6th	7th
65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits Per Hour:

Apprentice(s)	32% of Hourly Wage Paid Plus Amount Below
---------------	---

1st Term	\$ 19.41
2nd Term	20.26
3rd Term	21.11
4th Term	21.96
5th Term	22.82
6th Term	23.68
7th Term	24.52

NOTE: "Hourly Wage Paid" shall include any and all premium(s)

4-5

Carpenter **03/01/2023**

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour: 07/01/2022

Piledriver	\$ 58.16
	+ 9.54*

Dockbuilder \$ 58.16
 + 9.54*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 44.54

OVERTIME PAY

See (B, E2, O) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.

Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour

(1)year terms:

	1st	2nd	3rd	4th
	\$24.60	\$30.20	\$38.58	\$46.97
	+ 5.05*	+ 5.05*	+ 5.05*	+ 5.05*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

All Terms: \$ 31.03

8-1556 Db

Carpenter

03/01/2023

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour: 07/01/2022

Carpet/Resilient

Floor Coverer \$ 55.05
 + 8.25*

*This portion is not subject to overtime premiums

INCLUDES HANDLING & INSTALLATION OF ARTIFICIAL TURF AND SIMILAR TURF INDOORS/OUTDOORS.

SUPPLEMENTAL BENEFITS

Per hour:

\$ 39.40

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18, 19) on HOLIDAY PAGE.

Paid for 1st & 2nd yr.

Apprentices See (5,6,11,13,16,18,19,25)

Overtime: See (5,6,11,13,16,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wage per hour - (1) year terms:

	1st	2nd	3rd	4th
	\$ 24.80	\$ 27.80	\$ 32.05	\$ 39.93
	+ 1.85*	+ 2.35*	+ 2.85*	+ 3.85*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

1st	2nd	3rd	4th
\$ 14.80	\$ 15.80	\$ 18.90	\$ 19.90

8-2287

Carpenter

03/01/2023

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per Hour: 07/01/2022

Marine Construction:

Marine Diver \$ 73.03
+ 9.54*

Marine Tender \$ 62.11
+ 9.54*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 44.54

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18, 19) on HOLIDAY PAGE

Overtime: See (5, 6, 10, 11, 13, 16, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms.

1st year	\$ 24.60 + 5.05*
2nd year	30.20 + 5.05*
3rd year	38.58 + 5.05*
4th year	56.97 + 5.05*

*This portion is not subject to overtime premiums

Supplemental Benefits

Per Hour:

All terms \$ 31.03

8-1456MC

Carpenter

03/01/2023

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour: 07/01/2022

Building
Millwright \$ 57.80
+ 12.62*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per hour:

Millwright \$ 43.16

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18,19) on HOLIDAY PAGE.

Overtime See (5,6,8,11,13,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms:

1st.	2nd.	3rd.	4th.
\$31.24	\$36.69	\$42.14	\$53.04
+ 6.75*	+ 7.92*	+ 9.09*	+ 11.43*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

One (1) year terms:

1st.	2nd.	3rd.	4th.
\$29.01	\$31.54	\$34.72	\$39.14

8-740.1

Carpenter

03/01/2023

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:

07/01/2022

Timberman \$ 53.05
+ 10.01*

*This portion not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per Hour:

07/01/2022

\$ 43.75

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.

Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms:

1st	2nd	3rd	4th
\$22.42	\$27.53	\$35.18	\$42.84
+ 5.30*	+ 5.30*	+ 5.30*	+5.30*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

All terms \$ 30.74

8-1556 Tm

Carpenter **03/01/2023**

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Westchester

PARTIAL COUNTIES

Orange: South of but including the following, Waterloo Mills, Slate Hill, New Hampton, Goshen, Blooming Grove, Mountainville, east to the Hudson River.

Putnam: South of but including the following, Cold Spring, TompkinsCorner, Mahopac, Croton Falls, east to Connecticut border.

Suffolk: West of Port Jefferson and Patchogue Road to Route 112 to the Atlantic Ocean.

WAGES

Per hour: 07/01/2022 10/18/2022

Core Drilling:

Driller	\$ 42.27	\$ 43.38	
	+ 2.30*	+ 2.50*	

Driller Helper

	33.47	34.47	
	+ 2.30*	+ 2.50*	

Note: Hazardous Waste Pay Differential:

For Level C, an additional 15% above wage rate per hour

For Level B, an additional 15% above wage rate per hour

For Level A, an additional 15% above wage rate per hour

Note: When required to work on water: an additional \$ 3.00 per hour.

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per hour:

Driller and Helper	\$ 28.30	\$ 28.85	
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OVERTIME PAY

See (B, G, P) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

8-1536-CoreDriller

Carpenter - Building / Heavy&Highway **03/01/2023**

JOB DESCRIPTION Carpenter - Building / Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Putnam, Rockland, Westchester

WAGES

WAGES:(per hour)

Applies to CAPRENTER BUILDING/HEAVY & HIGHWAY/TUNNEL:

	07/01/2022	07/01/2023	07/01/2024	07/01/2025
Base Wage	\$ 38.95	\$ 1.25**	\$ 1.25**	\$ 1.25**
	+\$6.65*			

*For all hours paid straight or premium.

**To be allocated at a later date.

SHIFT DIFFERENTIAL: When it is mandated by a Government Agency irregular or off shift can be worked. The Carpenter shall receive an additional fifteen percent (15%) of wage plus applicable benefits.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 32.88

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

BUILDING:

Paid: See (1) on HOLIDAY PAGE.
 Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE.
 - Holidays that fall on Sunday will be observed Monday.

HEAVY&HIGHWAY/TUNNEL:

Paid: See (5, 6, 25) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE
 - Holidays that fall on Sunday will be observed Monday
 - Must be employed during the five (5) work days immediately preceding a holiday or during the five (5) work days following the paid holiday to receive holiday pay
 - If Employee is entitled to a paid holiday, the Employee is paid the Holiday wage and supplemental benefits whether they work or not. If Employee works the Holiday, the Employee will receive holiday pay (including supplemental benefits), plus the applicable premium wage for working the Holiday. If Employee works in excess of 8 hours on Holiday, then benefits will be paid for any hours in excess of 8 hours.

REGISTERED APPRENTICES

1 year terms at the following wage rates:

1st	2nd	3rd	4th	5th
\$ 19.48	\$ 23.37	\$ 25.32	\$ 27.27	\$ 31.16
+3.57*	+3.57*	+3.57*	+3.57*	+3.57*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS per hour:

All terms \$ 16.28

11-279.1B/HH

Electrician

03/01/2023

JOB DESCRIPTION Electrician

DISTRICT 8

ENTIRE COUNTIES

Westchester

WAGES

Per hour: 07/01/2022

*Electrician/A-Technician \$ 53.75
 Teledata 53.75

*All new installations of wiring, conduit, junction boxes and light fixtures for projects with a base bid of more than \$325,000. For projects with a base bid of \$325,000 or less, see Maintenance and Repair rates.

Note: On a job where employees are required to work on bridges over navigable waters, transmission towers, light poles, bosun chairs, swinging scaffolds , etc. 40 feet or more above the water or ground or under compressed air, or tunnel projects under construction or where assisted breathing apparatus is required, they will be paid at the rate of time and one-half for such work except on normal pole line or building construction work.

SUPPLEMENTAL BENEFITS

Per hour:
 Journeyworker \$ 54.39

OVERTIME PAY

See (A, G, *J, P) on OVERTIME PAGE

*NOTE: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year terms at the following wage rates:

	07/01/2022
1st term	\$ 15.00
2nd term	16.00
3rd term	18.00
4th term	20.00
MIJ 1-12 months	25.00

MIJ 13-18 months 28.50

Supplemental Benefits per hour:

	07/01/2022
1st term	\$ 10.82
2nd term	13.05
3rd term	14.39
4th term	15.72
MIJ 1-12 months	13.49
MIJ 13-18 months	13.87

8-3/W

Electrician

03/01/2023

JOB DESCRIPTION Electrician

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond, Westchester

WAGES

Per hour:	07/01/2022	03/09/2023
Service Technician	\$ 35.40	\$ 36.40

Service and Maintenance on Alarm and Security Systems.

Maintenance, repair and /or replacement of defective (or damaged) equipment on, but not limited to, Burglar - Fire - Security - CCTV - Card Access - Life Safety Systems and associated devices. (Whether by service contract of T&M by customer request.)

SUPPLEMENTAL BENEFITS

Per hour:		
Journeyworker:	\$ 20.18	\$ 21.07

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE
 Overtime: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE

9-3H

Electrician

03/01/2023

JOB DESCRIPTION Electrician

DISTRICT 8

ENTIRE COUNTIES

Westchester

WAGES

Per hour	07/01/2022
Electrician -M	\$ 28.50
H - Telephone	28.50

All work with a base bid amount of \$325,000 or less. Including repairs and /or replacement of defective electrical and teledata equipment, all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls, and washing and cleaning of foregoing fixtures.

*If the project exceeds \$375,000 due to changes in the scope of work, an Electrician/A Technician must be part of the labor ratio.

SUPPLEMENTAL BENEFITS

	07/01/2022
Electrician & H - Telephone	\$ 13.87

OVERTIME PAY

See (B, G, *J, P) on OVERTIME PAGE

*Note: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

8-3m

Elevator Constructor **03/01/2023**

JOB DESCRIPTION Elevator Constructor

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

PARTIAL COUNTIES

Rockland: Entire County except for the Township of Stony Point

Westchester: Entire County except for the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES

Per hour:

07/01/2022 03/17/2023

Elevator Constructor \$ 75.14 \$ 77.49

Modernization & Service/Repair 59.09 60.89

Four(4), ten(10) hour days may be worked at straight time during a week, Monday thru Friday.

NOTE- In order to use the '4 Day/10 Hour Work Schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 IS NOT SUBMITTED you will be liable for overtime payments for work over the allotted hours per day listed.

SUPPLEMENTAL BENEFITS

Per Hour:

Elevator Constructor \$ 43.914 \$ 45.574

Modernization & Service/Repairs 42.787 44.412

OVERTIME PAY

Constructor See (D, M, T) on OVERTIME PAGE.

Modern/Service See (B, F, S) on OVERTIME PAGE.

HOLIDAY

Paid: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES PER HOUR:

*Note:1st, 2nd, 3rd Terms are based on Average wage of Constructor & Modernization.

Terms 4 thru 9 Based on Journeyman's wage of classification Working in.

6 MONTH TERMS:

1st Term* 50%	2nd & 3rd Term* 50%	4th & 5th Term 55%	6th & 7th Term 65%	8th & 9th Term 75%
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SUPPLEMENTAL BENEFITS

Elevator Constructor

1st Term	\$ 0.00	\$ 0.00
2nd & 3rd Term	34.772	36.024
4th & 5th Term	35.606	36.943
6th & 7th Term	37.052	38.448
8th & 9th Term	38.497	39.953

Modernization & Service/Repair

1st Term	\$ 0.00	\$ 0.00
2nd & 3rd Term	34.672	35.694
4th & 5th Term	35.195	36.525
6th & 7th Term	36.571	37.948
8th & 9th Term	37.938	39.38

JOB DESCRIPTION Elevator Constructor

DISTRICT 1

ENTIRE COUNTIES

Columbia, Dutchess, Greene, Orange, Putnam, Sullivan, Ulster

PARTIAL COUNTIES

Delaware: Towns of Andes, Bovina, Colchester, Davenport, Delhi, Harpersfield, Hemdon, Kortright, Meredith, Middletown, Roxbury, Hancock & Stamford

Rockland: Only the Township of Stony Point.

Westchester: Only the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES

Per Hour	07/01/2022	01/01/2023
Mechanic	\$ 64.63	\$ 67.35
Helper	70% of Mechanic Wage Rate	70% of Mechanic Wage Rate

Four (4), ten (10) hour days may be worked for New Construction and Modernization Work at straight time during a week, Monday thru Thursday or Tuesday thru Friday.

***Four (4), ten (10) hour days are not permitted for Contract Work/Repair Work

NOTE - In order to use the '4 Day/10 Hour Work Schedule' as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule', form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour	07/01/2022	01/01/2023
Journeyman/Helper	\$ 36.885*	\$ 37.335*

(*)Plus 6% of regular hourly if less than 5 years of service. Plus 8% of regular hourly rate if more than 5 years of service.

OVERTIME PAY

See (D, O) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 15, 16) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE

Note: When a paid holiday falls on Saturday, it shall be observed on Friday. When a paid holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES

Wages per hour:				
0-6 mo*	6-12 mo	2nd yr	3rd yr	4th yr
50 %	55 %	65 %	70 %	80 %

(*)Plus 6% of the hourly rate, no additional supplemental benefits.

Supplemental Benefits per hour worked:

Same as Journeyman/Helper

1-138

Glazier

03/01/2023

JOB DESCRIPTION Glazier

DISTRICT 8

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per hour:	7/01/2022	11/01/2022
Glazier	\$ 59.59	\$ 60.34
*Scaffolding	61.55	62.55
Glass Tinting & Window Film	30.11	30.11
**Repair & Maintenance	30.11	30.11

*Scaffolding includes swing scaffold, mechanical equipment, scissor jacks, man lifts, booms & buckets 24' or more, but not pipe scaffolding.

**Repair & Maintenance- All repair & maintenance work on a particular building whenever performed, where the total cumulative contract value is under \$148,837. All Glass tinting, window film, regardless of material or intended use, and all affixing of decals to windows or glass.

SUPPLEMENTAL BENEFITS

Per hour:	7/01/2022	11/01/2022
Journeyworker	\$ 37.55	\$ 38.05
Glass tinting &	22.01	22.01
Window Film		
Repair & Maintenance	22.01	22.01

OVERTIME PAY

See (B,H,V) on OVERTIME PAGE.
 For 'Repair & Maintenance' and 'Glass Tinting & Window Film' see (B, B2, I, S) on overtime page.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (4, 6, 16, 25) on HOLIDAY PAGE
 For 'Repair & Maintenance' and 'Glass Tinting & Window Film' Only
 Paid: See(5, 6, 16, 25)
 Overtime: See(5, 6, 16, 25)

REGISTERED APPRENTICES

Wage per hour:	7/01/2022	11/01/2022
(1) year terms at the following wage rates:		
1st term	\$ 21.15	\$ 21.45
2nd term	29.07	29.45
3rd term	35.20	35.65
4th term	47.38	47.98
Supplemental Benefits:		
(Per hour)		
1st term	\$ 17.15	\$ 17.35
2nd term	24.42	24.67
3rd term	27.06	27.36
4th term	32.15	32.55

8-1087 (DC9 NYC)

Insulator - Heat & Frost **03/01/2023**

JOB DESCRIPTION Insulator - Heat & Frost **DISTRICT 8**

ENTIRE COUNTIES
 Dutchess, Orange, Putnam, Rockland, Westchester

WAGES

Per hour:	07/01/2022	05/31/2023
Insulator	\$ 58.25	+ \$ 2.00
Discomfort & Additional Training**	61.30	+ \$ 2.00
Fire Stop Work*	31.15	+ \$ 2.00

* Applies on all exclusive Fire Stop Work (When contract is for Fire Stop work only). No apprentices on these contracts only.

**Applies to work requiring: garb or equipment worn against the body not customarily worn by insulators;psychological evaluation;special training, including but not limited to "Yellow Badge" radiation training

Note: Additional \$0.50 per hour for work 30 feet or more above floor or ground level.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 36.10

Discomfort & Additional Training 38.09

Fire Stop Work:
 Journeyworker 18.41

OVERTIME PAY

See (B, E, E2, Q, *T) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Note: Last working day preceding Christmas and New Years day, workers shall work no later than 12:00 noon and shall receive 8 hrs pay.

Overtime: See (2*, 4, 6, 16, 25) on HOLIDAY PAGE.

*Note: Labor Day triple time if worked.

REGISTERED APPRENTICES

(1) year terms:

Insulator Apprentices:

1st	2nd	3rd	4th
\$ 31.15	\$ 36.56	\$ 41.98	\$ 47.41

Discomfort & Additional Training Apprentices:

1st	2nd	3rd	4th
\$ 32.67	\$ 38.39	\$ 44.12	\$ 49.85

Supplemental Benefits paid per hour:

Insulator Apprentices:

1st term	\$ 18.41
2nd term	21.94
3rd term	25.48
4th term	29.03

Discomfort & Additional Training Apprentices:

1st term	\$ 19.41
2nd term	23.14
3rd term	26.88
4th term	30.62

8-91

Ironworker

03/01/2023

JOB DESCRIPTION Ironworker

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:	07/01/2022	01/01/2023
		Additional
Stone Derrickmen Rigger	\$ 72.26	+ \$ 1.64

Stone Handset Derrickman	70.11	+ \$ 1.11
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SUPPLEMENTAL BENEFITS

Per hour:

Stone Derrickmen Rigger \$ 42.10

Stone Handset
Derrickman 42.09

OVERTIME PAY

See (B, D1, *E, Q, **V) on OVERTIME PAGE

*Time and one-half shall be paid for all work on Saturday up to eight (8) hours and double time shall be paid for all work thereafter.

** Benefits same premium as wages on Holidays only

HOLIDAY

Paid: See (18) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 25) on HOLIDAY PAGE
 Work stops at schedule lunch break with full day's pay.

REGISTERED APPRENTICES

Wage per hour:

Stone Derrickmen Rigger:

	1st	2nd	3rd	4th
07/01/2022	\$ 35.58	\$ 50.89	\$ 56.71	\$ 62.48

Supplemental benefits:

Per hour:				
07/01/2022	21.61	31.97	31.97	31.97

Stone Handset:

1/2 year terms at the following hourly wage rate:

	1st	2nd	3rd	4th
07/01/2022	34.50	49.43	54.99	61.00

Supplemental benefits:

Per hour:				
07/01/2022	21.60	31.96	31.96	31.96

9-197D/R

Ironworker

03/01/2023

JOB DESCRIPTION Ironworker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:	07/01/2022	01/01/2023
Ornamental	\$ 46.65	\$ 46.90
Chain Link Fence	46.65	46.90
Guide Rail	46.65	46.90

SUPPLEMENTAL BENEFITS

Per hour:		
Journeyworker:	\$ 62.04	\$ 63.04

OVERTIME PAY

See (B, B1, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Apprentices Hired after 9/1/18:

1 year terms

	07/01/2022	01/01/2023
1st Term	\$ 20.63	\$ 21.13
2nd Term	24.22	24.77
3rd Term	27.80	28.40
4th Term	31.38	32.06

Supplemental Benefits per hour:

1st Term	\$ 17.90	\$ 17.90
2nd Term	19.15	19.15
3rd Term	20.41	20.41
4th Term	21.67	21.67

4-580-Or

Ironworker

03/01/2023

JOB DESCRIPTION Ironworker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

PER HOUR:

	07/01/2022	01/01/2023
Ironworker:		
Structural	\$ 55.70	\$ 56.45
Bridges		
Machinery		

SUPPLEMENTAL BENEFITS

PER HOUR PAID:

Journeyman	\$ 85.35	\$ 86.35
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OVERTIME PAY

See (B, B1, Q, *V) on OVERTIME PAGE

*NOTE: Benefits are calculated for every hour paid

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES PER HOUR:

6 month terms at the following rate:

1st	\$ 28.97	\$ 29.35
2nd	29.57	29.95
3rd - 6th	30.18	30.56

Supplemental Benefits

PER HOUR PAID:

All Terms	\$ 59.18	\$ 59.94
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4-40/361-Str

Ironworker

03/01/2023

JOB DESCRIPTION Ironworker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES

Rockland: Southern section - south of Convent Road and east of Blue Hills Road.

WAGES

Per hour:	07/01/2022	07/01/2023
Reinforcing & Metal Lathing	\$ 56.90	Additional \$ 1.50
"Base" Wage	\$ 55.20 plus \$ 1.70	

"Base" Wage is used to calculate overtime hours only.

SUPPLEMENTAL BENEFITS

Per hour:

Reinforcing & Metal Lathing	\$ 41.18
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OVERTIME PAY

See (B, E, Q, *X) on OVERTIME PAGE

*Only \$23.50 per Hour for non worked hours

Supplemental Benefit Premiums for Overtime Hours worked:

Time & One Half	\$ 47.68
Double Time	\$ 54.18

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 13, *18, **19, 25) on HOLIDAY PAGE

*Note: Work performed after first 4 Hours.

REGISTERED APPRENTICES

(1) year terms at the following wage rates:

1st term	2nd term	3rd term	4th Term
Wage Per Hour: \$ 22.55	\$ 23.60	\$ 24.60	\$ 37.18
"Base" Wage \$ 21.00 plus \$1.55	\$ 22.00 plus \$1.60	\$ 23.00 plus \$1.60	\$ 35.60 plus \$1.58

"Base" Wage is used to calculate overtime hours ONLY.

SUPPLEMENTAL BENEFITS

Per Hour:

1st term	2nd term	3rd term	4th Term
\$ 18.17	\$ 17.17	\$ 16.22	\$ 22.50

4-46Reinf

Laborer - Building

03/01/2023

JOB DESCRIPTION Laborer - Building

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

Per hour 07/01/2022

Laborer \$ 39.05
plus \$5.45**

Laborer - Asbestos & Hazardous
Materials Removal \$ 43.50*

* Abatement/Removal of:

- Lead based or lead containing paint on materials to be repainted is classified as Painter.
- Asbestos containing roofs and roofing material is classified as Roofer.

** This portion is not subject to overtime premium.

NOTE: Upgrade/Material condition work plan for work performed during non-outage under a wage formula of 90% wage/100% fringe benefits at nuclear power plants.

SUPPLEMENTAL BENEFITS

Per hour: 07/01/2022

Journeyworker \$ 29.50

OVERTIME PAY

See (B, E, E2, Q, *V) on OVERTIME PAGE

*Note: For Sundays and Holidays worked benefits are at the same premium as wages.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

LABORER ONLY

Hourly terms at the following wage:

Level A 0-1000	Level B 1001-2000	Level C 2001-3000	Level D 3001-4000
\$ 27.07	\$ 30.89	\$ 34.72	\$ 38.54

Supplemental Benefits per hour:

Apprentices
All terms \$ 22.20

Laborer - Heavy&Highway

03/01/2023

JOB DESCRIPTION Laborer - Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

****PUTNAM: APPLIES TO ALL HEAVY & HIGHWAY WORK EXCLUDING HIGHWAYS, STREETS, AND BRIDGES****

GROUP I: Blaster, Quarry Master, Curbs/Asphalt Screedman, Pipe Jacking and Boring Operations Operator, Qualified Dead Condition Pipe Fuser (B Mechanic)

GROUP II: Burner, Drillers(jumbo, joy, wagon, air track, hydraulic), Drill Operator, Self Contained Rotary Drill, Curbs, Raker, Bar Person, Concrete Finisher.

GROUP III: Pavement Breakers, Jeeper Operator, Jack Hammer, Pneumatic Tools (all), Gas Driller, Guniting, Railroad Spike Puller, Pipelayer, Chain Saw, Deck winches on scows, Power Buggy Operator, Power Wheelbarrow Operator, Bar Person Helper, Compressed Air lance, Water Jet Lance.

GROUP IV: Concrete Laborers, Asph. Worker, Rock Scaler, Vibrator Oper., Bit Grinder, Air Tamper, Pumps, Epoxy (adhesives, fillers and troweled on), Barco Rammer, Concrete Grinder, Crack Router Operator, Guide Rail-digging holes and placing concrete and demolition when not to be replaced, distribution of materials and tightening of bolts.

GROUP V: Drillers Helpers, Common Laborer, Mason Tenders, Signal Person, Pit Person, Truck Spotter, Powder Person, Landscape/Nursery Person, Dump Person, Temp. Heat.

GROUP VIA: Asbestos/Toxic Waste Laborer-All removal (Roads, Tunnels, Landfills, etc.) Confined space laborer, Bio-remediation, Phyto-remediation, Lead or Hazardous material, Abatement Laborer.

Wages:(per hour) 07/01/2022

GROUP I	\$ 47.13*
GROUP II	45.78*
GROUP III	45.38*
GROUP IV	45.03*
GROUP V	44.68*
GROUP VIA	46.68*
Operator Qualified	
Gas Mechanic(A Mech)	57.13*
Flagperson	38.33*

*NOTE: To calculate overtime premiums, deduct \$0.10 from above wages

SHIFT WORK: A shift premium will be paid on Public Work contracts for off-shift or irregular shift work when mandated by the NYS D.O.T. or other Governmental Agency contracts. Employees shall receive an additional 15% per hour above current rate for all regular and irregular shift work. Premium pay shall be calculated using the 15% per hour differential as base rate.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:

First 40 Hours	
Per Hour	\$ 26.82
Over 40 Hours	
Per Hour	20.32

OVERTIME PAY

See (B, E, P, R, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

NOTE: For Holiday Overtime: 5, 6 - Code 'S' applies
 For Holiday Overtime: 8, 15, 25, 26 - Code 'R' applies

REGISTERED APPRENTICES

	1st term	2nd term	3rd term	4th term
	1-1000hrs	1001-2000hrs	2001-3000hrs	3001-4000hrs
07/01/2022	\$ 25.37	\$ 29.94	\$ 34.51	\$ 38.98

Supplemental Benefits per hour:

1st term	\$ 4.70 - After 40 hours: \$ 4.45
2nd term	\$ 4.80 - After 40 hours: 4.45
3rd term	\$ 5.30 - After 40 hours: 4.85
4th term	\$ 5.85 - After 40 hours: 5.35

8-60H/H

Laborer - Tunnel

03/01/2023

JOB DESCRIPTION Laborer - Tunnel

DISTRICT 11

ENTIRE COUNTIES

Columbia, Dutchess, Greene, Orange, Otsego, Putnam, Rockland, Sullivan, Ulster, Westchester

PARTIAL COUNTIES

Chenango: Townships of Columbus, Sherburne and New Berlin.

Delaware: Townships of Andes, Bovina, Middletown, Roxbury, Franklin, Hamden, Stamford, Delhi, Kortright, Harpersfield, Merideth and Davenport.

WAGES

Class 1: All support laborers/sandhogs working above the shaft or tunnel.

Class 2: All laborers/sandhogs working in the shaft or tunnel.

Class 4: Safety Miners

Class 5: Site work related to Shaft/Tunnel

WAGES: (per hour)

	07/01/2022
Class 1	\$ 53.45
Class 2	55.60
Class 4	62.00
Class 5	44.80

Toxic and hazardous waste, lead abatement and asbestos abatement work will be paid an additional \$ 3.00 an hour.

SHIFT DIFFERENTIAL...On all Government mandated irregular shift work:

- Employee shall be paid at time and one half the regular rate Monday through Friday.
- Saturday shall be paid at 1.65 times the regular rate.
- Sunday shall be paid at 2.15 times the regular rate.

SUPPLEMENTAL BENEFITS

Per hour:

Benefit 1	\$ 34.45
Benefit 2	51.60
Benefit 3	68.75

Benefit 1 applies to straight time hours, paid holidays not worked.

Benefit 2 applies to over 8 hours in a day (M-F), irregular shift work hours worked, and Saturday hours worked.

Benefit 3 applies to Sunday and Holiday hours worked.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE

When a recognized Holidays falls on Saturday or Sunday, holidays falling on Saturday shall be recognized or observed on Friday and holidays falling on Sunday shall be recognized or observed on Monday. Employees ordered to work on the Saturday or Sunday of the holiday or on the recognized or the observed Friday or Monday for those holidays falling on Saturday or Sunday shall receive double time the established rate and benefits for the holiday.

REGISTERED APPRENTICES

FOR APPRENTICE RATES, refer to the appropriate Laborer Heavy & Highway wage rate contained in the wage schedule for the County and location where the work is to be performed.

11-17/60/235/754Tun

Lineman Electrician

03/01/2023

JOB DESCRIPTION Lineman Electrician

DISTRICT 6

ENTIRE COUNTIES

Westchester

WAGES

A Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors, assembly of all electrical materials, conduit, pipe or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

A Groundman/Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator equipment/operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

Below rates apply to electrical overhead and underground distribution and maintenance work and overhead and underground transmission line work, electrical substations, switching structures, continuous pipe-type underground fluid or gas filled transmission conduit and cable installations, maintenance jobs or projects, railroad catenary installations and maintenance, third rail installations, the bonding of rails and the installation of fiber optic cable. (Ref #14.04.01)

NOTE: Includes Teledata Work within ten (10) feet of High Voltage Transmission Lines. Also includes digging of holes for poles, anchors, footer, and foundations for electrical equipment.

Per hour:	07/01/2022	05/01/2023	05/06/2024
Lineman, Tech, Welder	\$ 59.01	\$ 60.41	\$ 61.91
Crane, Crawler Backhoe	59.01	60.41	61.91
Cable Splicer-Pipe Type	64.91	66.45	68.10
Digging Mach Operator	53.11	54.37	55.72
Cert. Welder-Pipe Type	61.96	63.43	65.01
Tractor Trailer Driver	50.16	51.35	52.62
Groundman, Truck Driver	47.21	48.33	49.53
Equipment Mechanic	47.21	48.33	49.53
Flagman	35.41	36.25	37.15

Additional \$1.00 per hour for entire crew when a helicopter is used.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2022	05/01/2023	05/06/2024
Journeyman	\$ 25.90 *plus 7% of the hourly wage paid	\$ 26.40 *plus 7% of the hourly wage paid	\$ 26.90 *plus 7% of the hourly wage paid
Journeyman Lineman or Equipment Operators with Crane License	\$ 27.90 *plus 7% of the hourly wage paid	\$ 29.40 *plus 7% of the hourly wage paid	\$ 30.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q,) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept of Jurisdiction.

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
 Overtime See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2022	05/01/2023	05/06/2024
\$ 25.90	\$ 26.40	\$ 26.90
*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWest

Lineman Electrician - Teledata

03/01/2023

JOB DESCRIPTION Lineman Electrician - Teledata

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour:

For outside work, stopping at first point of attachment (demarcation).

	07/01/2022	01/01/2023	01/01/2024	01/01/2025
Cable Splicer	\$ 36.28	\$ 37.73	\$ 39.24	\$ 40.81
Installer, Repairman	\$ 34.43	\$ 35.81	\$ 37.24	\$ 38.73
Teledata Lineman	\$ 34.43	\$ 35.81	\$ 37.24	\$ 38.73
Tech., Equip. Operator	\$ 34.43	\$ 35.81	\$ 37.24	\$ 38.73
Groundman	\$ 18.25	\$ 18.98	\$ 19.74	\$ 20.53

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2022	01/01/2023	01/01/2024	01/01/2025
Journeyman	\$ 5.14	\$ 5.14	\$ 5.14	\$ 5.14
	*plus 3% of the hourly wage paid	*plus 3% of the hourly wage paid	*plus 3% of the hourly wage paid	*plus 3% of the hourly wage paid

*The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.
 Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16) on HOLIDAY PAGE

6-1249LT - Teledata

Lineman Electrician - Traffic Signal, Lighting **03/01/2023**

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting **DISTRICT 6**

ENTIRE COUNTIES

Westchester

WAGES

Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors which includes, but is not limited to road loop wires; conduit and plastic or other type pipes that carry conductors, flex cables and connectors, and to oversee the encasement or burial of such conduits or pipes.

A Groundman/Groundman Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator/equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.
 (Ref #14.01.03)

Per hour:	07/01/2022	05/01/2023	05/06/2024
Lineman, Technician	\$ 53.60	\$ 54.73	\$ 55.95
Crane, Crawler Backhoe	53.60	54.73	55.95
Certified Welder	56.28	57.47	58.75
Digging Machine	48.24	49.26	50.36
Tractor Trailer Driver	45.56	46.52	47.56
Groundman, Truck Driver	42.88	43.78	44.76
Equipment Mechanic	42.88	43.78	44.76
Flagman	32.16	32.84	33.57

Above rates are applicable for installation, testing, operation, maintenance and repair on all Traffic Control (Signal) and Illumination (Lighting) projects, Traffic Monitoring Systems, and Road Weather Information Systems. Includes digging of holes for poles, anchors, footer foundations for electrical equipment; assembly of all electrical materials or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2022	05/01/2023	05/06/2024
Journeyman	\$ 25.90	\$ 26.40	\$ 26.90
	*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid

Journeyman Lineman or Equipment Operators with Crane License	\$ 27.90 *plus 7% of the hourly wage paid	\$ 29.40 *plus 7% of the hourly wage paid	\$ 30.90 *plus 7% of the hourly wage paid
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*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept. of Jurisdiction.
 NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.
 Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.
 Overtime: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2022	05/01/2023	05/06/2024
\$ 25.90 *plus 7% of the hourly wage paid	\$ 26.40 *plus 7% of the hourly wage paid	\$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWestLT

Mason - Building **03/01/2023**

JOB DESCRIPTION Mason - Building

DISTRICT 11

ENTIRE COUNTIES
 Putnam, Rockland, Westchester

PARTIAL COUNTIES
 Orange: Only the Township of Tuxedo.

WAGES

Per hour:	07/01/2022	06/01/2023
Bricklayer	\$ 44.79	\$ 45.89
Cement Mason	44.79	45.89
Plasterer/Stone Mason	44.79	45.89
Pointer/Caulker	44.79	45.89

Additional \$1.00 per hour for power saw work
 Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:

- Irregular work day requires 15% premium
- Second shift an additional 15% of wage plus benefits to be paid
- Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:		
Journeyman	\$ 37.00	\$ 37.95

OVERTIME PAY

OVERTIME:
 Cement Mason See (B, E, Q, W) on OVERTIME PAGE.
 All Others See (B, E, Q) on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5wp-b

Mason - Building

03/01/2023

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Building

07/01/2022

Wages per hour:

Mosaic & Terrazzo Mechanic \$ 59.21

Mosaic & Terrazzo Finisher 57.60

SUPPLEMENTAL BENEFITS

Per hour:

Mosaic & Terrazzo Mechanic \$ 26.21*
 + \$11.73

Mosaic & Terrazzo Finisher \$ 26.21*
 + \$11.72

*This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY

See (A, E, Q) on OVERTIME PAGE

07/01/2022- Deduct \$7.00 from hourly wages before calculating overtime.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

Easter Sunday is an observed holiday. Holidays falling on a Saturday will be observed on that Saturday. Holidays falling on a Sunday will be celebrated on the Monday.

REGISTERED APPRENTICES

Wages Per hour:

1st	2nd	3rd	4th	5th	6th
0-1500	1501-3000	3001-3750	3751-4500	4501-5250	5251-6000
\$ 22.82	\$ 29.34	\$ 31.32	\$ 36.55	\$ 41.77	\$ 46.99

Supplemental Benefits per hour:

\$4.62*	\$5.94*	\$15.73*	\$18.35*	\$20.97*	\$23.59*
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+\$6.56 +\$8.43 +\$11.24 +\$13.11 +\$14.99 +\$16.85

*This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/3

Mason - Building

03/01/2023

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour: 07/01/2022

Building-Marble Restoration:
 Marble, Stone & \$ 46.60

Terrazzo Polisher, etc

SUPPLEMENTAL BENEFITS

Per Hour:
 Journeyworker:

Building-Marble Restoration:
 Marble, Stone &
 Polisher \$ 29.77

OVERTIME PAY

See (B, *E, Q, V) on OVERTIME PAGE

*ON SATURDAYS, 8TH HOUR AND SUCCESSIVE HOURS PAID AT DOUBLE HOURLY RATE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
 1ST TERM APPRENTICE GETS PAID FOR ALL OBSERVED HOLIDAYS.

REGISTERED APPRENTICES

WAGES per hour:

900 hour term at the following wage:

1st 1- 900	2nd 901- 1800	3rd 1801- 2700	4th 2701
\$ 32.61	\$ 37.28	\$ 41.94	\$ 46.60

Supplemental Benefits Per Hour:

27.07	27.97	28.87	29.77
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9-7/24-MP

Mason - Building

03/01/2023

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Wages: 07/01/2022

Marble Cutters & Setters \$ 62.17

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 38.27

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage Per Hour:

750 hour terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-750	751-1500	1501-2250	2251-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6751	6751-7500
\$ 24.88	\$ 27.97	\$ 31.08	\$ 34.17	\$ 37.29	\$ 40.39	\$ 43.51	\$ 46.61	\$ 52.82	\$ 59.05

Supplemental Benefits per hour:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 20.55	\$ 22.04	\$ 23.52	\$ 25.01	\$ 26.47	\$ 27.96	\$ 29.42	\$ 30.91	\$ 33.86	\$ 36.81 9-7/4

Mason - Building

03/01/2023

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour: 07/01/2022

Marble, Stone, etc.
 Maintenance Finishers: \$ 27.01

Note 1: An additional \$2.00 per hour for time spent grinding floor using "60 grit" and below.

Note 2: Flaming equipment operator shall be paid an additional \$25.00 per day.

SUPPLEMENTAL BENEFITS

Per Hour:

Marble, Stone, etc
 Maintenance Finishers: \$ 14.40

OVERTIME PAY

See (B, *E, Q, V) on OVERTIME PAGE

*Double hourly rate after 8 hours on Saturday

HOLIDAY

Paid: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE

1st term apprentice gets paid for all observed holidays.

REGISTERED APPRENTICES

WAGES per hour:

07/01/2022

0-750	\$ 21.67
751-1500	22.38
1501-2250	23.10
2251-3000	23.80
3001-3750	24.87
3751-4500	26.29
4501+	27.01

Supplemental Benefits:

Per hour:

0-750	11.52
751-1500	11.90
1501-2250	12.29

2251-3000	12.67
3001-3750	13.25
3751-4500	14.01
4501+	14.40

9-7/24M-MF

Mason - Building **03/01/2023**

JOB DESCRIPTION Mason - Building **DISTRICT 9**

ENTIRE COUNTIES
 Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2022	12/05/2022	06/05/2023 Additional
Tile Setters	\$ 62.01	\$ 62.62	\$ 0.73

SUPPLEMENTAL BENEFITS

Per Hour:	\$ 26.13*	\$ 25.26*
	+ \$10.02	+ \$10.03

* This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY
 See (B, E, Q, V) on OVERTIME PAGE
 Work beyond 10 hours on Saturday shall be paid at double the hourly wage rate.

HOLIDAY
 Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
 Wage per hour:

(750 hour) term at the following wage rate:

Term:	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
	1-750	751-1500	1501-2250	2251-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6750	6501-7000
07/01/2022	\$21.23	\$26.11	\$33.26	\$38.14	\$41.67	\$45.04	\$48.60	\$53.47	\$56.25	\$60.33
12/05/2022	\$21.47	\$26.39	\$33.60	\$38.52	\$42.06	\$45.47	\$49.05	\$53.96	\$56.77	\$60.90

Supplemental Benefits per hour:

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
07/01/2022	\$12.55*	\$12.55*	\$15.16*	\$15.16*	\$16.75*	\$18.30*	\$19.35*	\$19.40*	\$17.45*	\$22.80*
	+\$.69	+\$.74	+\$.84	+\$.88	+\$1.28	+\$1.33	+\$1.70	+\$1.75	+\$5.90	+\$6.42
12/05/2022	\$12.55*	\$12.55*	\$15.16*	\$15.16*	\$16.16*	\$17.66*	\$18.66*	\$18.66*	\$16.66*	\$21.91*
	+\$.71	+\$.76	+\$.86	+\$.90	+\$1.32	+\$1.37	+\$1.76	+\$1.81	+\$5.96	+\$6.51

* This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/52A

Mason - Building **03/01/2023**

JOB DESCRIPTION Mason - Building **DISTRICT 9**

ENTIRE COUNTIES
 Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2022	12/05/2022	06/05/2023
Tile Finisher	\$ 47.60	\$ 48.04	Additional \$ 0.58

SUPPLEMENTAL BENEFITS

Per Hour:	\$ 22.16*	\$ 22.31*
	+ \$9.85	+ \$9.85

*This portion of benefits subject to same premium rate as shown for overtime wages

OVERTIME PAY

See (B, E, Q, *V) on OVERTIME PAGE

*Work beyond 10 hours on a Saturday shall be paid at double the hourly wage rate.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

9-7/88A-tf

Mason - Building / Heavy&Highway **03/01/2023**

JOB DESCRIPTION Mason - Building / Heavy&Highway **DISTRICT 9**

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour: 07/01/2022

Marble-Finisher \$ 48.97

SUPPLEMENTAL BENEFITS

Journeyworker:
per hour

Marble- Finisher \$ 35.76

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE

Work beyond 8 hours on a Saturday shall be paid at double the rate.

HOLIDAY

Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
 When an observed holiday falls on a Sunday, it will be observed the next day.

9-7/20-MF

Mason - Heavy&Highway **03/01/2023**

JOB DESCRIPTION Mason - Heavy&Highway **DISTRICT 11**

ENTIRE COUNTIES

Putnam, Rockland, Westchester

PARTIAL COUNTIES

Orange: Only the Township of Tuxedo.

WAGES

Per hour: 07/01/2022 06/01/2023

Bricklayer	\$ 45.29	\$ 46.39
Cement Mason	45.29	46.39
Marble/Stone Mason	45.29	46.39
Plasterer	45.29	46.39
Pointer/Caulker	45.29	46.39

Additional \$1.00 per hour for power saw work
 Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:

Irregular work day requires 15% premium
 Second shift an additional 15% of wage plus benefits to be paid

Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 37.00 \$ 37.95

OVERTIME PAY

Cement Mason See (B, E, Q, W)
 All Others See (B, E, Q,)

HOLIDAY

Paid: See (5, 6, 16, 25) on HOLIDAY PAGE
 Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

- Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.
- Supplemental Benefits are not paid for paid Holiday
- If Holiday is worked, Supplemental Benefits are paid for hours worked.
- Whenever an Employee works within three (3) calendar days before a holiday, the Employee shall be paid for the Holiday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5WP-H/H

Operating Engineer - Building

03/01/2023

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I:

Cranes (All Types up to 49 tons), Boom Trucks, Cherry Pickers (All Types), Clamshell Crane, Derrick (Stone and Steel), Dragline, Franki Pile Rig or similar, High Lift (Lull or similar) with crane attachment and winch used for hoisting or lifting, Hydraulic Cranes, Pile Drivers, Potain and similar.

Cranes (All types 50-99 tons), Drill Rig Casa Grande (CAT or similar), Franki Pile Rig or similar, Hydraulic Cranes (All types including Crawler Cranes- No specific boom length).

Cranes (All types 100 tons and over), All Tower Cranes, All Climbing Cranes irrespective of manufacturer and regardless of how the same is rigged, Franki Pile Rig or similar, Conventional Cranes (All types including Crawler Cranes-No specific boom length), Hydraulic Cranes.

GROUP I-A: Barber Green Loader-Euclid Loader, Bulldozer, Carrier-Trailer Horse, Concrete Cleaning Decontamination Machine Operator, Concrete-Portable Hoist, Conway or Similar Mucking Machines, Elevator & Cage, Excavators all types, Front End Loaders, Gradall, Shovel, Backhoe, etc.(Crawler or Truck), Heavy Equipment Robotics Operator/Mechanic, Hoist Engineer-Material, Hoist Portable Mobile Unit, Hoist(Single, Double or Triple Drum), Horizontal Directional Drill Locator, Horizontal Directional Drill Operator and Jersey Spreader, Letourneau or Tournapull(Scrapers over 20 yards Struck), Lift Slab Console, etc., Lull HiLift or Similar, Master Environmental Maintenance Mechanics, Mucking Machines Operator/Mechanic or Similar Type, Overhead Crane, Pavement Breaker(Air Ram), Paver(Concrete), Post Hole Digger, Power House Plant, Road Boring Machine, Road Mix Machine, Ross Carrier and Similar Machines, Rubber tire double end backhoes and similar machines, Scoopmobile Tractor-Shovel Over 1.5 yards, Shovel (Tunnels), Spreader (Asphalt) Telephie(Cableway), Tractor Type Demolition Equipment, Trenching Machines-Vermeer Concrete Saw Trencher and Similar, Ultra High Pressure Waterjet Cutting Tool System, Vacuum Blasting Machine operator/mechanic, Winch Truck A Frame.

GROUP I-B: Compressor (Steel Erection), Mechanic (Outside All Types), Negative Air Machine (Asbestos Removal), Push Button (Buzz Box) Elevator.

GROUP II: Compactor Self-Propelled, Concrete Pump, Crane Operator in Training (Over 100 Tons), Grader, Machines Pulling Sheep's Foot Roller, Roller (4 ton and over), Scrapers (20 yards Struck and Under), Vibratory Rollers, Welder.

GROUP III-A: Asphalt Plant, Concrete Mixing Plants, Forklift (All power sources), Joy Drill or similar, Tractor Drilling Machine, Loader (1 1/2 yards and under), Portable Asphalt Plant, Portable Batch Plant, Portable Crusher, Skid Steer (Bobcat or similar), Stone Crusher, Well Drilling Machine, Well Point System.

GROUP III-B: Compressor Over 125 cu. Feet, Conveyor Belt Machine regardless of size, Compressor Plant, Ladder Hoist, Stud Machine.

GROUP IV-A: Batch Plant, Concrete Breaker, Concrete Spreader, Curb Cutter Machine, Finishing Machine-Concrete, Fine Grading Machine, Hepa Vac Clean Air Machine, Material Hopper(sand, stone, cement), Mulching Grass Spreader, Pump Gypsum etc, Pump-Plaster-GROUT-Fireproofing. Roller(Under 4 Ton),Spreading and Fine Grading Machine, Steel Cutting Machine, Siphon Pump, Tar Joint Machine, Television Cameras for Water, Sewer, Gas etc. Turbo Jet Burner or Similar Equipment, Vibrator (1 to 5).

GROUP IV-B: Compressor (all types), Heater (All Types), Fire Watchman, Lighting Unit (Portable & Generator) Pump, Pump Station(Water, Sewer, Portable, Temporary), Welding Machine (Steel Erection & Excavation).

GROUP V: Mechanics Helper, Motorized Roller (walk behind), Stock Attendant, Welder's Helper, Maintenance Engineer Crane(75 ton and over).

Group VI-A: Welder Certified

GROUP VI-B: Utility Man, Warehouse Man.

WAGES: (per hour)

	07/01/2022	03/06/2023	03/04/2024
GROUP I			
Cranes- up to 49 tons	\$ 65.03	\$ 66.23	\$ 67.43
Cranes- 50 tons to 99 tons	67.28	68.53	69.77
Cranes- 100 tons and over	76.77	78.21	79.64
GROUP I-A	56.97	58.01	59.04
GROUP I-B	52.52	53.48	54.41
GROUP II	54.98	55.98	56.97
GROUP III-A	52.97	53.94	54.88
GROUP III-B	50.44	51.35	52.25
GROUP IV-A	52.44	53.40	54.33
GROUP IV-B	44.38	45.17	45.94
GROUP V	47.83	48.69	49.53
Group VI-A	55.93	56.96	57.96
GROUP VI-B			
Utility Man	45.39	46.21	47.00
Warehouse Man	47.57	48.52	49.26

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects.

Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour.

Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour.

Loader operators over 5 cubic yard capacity additional .50 per hour.

Shovel operators over 4 cubic yard capacity additional \$1.00 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	\$ 29.87	\$ 30.57	\$ 31.32
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OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

8-137B

Operating Engineer - Building

03/01/2023

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, New York, Putnam, Queens, Richmond, Westchester

PARTIAL COUNTIES

Dutchess: that part of Dutchess County lying south of the North City Line of the City of Poughkeepsie.

WAGES

NOTE: Construction surveying

Party Chief--One who directs a survey party

Instrument Man--One who runs the instrument and assists Party Chief.

Rodman--One who holds the rod and assists the Survey Crew

Wages:(Per Hour) 07/01/2022

Building Construction:

Party Chief	\$ 76.64
Instrument Man	60.50
Rodman	40.64

Steel Erection:

Party Chief	79.41
Instrument Man	62.85
Rodman	43.48

Heavy Construction-NYC counties only:
(Foundation, Excavation.)

Party Chief	84.60
Instrument man	63.79
Rodman	54.52

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2022

Building Construction \$ 26.69* +\$ 7.40

Steel Erection 27.29* +\$ 7.40

Heavy Construction 25.25* +\$ 7.15

* This portion subject to same premium as wages

Non-Worked Holiday Supplemental Benefit:

16.45

OVERTIME PAY

See (A, B, E, Q) on OVERTIME PAGE

Code "A" applies to Building Construction and has double the rate after 7 hours on Saturdays.

Code "B" applies to Heavy Construction and Steel Erection and had double the rate after 8 hours on Saturdays.

HOLIDAY

Paid: See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE

9-15Db

Operating Engineer - Heavy&Highway

03/01/2023

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane, (Crawler, Truck), Dragline, Drill Rig (Casa Grande, Cat, or Similar), Floating Crane (Crane on Barges) under 100 tons, Gin Pole, Hoist Engineer-Concrete (Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger (Truck or Truck Mounted), Boat Captain, Bulldozer-All Sizes, Central Mix Plant Operator, Chipper (all types), Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader (Motor Grader), Elevator & Cage (Materials or Passenger), Excavator (and all attachments), Front End Loaders (1 1/2 yards and over), High Lift Lull and similar, Hoist (Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer (Material), Jack and Bore Machine, Log Skidders, Mill Machines, Mucking Machines, Overhead Crane, Paver (concrete), Post Pounder (of any type), Push Cats, Road Reclaimer, Robot Hammer (Brokk or similar), Robotic Equipment (Scope of Engineer Schedule), Ross Carrier and similar, Scrapers (20 yard struck and over), Side Boom, Slip Form Machine, Spreader (Asphalt), Trenching Machines (Telephies-Vermeer Concrete Saw), Tractor Type Demolition Equipment, Vacuum Truck. Vibratory Roller(Riding) or Roller used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver (Asphalt).

GROUP II-A: Ballast Regulators, Compactor Self Propelled, Fusion Machine, Rail Anchor Machines, Roller (4 ton and over), Scrapers (20 yard struck and under).

GROUP II-B: Mechanic (Outside) All Types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler (High Pressure), Concrete Breaker (Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift (all types), Gas Tapping (Live), Hydroseeder, Loader (1 1/2 yards and under), Locomotive (all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher (Apprentice), Powerhouse Plant, Roller (under 4 ton), Sheer Excavator, Skid Steer/Bobcat, Stone Crusher, Sweeper (with seat), Well Drilling Machine.

GROUP IV: Service Person (Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine (Truck Mounted), Heater (all types), Lighting Unit (Portable), Maintenance Engineer (For Crane Only), Mechanics Helper, Pump (Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck (Sewer Jet or Similar), Welders Helper, Welding Machine (Steel Erection), Well Point System.

GROUP V: All Tower Cranes-All Climbing Cranes and all cranes of 100-ton capacity or greater (3900 Manitowac or similar) irrespective of manufacturer and regardless of how the same is rigged, Hoist Engineer (Steel), Engineer-Pile Driver, Jersey Spreader, Pavement Breaker/Post Hole Digger.

WAGES: Per hour:	07/01/2022	03/06/2023	03/04/2024
Group I	\$ 65.97	\$ 67.27	\$ 68.63
Group I-A	58.16	59.26	60.42
Group I-B	61.28	62.46	63.70
Group II-A	55.70	56.74	57.84
Group II-B	57.44	58.52	59.67
Group III	54.72	55.74	56.81
Group IV	49.74	50.63	51.57
Group IV-B	42.71	43.43	44.19
Group V			
Engineer All Tower, Climbing and Cranes of 100 Tons	74.73	76.24	77.82
Hoist Engineer(Steel)	67.67	69.01	70.41
Engineer(Pile Driver)	72.16	73.61	75.13
Jersey Spreader, Pavement Breaker (Air Ram)Post Hole Digger	56.99	58.06	59.19

SHIFT DIFFERENTIAL:

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour over the rate listed in the Wage Schedule. Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour over the rate listed in the Wage Schedule. Loader and Excavator Operators: over 5 cubic yards capacity \$0.50 per hour over the rate listed in the Wage Schedule. Shovel Operators: over 4 cubic yards capacity \$1.00 per hour over the rate listed in the Wage Schedule.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday; Friday may be used as a make-up day.

NOTE - In order to use the 4 Day/10 Hour Work schedule Registration for Use of 4 Day/10 Hour Work Schedule, form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:	\$ 32.60 up to 40 Hours	\$ 33.75 up to 40 hours	\$ 34.85 up to 40 hours
	After 40 hours \$ 23.40* PLUS \$ 1.20 on all hours worked	After 40 hours \$ 24.50* PLUS \$ 1.25 on all hours worked	After 40 hours \$ 25.55* PLUS \$ 1.25 on all hours worked

*This amount is subject to premium

OVERTIME PAY

See (B, E, P, *R, **U) on OVERTIME PAGE

HOLIDAY

Paid:..... See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime..... See (5, 6, 8, 15, 25, 26) on OVERTIME PAGE

* For Holiday codes 8,15,25,26 code R applies

** For Holiday Codes 5 & 6 code U applies

Note: If employees are required to work on Easter Sunday they shall be paid at the rate of triple time.

REGISTERED APPRENTICES

(1)year terms at the following rate.

1st term	\$ 29.08	\$ 29.63	\$ 30.21
2nd term	34.90	35.56	36.25
3rd term	40.71	41.48	42.30
4th term	46.53	47.41	48.34
Supplemental Benefits per hour:			
	24.55	25.70	26.85

8-137HH

Operating Engineer - Heavy&Highway

03/01/2023

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 9

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: South of the North city line of Poughkeepsie

WAGES

Party Chief - One who directs a survey party

Instrument Man - One who runs the instrument and assists Party Chief

Rodman - One who holds the rod and in general, assists the Survey Crew

Categories cover GPS & Underground Surveying

Per Hour: 07/01/2022

Party Chief	\$ 81.72
Instrument Man	61.43
Rodman	52.40

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2022

All Categories
 Straight Time: \$ 25.25* plus \$7.15

Premium:
 Time & 1/2 \$ 37.88* plus \$7.15

Double Time \$ 50.50* plus \$7.15

Non-Worked Holiday Supplemental Benefits:
 \$ 16.45

OVERTIME PAY

See (B, *E, Q) on OVERTIME PAGE

* Doubletime paid on all hours in excess of 8 hours on Saturday

HOLIDAY

Paid: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

Overtime: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

9-15Dh

Operating Engineer - Heavy&Highway - Tunnel

03/01/2023

JOB DESCRIPTION Operating Engineer - Heavy&Highway - Tunnel

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane(Crawler, Truck), Dragline, Drill Rig Casa Grande(Cat or Similar), Floating Crane(Crane on Barge-Under 100 Tons), Hoist Engineer(Concrete/Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger(Truck or Truck Mounted), Boat Captain, Bull Dozer-all sizes, Central Mix Plant Operator, Chipper-all types, Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader(Motor Grader), Elevator & Cage(Materials or Passengers), Excavator(and all attachments), Front End Loaders(1 1/2 yards and over), High Lift Lull, Hoist(Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer(Material), Jack and Bore Machine, Log Skidder, Milling Machine, Moveable Concrete Barrier Transfer & Transport Vehicle, Mucking Machines. Overhead Crane, Paver(Concrete), Post Pounder of any type, Push Cats, Road Reclaimer, Robot Hammer(Brokk or similar), Robotic Equipment(Scope of Engineer Schedule), Ross Carrier and similar machines, Scrapers(20 yards struck and over), Side Boom, Slip Form Machine, Spreader(Asphalt), Trenching Machines, Telephies-Vermeer Concrete Saw, Tractor type demolition equipment, Vacuum Truck, Vibratory Roller (Riding) used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver(Asphalt).

GROUP II-A: Ballast Regulators, Compactor(Self-propelled), Fusion Machine, Rail Anchor Machines, Roller(4 ton and over), Scrapers(20 yard struck and under).

GROUP II-B: Mechanic(outside)all types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler(High Pressure), Concrete Breaker(Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift(all types of power), Gas Tapping(Live), Hydroseeder, Loader(1 1/2 yards and under), Locomotive(all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher(Apprentice), Powerhouse Plant, Roller(under 4 ton), Sheer Excavator, Skidsteer/Bobcat, Stone Crusher, Sweeper(with seat), Well Drilling Machine.

GROUP IV-A: Service Person(Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine(Truck Mounted), Heater(all types), Lighting Unit(Portable), Maintenance Engineer(for Crane only), Mechanics Helper, Pump(Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck(Sewer Jet or similar), Welding Machine(Steel Erection), Welders Helper.

GROUP V-A: Engineer(all Tower Cranes, all Climbing Cranes & all Cranes of 100 ton capacity or greater),Hoist Engineer(Steel-Sub Structure), Engineer-Pile Driver, Jersey-Spreader, Pavement breaker, Post Hole Digger

WAGES: (per hour)

	07/01/2022	03/06/2023	03/04/2024
GROUP I	\$ 65.97	\$ 67.27	\$ 68.63
GROUP I-A	58.16	59.26	60.42
GROUP I-B	61.28	62.46	63.70
GROUP II-A	55.70	56.74	57.84
GROUP II-B	57.44	58.52	59.67
GROUP III	54.72	55.74	56.81
GROUP IV-A	49.74	50.63	51.57
GROUP IV-B	42.71	43.43	44.19
GROUP V-A			
Engineer-Cranes	74.73	76.24	77.82

Engineer-Pile Driver	72.16	73.61	75.13
Hoist Engineer	67.67	69.01	70.41
Jersey Spreader/Post Hole Digger	56.99	58.06	59.19

SHIFT DIFFERENTIAL:

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects. Operators required to use two buckets pouring concrete on other than road pavement shall receive \$0.50 per hour over scale. Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour. Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour. Operators of shovels with a capacity over (4) cubic yards shall be paid an additional \$1.00 per hour. Operators of loaders with a capacity over (5) cubic yards shall be paid an additional \$0.50 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:

\$ 32.60 up to 40 hours After 40 hours \$23.40 plus \$1.20 on all hours worked	\$ 33.75 up to 40 hours After 40 hours \$24.50 plus \$1.25 on all hours worked	\$ 34.85 up to 40 hours After 40 hours \$25.55 plus \$1.25 on all hours worked
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OVERTIME PAY

See (D, O, *U, V) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

* Note: For Holiday codes 5 & 6, code U applies. For Holiday codes 8, 15, 25, 26, code R applies.

Note: If employees are required to work on Easter Sunday, they shall be paid at the rate of triple time.

REGISTERED APPRENTICES

(1)year terms at the following rates:

1st term	\$ 29.08	\$ 29.63	\$ 30.21
2nd term	34.90	35.56	36.25
3rd term	40.71	41.48	42.30
4th term	46.53	47.41	48.34

Supplemental Benefits per hour:

All terms	\$ 24.55	\$ 25.70	\$ 26.85
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8-137Tun

Operating Engineer - Marine Dredging

03/01/2023

JOB DESCRIPTION Operating Engineer - Marine Dredging

DISTRICT 4

ENTIRE COUNTIES

Albany, Bronx, Cayuga, Clinton, Columbia, Dutchess, Essex, Franklin, Greene, Jefferson, Kings, Monroe, Nassau, New York, Orange, Oswego, Putnam, Queens, Rensselaer, Richmond, Rockland, St. Lawrence, Suffolk, Ulster, Washington, Wayne, Westchester

WAGES

These wages do not apply to Operating Engineers on land based construction projects. For those projects, please see the Operating Engineer Heavy/Highway Rates. The wage rates below for all equipment and operators are only for marine dredging work in navigable waters found in the counties listed above.

Per Hour:	07/01/2022	10/01/2022
CLASS A1 Deck Captain, Leverman Mechanical Dredge Operator Licensed Tug Operator 1000HP or more.	\$ 42.66	\$ 43.94
CLASS A2 Crane Operator (360 swing)	38.02	39.16

CLASS B To conform to Operating Engineer

Dozer, Front Loader Operator on Land	Prevailing Wage in locality where work is being performed including benefits.	
CLASS B1 Derrick Operator (180 swing) Spider/Spill Barge Operator Operator II, Fill Placer, Engineer, Chief Mate, Electrician, Chief Welder, Maintenance Engineer Licensed Boat, Crew Boat Operator	36.89	38.00
CLASS B2 Certified Welder	34.73	35.77
CLASS C1 Drag Barge Operator, Steward, Mate, Assistant Fill Placer	33.78	34.79
CLASS C2 Boat Operator	32.69	33.67
CLASS D Shoreman, Deckhand, Oiler, Rodman, Scowman, Cook, Messman, Porter/Janitor	27.16	27.97

SUPPLEMENTAL BENEFITS

Per Hour:
 THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes A & B	\$ 11.40 plus 6% of straight time wage, Overtime hours add \$ 0.63	\$ 11.85 plus 6% of straight time wage, Overtime hours add \$ 0.63
All Class C	\$ 11.10 plus 6% of straight time wage, Overtime hours add \$ 0.48	\$ 11.60 plus 6% of straight time wage, Overtime hours add \$ 0.50
All Class D	\$ 10.80 plus 6% of straight time wage, Overtime hours add \$ 0.33	\$ 11.35 plus 6% of straight time wage, Overtime hours add \$ 0.38

OVERTIME PAY
 See (B2, F, R) on OVERTIME PAGE

HOLIDAY
 Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 15, 26) on HOLIDAY PAGE

4-25a-MarDredge

Operating Engineer - Survey Crew - Consulting Engineer **03/01/2023**

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer **DISTRICT 9**

ENTIRE COUNTIES
 Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES
 Dutchess: That part in Dutchess County lying South of the North City line of Poughkeepsie.

WAGES
 Feasibility and preliminary design surveying, any line and grade surveying for inspection or supervision of construction.

Per hour: 07/01/2022
 Survey Classifications

Party Chief	\$ 46.44
Instrument Man	38.60
Rodman	33.64

SUPPLEMENTAL BENEFITS

Per Hour:

All Crew Members:	\$ 21.60
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OVERTIME PAY

OVERTIME:.... See (B, E*, Q, V) ON OVERTIME PAGE.

*Doubletime paid on the 9th hour on Saturday.

HOLIDAY

Paid: See (5, 6, 7, 11, 16) on HOLIDAY PAGE

Overtime: See (5, 6, 7, 11, 16) on HOLIDAY PAGE

9-15dconsult

Painter

03/01/2023

JOB DESCRIPTION Painter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour: 07/01/2022

Brush \$ 51.45*

Abatement/Removal of lead based
or lead containing paint on
materials to be repainted. 51.45*

Spray & Scaffold \$ 54.45*

Fire Escape 54.45*

Decorator 54.45*

Paperhanger/Wall Coverer 53.83*

*Subtract \$ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour:

Paperhanger \$ 33.15

All others 30.88

Premium 37.72**

**Applies only to "All others" category, not paperhanger journeyworker.

OVERTIME PAY

See (A, H) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

One (1) year terms at the following wage rate.

Per hour: 07/01/2022

Appr 1st term... \$ 19.95*

Appr 2nd term... 25.56*

Appr 3rd term... 31.00*

Appr 4th term... 41.52*

*Subtract \$ 0.10 to calculate premium rate.

Supplemental benefits:

Per Hour:

Appr 1st term... \$ 15.22

Appr 2nd term... 18.90

Appr 3rd term... 21.81

Appr 4th term... 27.58

8-NYDC9-B/S

Painter 03/01/2023

JOB DESCRIPTION Painter

DISTRICT 8

ENTIRE COUNTIES

Putnam, Suffolk, Westchester

PARTIAL COUNTIES

Nassau: All of Nassau except the areas described below: Atlantic Beach, Ceaderhurst, East Rockaway, Gibson, Hewlett, Hewlett Bay, Hewlett Neck, Hewlett Park, Inwood, Lawrence, Lido Beach, Long Beach, parts of Lynbrook, parts of Oceanside, parts of Valley Stream, and Woodmere. Starting on the South side of Sunrise Hwy in Valley Stream running east to Windsor and Rockaway Ave., Rockville Centre is the boundary line up to Lawson Blvd. turn right going west all the above territory. Starting at Union Turnpike and Lakeville Rd. going north to Northern Blvd. the west side of Lakeville road to Northern blvd. At Northern blvd. going east the district north of Northern blvd. to Port Washington Blvd. West of Port Washington blvd.to St.Francis Hospital then north of first traffic light to Port Washington and Sands Point, Manor HAven, Harbour Acres.

WAGES

Per hour: 07/01/2022
 Drywall Taper \$ 51.45*

*Subtract \$ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour:
 Journeyman \$ 30.88

OVERTIME PAY

See (A, H) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages - Per Hour:

1500 hour terms at the following wage rate:

1st term \$ 19.95*
 2nd term 25.56*
 3rd term 31.00*
 4th term 41.52*

*Subtract \$ 0.10 to calculate premium rate.

Supplemental Benefits - Per hour:

One year term (1500 hours) at the following dollar amount.

1st year \$ 15.22
 2nd year 18.90
 3rd year 21.81
 4th year 27.58

8-NYDCT9-DWT

Painter - Bridge & Structural Steel 03/01/2023

JOB DESCRIPTION Painter - Bridge & Structural Steel

DISTRICT 8

ENTIRE COUNTIES

Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per Hour:
STEEL:
 Bridge Painting: 07/01/2022 10/01/2022
 \$ 53.00 \$ 54.50
 + 9.63* + 10.10*

ADDITIONAL \$6.00 per hour for POWER TOOL/SPRAY, whether straight time or overtime.

NOTE: All premium wages are to be calculated on base rate per hour only.

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

NOTE: Generally, for Bridge Painting Contracts, ALL WORKERS on and off the bridge (including Flagmen) are to be paid Painter's Rate; the contract must be ONLY for Bridge Painting.

SHIFT WORK:

When directly specified in public agency or authority contract documents for an employer to work a second shift and works the second shift with employees other than from the first shift, all employees who work the second shift will be paid 10% of the base wage shift differential in lieu of overtime for the first eight (8) hours worked after which the employees shall be paid at time and one half of the regular wage rate. When a single irregular work shift is mandated in the job specifications or by the contracting agency, wages shall be paid at time and one half for single shifts between the hours of 3pm-11pm or 11pm-7am.

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker:

\$ 10.90	\$ 11.78
+ 30.60*	+ 30.75*

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (4, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage - Per hour:

Apprentices: (1) year terms

1st year	\$ 21.20 + 3.86	\$ 21.80 + 4.04
2nd year	\$ 31.80 + 5.78	\$ 32.70 + 6.06
3rd year	\$ 42.40 + 7.70	\$ 43.60 + 8.08
Supplemental Benefits - Per hour:		
1st year	\$.25 + 12.24	\$.25 + 12.34
2nd year	\$ 10.90 + 18.36	\$ 10.90 + 18.51
3rd year	\$ 10.90 + 24.48	\$ 10.90 + 24.68

NOTE: All premium wages are to be calculated on base rate per hour only.

8-DC-9/806/155-BrSS

Painter - Line Striping

03/01/2023

JOB DESCRIPTION Painter - Line Striping

DISTRICT 8

ENTIRE COUNTIES

Albany, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Nassau, Orange, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per hour:

Painter (Striping-Highway): 07/01/2022
Striping-Machine Operator* \$ 31.53

Linerman Thermoplastic 38.34

Note: * Includes but is not limited to: Positioning of cones and directing of traffic using hand held devices. Excludes the Driver/Operator of equipment used in the maintenance and protection of traffic safety.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour paid:

Journeyworker:
Striping Machine Operator: \$ 10.03
Linerman Thermoplastic: 10.03

OVERTIME PAY

See (B, B2, E2, F, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 20) on HOLIDAY PAGE
Overtime: See (5, 20) on HOLIDAY PAGE

REGISTERED APPRENTICES

One (1) year terms at the following wage rates:

1st Term: \$ 15.00
2nd Term: 18.92
3rd Term: 25.22

Supplemental Benefits per hour:

1st term: \$ 9.16
2nd Term: 10.03
3rd Term: 10.03

8-1456-LS

Painter - Metal Polisher

03/01/2023

JOB DESCRIPTION Painter - Metal Polisher

DISTRICT 8

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuylar, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

07/01/2022
Metal Polisher \$ 37.78
Metal Polisher* 38.80
Metal Polisher** 41.78

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2022

Journeyworker:
All classification \$ 11.24

OVERTIME PAY

See (B, E, P, T) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 9, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year term at the following wage rates:

	07/01/2022
1st year	\$ 16.00
2nd year	17.00
3rd year	18.00
1st year*	\$ 16.39
2nd year*	17.44
3rd year*	18.54
1st year**	\$ 18.50
2nd year**	19.50
3rd year**	20.50

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:

Per hour:

1st year	\$ 7.99
2nd year	7.99
3rd year	7.99

8-8A/28A-MP

Plumber

03/01/2023

JOB DESCRIPTION Plumber

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

Per hour:

	07/01/2022
Plumber and Steamfitter	\$ 60.21

SHIFT WORK:

When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 40.01

OVERTIME PAY

See (B, E, E2, Q, V) on OVERTIME PAGE

OVERTIME:... See on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1)year terms at the following wages:

1st Term	\$ 22.36
2nd Term	25.66
3rd Term	29.63
4th Term	42.28
5th Term	45.36

Supplemental Benefits per hour:

1st term	\$ 16.54
2nd term	18.46
3rd term	21.96
4th term	28.95
5th term	30.68

8-21.1-ST

Plumber - HVAC / Service

03/01/2023

JOB DESCRIPTION Plumber - HVAC / Service

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Putnam, Westchester

PARTIAL COUNTIES

Delaware: Only the townships of Middletown and Roxbury

Ulster: Entire County(including Wallkill and Shawangunk Prisons) except for remainder of Town of Shawangunk and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour: 07/01/2022

HVAC Service \$ 41.68
+ \$ 4.32*

*Note: This portion of wage is not subject to overtime premium.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker HVAC Service
\$ 27.79

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 16, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

HVAC SERVICE

(1)year terms at the following wages:

1st yr.	2nd yr.	3rd yr.	4th yr.	5th yr.
\$ 18.87	\$ 22.36	\$ 27.91	\$ 34.33	\$ 37.25
+\$2.37*	+\$2.67*	+\$3.22*	+\$3.84*	+\$4.07*

*Note: This portion of wage is not subject to overtime premium.

Supplemental Benefits per hour:

Apprentices 07/01/2022

1st term	\$ 20.30
2nd term	21.62
3rd term	23.07
4th term	25.05
5th term	26.47

8-21.1&2-SF/Re/AC

Plumber - Jobbing & Alterations

03/01/2023

JOB DESCRIPTION Plumber - Jobbing & Alterations

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Putnam, Westchester

PARTIAL COUNTIES

Ulster: Entire county (including Wallkill and Shawangunk Prisons in Town of Shawangunk) EXCEPT for remainder of Town of Shawangunk, and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour: 07/01/2022
Journeyworker: \$ 46.79

Repairs, replacements and alteration work is any repair or replacement of a present plumbing system that does not change existing roughing or water supply lines.

SHIFT WORK:

When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS

Per hour:
Journeyworker \$ 33.56

OVERTIME PAY

See (B, *E, E2, Q, V) on OVERTIME PAGE

*When used as a make-up day, hours after 8 on Saturday shall be paid at time and one half.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year terms at the following wages:

1st year	\$ 20.25
2nd year	22.48
3rd year	24.40
4th year	34.25
5th year	36.19

Supplemental Benefits per hour:

1st year	\$ 10.98
2nd year	12.92
3rd year	16.89
4th year	22.82
5th year	24.77

8-21.3-J&A

Roofer

03/01/2023

JOB DESCRIPTION Roofer

DISTRICT 9

ENTIRE COUNTIES

Bronx, Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2022	05/01/2023
Roofer/Waterproofeer	\$ 45.25	Additional \$ 2.00
	+ \$7.00*	

* This portion is not subjected to overtime premiums.

Note: Abatement/Removal of Asbestos containing roofs and roofing material is classified as Roofer.

SUPPLEMENTAL BENEFITS

Per Hour: \$ 30.62

OVERTIME PAY

See (B, H) on OVERTIME PAGE

Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year term

	1st	2nd	3rd	4th
	\$ 15.84	\$ 22.63	\$ 27.15	\$ 33.94
		+ 3.50*	+ 4.20*	+ 5.26*

Supplements:

	1st	2nd	3rd	4th
	\$ 3.88	\$ 15.48	\$ 18.50	\$ 23.04

* This portion is not subjected to overtime premiums.

9-8R

Sheetmetal Worker

03/01/2023

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

	07/01/2022
SheetMetal Worker	\$ 45.25
	+ 3.52*

*This portion is not subject to overtime premiums.

SHIFT WORK

For all NYS D.O.T. and other Governmental mandated off-shift work:
 10% increase for additional shifts for a minimum of five (5) days

SUPPLEMENTAL BENEFITS

Journeyworker \$ 45.20

OVERTIME PAY

OVERTIME:.. See (B, E, Q,) on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 15, 16, 23) on HOLIDAY PAGE

REGISTERED APPRENTICES

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 16.79	\$ 18.88	\$ 21.00	\$ 23.08	\$ 25.20	\$ 27.30	\$ 29.89	\$ 32.43
+ 1.41*	+ 1.58*	+ 1.76*	+ 1.94*	+ 2.11*	+ 2.29*	+ 2.46*	+ 2.64*

*This portion is not subject to overtime premiums.

Supplemental Benefits per hour:

Apprentices

1st term	\$ 19.37
2nd term	21.81
3rd term	24.21
4th term	26.65
5th term	29.06
6th term	31.48
7th term	33.42
8th term	35.40

8-38

Sheetmetal Worker

03/01/2023

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per Hour:	07/01/2022
Sign Erector	\$ 53.79

NOTE: Structurally Supported Overhead Highway Signs(See STRUCTURAL IRON WORKER CLASS)

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2022

Sign Erector \$ 53.33

OVERTIME PAY

See (A, F, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE
 Overtime: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Per Hour:
 6 month Terms at the following percentage of Sign Erectors wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
35%	40%	45%	50%	55%	60%	65%	70%	75%	80%

SUPPLEMENTAL BENEFITS

Per Hour:

07/01/2022

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 14.34	\$ 16.26	\$ 18.17	\$ 20.10	\$ 28.02	\$ 30.47	\$ 33.72	\$ 36.27	\$ 38.77	\$ 41.29

4-137-SE

Sprinkler Fitter

03/01/2023

JOB DESCRIPTION Sprinkler Fitter

DISTRICT 1

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

Per hour 07/01/2022

Sprinkler \$ 48.98
 Fitter

SUPPLEMENTAL BENEFITS

Per hour

Journey person \$ 29.13

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

Note: When a holiday falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double time rate. When a holiday falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double time rate.

REGISTERED APPRENTICES

Wages per hour

One Half Year terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 23.70	\$ 26.34	\$ 28.72	\$ 31.35	\$ 33.99	\$ 36.62	\$ 39.25	\$ 41.89	\$ 44.52	\$ 47.15

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 8.37	\$ 8.37	\$ 19.76	\$ 19.76	\$ 20.01	\$ 20.01	\$ 20.01	\$ 20.01	\$ 20.01	\$ 20.01

1-669.2

Teamster - Building / Heavy&Highway

03/01/2023

JOB DESCRIPTION Teamster - Building / Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

GROUP A: Straight Trucks (6-wheeler and 10-wheeler), A-frame, Winch, Dynamite Seeding, Mulching, Agitator, Water, Attenuator, Light Towers, Cement (all types), Suburban, Station Wagons, Cars, Pick Ups, any vehicle carrying materials of any kind.

GROUP AA: Tack Coat

GROUP B: Tractor & Trailers (all types).

GROUP BB: Tri-Axle, 14 Wheeler

GROUP C: Low Boy (carrying equipment).

GROUP D: Fuel Trucks, Tire Trucks.

GROUP E: Off-road Equipment (over 40 tons): Athey Wagons, Belly Dumps, Articulated Dumps, Trailer Wagons.

GROUP F: Off-road Equipment (over 40 tons) Euclid, DJB.

GROUP G: Off-road Equipment (under 40 tons) Athey Wagons, Belly Articulated Dumps, Trailer Wagons.

GROUP H: Off-road Equipment(under 40 tons), Euclid.

GROUP HH: Off-road Equipment(under 40 tons) D.J.B.

GROUP I: Off-road Equipment(under 40 tons) Darts.

GROUP II: Off-road Equipment(under 40 tons) RXS.

WAGES:(per hour)

07/01/2022

GROUP A	\$ 46.07*
GROUP AA	49.07*
GROUP B	46.69*
GROUP BB	46.19*
GROUP C	48.82*
GROUP D	46.52*
GROUP E	47.07*
GROUP F	48.07*
GROUP G	46.82*
GROUP H	47.44*
GROUP HH	47.82*
GROUP I	47.57*
GROUP II	47.94*

* To calculate premium wage, subtract \$.20 from the hourly wage.

Note: Fuel truck operators on construction sites addit. \$5.00 per day.
For work on hazardous/toxic waste site addit. 20% of hourly rate.

Shift Differential: When mandated by the contracting agency, DOT, or any governmental agency contracts shall receive a shift differential of fifteen (15%) above the wage rate.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker

First 40 hours	\$ 33.87
41st-45th hours	14.88
Over 45 hours	0.75

OVERTIME PAY

See (B, E, P, R) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour 07/01/2022

Welder: To be paid the same rate of the mechanic performing the work.*

*EXCEPTION: If a specific welder certification is required, then the 'Certified Welder' rate in that trade tag will be paid.

OVERTIME PAY

HOLIDAY

1-As Per Trade

Westchester County Residential

Carpenter - Residential **03/01/2023**

JOB DESCRIPTION Carpenter - Residential **DISTRICT 11**

ENTIRE COUNTIES
 Putnam, Rockland, Westchester

WAGES

***IMPORTANT NOTE: Residential construction consists of those projects involving the construction, alteration, or repair of single-family houses or apartment buildings of no more than four (4) floors in height, town homes, row houses, single family homes, mobile homes, multi-family houses, apartment building of four (4) floors or less and assisted living facilities of four (4) floors or less. Excluding dormitories and student housing. Fours (4) stories shall be above ground level and shall not include the building's basement nor unfinished attic space.

Per hour: 07/01/2022

Carpenter \$ 25.31
+4.35*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS

Per hour:
 Journeyman \$ 21.59

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE
 Holidays that fall on Sunday will be observed Monday.

REGISTERED APPRENTICES

1 year terms at the following wage rates:

	1st	2nd	3rd	4th	5th
07/01/2022	\$ 15.00	\$ 15.69	\$ 16.45	\$ 17.72	\$ 20.25
	+2.35*	+2.35*	+2.35*	+2.35*	+2.35*

*For all hours paid straight or premium

Supplemental Benefits per hour:

Apprentice all terms \$ 10.86

11-279.1r

Insulator - Heat & Frost - Residential **03/01/2023**

JOB DESCRIPTION Insulator - Heat & Frost - Residential **DISTRICT 8**

ENTIRE COUNTIES
 Dutchess, Orange, Putnam, Rockland, Westchester

WAGES

***IMPORTANT NOTE: All residential plumbing, heating and air conditioning and site work in a single-family residence or a single family residential development under one roof, regardless of cost and garden type apartment buildings or developments which do not exceed three stories high.

Per hour: 07/01/2022

Asbestos Worker \$ 47.41

Apprentices 31.15

Fire Stop Work*
 Asbestos Worker 31.15

* Applies on all exclusive Fire Stop Work (when contract is for Fire Stop Work only). No apprentices on these contracts only.

Note: Additional \$0.50 per hour for work 30 feet or more above floor or ground level.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 29.03

Apprentice 18.41

Fire Stop Work:

Journeyworker 18.41

OVERTIME PAY

OVERTIME: See (B, E, Q, T, V) on OVERTIME PAGE.

HOLIDAY

Paid:..... See (1) on HOLIDAY PAGE.

Overtime:... See (2, 4, 6, 16, 25) on HOLIDAY PAGE.

8-91R

Laborer - Residential

03/01/2023

JOB DESCRIPTION Laborer - Residential

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

***IMPORTANT NOTE: FOR ONE OR TWO STORIES HOUSES, TOWN HOUSES AND RESIDENTIAL BUILDINGS UP TO THREE STORIES.

07/01/2022

Laborer \$ 33.75

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 20.80

OVERTIME PAY

OVERTIME: See (B, E, Q, V*) on OVERTIME PAGE.

*Note: For Sundays and Holidays worked, benefits are at the same premium as wages.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

8-235r

Sheetmetal Worker - Residential

03/01/2023

JOB DESCRIPTION Sheetmetal Worker - Residential

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

***IMPORTANT NOTE: HVAC work on single family dwellings, multiple family housing units, apartments and condominium homes where each individual family apartment is individually conditioned by separate and independent unit or system.

Per hour: 07/01/2022

Sheetmetal Worker \$ 32.30
+ 1.81

SHIFT WORK

For all NYS D.O.T. and other Governmental mandated off-shift work:
10% increase for additional shifts for a minimum of five (5) days

SUPPLEMENTAL BENEFITS

Journeyworker \$ 22.35

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 15, 16, 23) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES - Per hour:

(1/2) year terms at the following rates.

	1st	2nd	3rd	4th	5th	6th	7th	8th
	\$16.96	\$18.55	\$20.13	\$21.64	\$23.56	\$25.32	\$27.29	\$28.98
	+\$.91	+\$1.01	+\$1.11	+\$1.22	+\$1.32	+\$1.41	+\$1.52	+\$1.62

Supplemental Benefits - Per hour:

1st	\$ 13.17
2nd	14.30
3rd	15.45
4th	16.65
5th	17.46
6th	18.43
7th	19.18
8th	20.21

8-38r

Sprinkler Fitter - Residential

03/01/2023

JOB DESCRIPTION Sprinkler Fitter - Residential

DISTRICT 1

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

IMPORTANT NOTE: "Residential fire protection work" is applicable to one or two family dwellings, all multiple family dwelling units which are permitted to have a single exterior up to and including four stories, townhouses with units stacked vertically up to and including four stories and group residential care facilities and protective care homes (sheltered housing), not to include nursing homes or ambulatory care facilities.

Per hour

07/01/2022

Sprinkler \$ 39.43
 Fitter

SUPPLEMENTAL BENEFITS

Per hour

Journeyman \$ 29.13

OVERTIME PAY

See (B, H) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

Note: When a holiday falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double time rate. When a holiday falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double time rate.

1-669r2

Overtime Codes

Following is an explanation of the code(s) listed in the OVERTIME section of each classification contained in the attached schedule. Additional requirements may also be listed in the HOLIDAY section.

NOTE: Supplemental Benefits are 'Per hour worked' (for each hour worked) unless otherwise noted

- (AA) Time and one half of the hourly rate after 7 and one half hours per day
- (A) Time and one half of the hourly rate after 7 hours per day
- (B) Time and one half of the hourly rate after 8 hours per day
- (B1) Time and one half of the hourly rate for the 9th & 10th hours week days and the 1st 8 hours on Saturday.
Double the hourly rate for all additional hours
- (B2) Time and one half of the hourly rate after 40 hours per week
- (C) Double the hourly rate after 7 hours per day
- (C1) Double the hourly rate after 7 and one half hours per day
- (D) Double the hourly rate after 8 hours per day
- (D1) Double the hourly rate after 9 hours per day
- (E) Time and one half of the hourly rate on Saturday
- (E1) Time and one half 1st 4 hours on Saturday; Double the hourly rate all additional Saturday hours
- (E2) Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E3) Between November 1st and March 3rd Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather, provided a given employee has worked between 16 and 32 hours that week
- (E4) Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E5) Double time after 8 hours on Saturdays
- (F) Time and one half of the hourly rate on Saturday and Sunday
- (G) Time and one half of the hourly rate on Saturday and Holidays
- (H) Time and one half of the hourly rate on Saturday, Sunday, and Holidays
- (I) Time and one half of the hourly rate on Sunday
- (J) Time and one half of the hourly rate on Sunday and Holidays
- (K) Time and one half of the hourly rate on Holidays
- (L) Double the hourly rate on Saturday
- (M) Double the hourly rate on Saturday and Sunday
- (N) Double the hourly rate on Saturday and Holidays
- (O) Double the hourly rate on Saturday, Sunday, and Holidays
- (P) Double the hourly rate on Sunday
- (Q) Double the hourly rate on Sunday and Holidays
- (R) Double the hourly rate on Holidays
- (S) Two and one half times the hourly rate for Holidays

- (S1) Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.
- (T) Triple the hourly rate for Holidays
- (U) Four times the hourly rate for Holidays
- (V) Including benefits at SAME PREMIUM as shown for overtime
- (W) Time and one half for benefits on all overtime hours.
- (X) Benefits payable on Paid Holiday at straight time. If worked, additional benefit amount will be required for worked hours. (Refer to other codes listed.)

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

- (1) None
- (2) Labor Day
- (3) Memorial Day and Labor Day
- (4) Memorial Day and July 4th
- (5) Memorial Day, July 4th, and Labor Day
- (6) New Year's, Thanksgiving, and Christmas
- (7) Lincoln's Birthday, Washington's Birthday, and Veterans Day
- (8) Good Friday
- (9) Lincoln's Birthday
- (10) Washington's Birthday
- (11) Columbus Day
- (12) Election Day
- (13) Presidential Election Day
- (14) 1/2 Day on Presidential Election Day
- (15) Veterans Day
- (16) Day after Thanksgiving
- (17) July 4th
- (18) 1/2 Day before Christmas
- (19) 1/2 Day before New Years
- (20) Thanksgiving
- (21) New Year's Day
- (22) Christmas
- (23) Day before Christmas
- (24) Day before New Year's
- (25) Presidents' Day
- (26) Martin Luther King, Jr. Day
- (27) Memorial Day
- (28) Easter Sunday

(29) Juneteenth

NO TEXT ON THIS PAGE

"General Decision Number: NY20230017 02/24/2023

Superseded General Decision Number: NY20220017

State: New York

Construction Types: Building, Heavy, Highway and Residential

County: Westchester County in New York.

BUILDING CONSTRUCTION PROJECTS, RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories), AND HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least \$16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.
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If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least \$12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.
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The applicable Executive Order minimum wage rate will be

adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/06/2023
1	01/13/2023
2	01/27/2023
3	02/24/2023

ASBE0091-003 05/30/2022

Rates Fringes

HAZARDOUS MATERIAL HANDLER

(Duties limited to preparation, wetting, stripping, removal, scraping, vacuuming, bagging and disposing of all insulation materials whether they contain asbestos or not from mechanical systems).....	\$ 44.47	45.85
Insulator/asbestos worker (Includes application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems).....	\$ 44.47	45.85

BOIL0005-001 01/01/2021

Rates Fringes

BOILERMAKER.....	\$ 63.38	33%+47.22+a
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FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day, Thanksgiving Day, Memorial Day, Independence Day, Labor Day and Good Friday, Friday after Thanksgiving, Christmas Eve Day and New Year's Eve

BRNY0001-003 06/01/2018

Rates Fringes

Pointer, cleaner and caulker.....\$ 41.96 33.38

BRNY0004-001 07/04/2022

Rates Fringes

MARBLE MASON.....\$ 62.40 38.82

BRNY0005-006 06/01/2022

HEAVY & HIGHWAY CONSTRUCTION

Rates Fringes

BRICKLAYER

Bricklayers, Stone Masons,
Cement Masons, Plasterers,
Pointers, Caulkers and
Cleaner.....\$ 45.29 36.50

BRNY0005-007 06/01/2022

BUILDING/RESIDENTIAL CONSTRUCTION

Rates Fringes

Bricklayer, Cement Mason,
Plasterer & Stonemason.....\$ 44.79 36.50

BRNY0007-001 07/01/2022

Rates Fringes

TERRAZZO FINISHER.....\$ 55.21 36.97
TERRAZZO WORKER/SETTER.....\$ 59.75 38.60

BRNY0007-002 12/06/2021

Rates Fringes

TILE FINISHER.....\$ 47.56 32.71

BRNY0020-001 07/04/2022

Rates Fringes

MARBLE FINISHER.....\$ 49.20 36.21

BRNY0024-001 07/04/2022

Rates Fringes

BRICKLAYER

MARBLE POLISHERS.....\$ 46.96 29.21

BRNY0052-001 12/06/2021

Rates Fringes

Tile Layer.....\$ 61.84 36.04

CARP0279-001 07/01/2022

Rates Fringes

Carpenters:

Building.....\$ 45.60 32.35
Heavy & Highway.....\$ 45.60 32.35
Residential.....\$ 29.66 21.11

* CARP0740-001 07/01/2022

Rates Fringes

MILLWRIGHT.....\$ 57.80 55.96

CARP1556-007 07/01/2022

Rates Fringes

Diver Tender.....\$ 52.57 53.56
Diver.....\$ 73.03 53.56

CARP1556-009 07/01/2022

Rates Fringes

Dock Builder & Piledrivermen.....\$ 58.16 53.56

CARP1556-011 07/01/2022

Rates Fringes

Carpenters:

TIMBERMEN.....\$ 53.05 53.94

CARP2287-001 07/01/2022

Rates Fringes

Carpenters:

Soft Floor Layers.....\$ 55.05 47.83

ELEC0003-003 04/21/2021

Rates Fringes

ELECTRICIAN (Teledata

Technician).....\$ 53.75 69.29%+14.50

a. \$2.00 per hour not to exceed \$14.00 per day.

ELEC1249-001 05/02/2022

Rates Fringes

ELECTRICIAN (LIGHTING AND
TRAFFIC SIGNAL WORK Including
any and all Fiber Optic Cable
necessary for Traffic Signal
Systems, Traffic monitoring
systems and Road Weather
Information systems)

Flagman.....	\$ 28.91	7%+34.90
Ground Digging Machine Operator.....	\$ 43.37	7%+34.90
Ground Truck Driver.....	\$ 38.55	7%+34.90
Tractor, Trailer Unit.....	\$ 40.96	7%+34.90
Lineman & Technician.....	\$ 48.19	7%+36.90
Mechanic.....	\$ 38.55	7%+34.90

FOOTNOTE:

a. PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, President's Day, Good Friday, Decoration Day, Election Day for the President of the Untied States and Election Day for the Governor of the State of New York provided the employee works two days before and two days after the holiday

ELEC1249-006 05/03/2021

Rates Fringes

ELECTRICIAN (LINE
CONSTRUCTION)
Substation and switching
structures pipetype cable,
underground fuil and gas
filled transmission
conduit and cable
installation, fiber optic
ground wire, fiber optic
shield wire or any other
like product having ground
protection or fiber optic
capabilities, maintenance
jobs or projects; rail-
road catenary installation
and maintenance bonding of
rails; Overhead &

underground distribution
work & Maintenance;
Overhead and under- ground
transmission line work:

Cable Splicer.....	\$ 63.48	7%+35.40
Flagman.....	\$ 34.63	7%+34.40
Groundman digging machine operator.....	\$ 51.94	7%+34.40
Groundman truck driver (tractor trailer unit).....	\$ 49.05	7%+34.40
Groundman truck driver;....	\$ 46.17	7%+34.40
Lineman & Technician.....	\$ 57.71	7%+35.40
Mechanic.....	\$ 46.17	7%+34.40

PAID HOLIDAYS:

a. New Year's Day, President's Day, Memorial Day, Good Friday, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, and Election Day for the President of the United States and Election Day for the Governor of New York State, provided the employee works two days before or two days after the holiday.

ELEC1249-009 01/01/2022

Rates Fringes

ELECTRICIAN (LINE
CONSTRUCTION)

TELEPHONE, CATV
FIBEROPTICS CABLE AND
EQUIPMENT

Cable Splicer.....	\$ 36.28	%3+5.14
Groundman.....	\$ 18.25	%3+5.14
Installer Repairman- Teledata Lineman/Technician- Equipment Operator.....	\$ 34.43	%3+5.14

ELEV0001-002 03/17/2022

Rates Fringes

ELEVATOR MECHANIC

Elevator Constructor.....	\$ 75.14	47.446+a+b
Modernization and Repair....	\$ 59.09	45.564+a+b

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day, Good Friday, President's Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

b. PAID VACATION: An employee who has worked less than 5 years shall receive vacation pay credit on the basis of 4% of his hourly rate for all hours worked; an employee who has worked 5 to 15 years shall receive vacation pay credit on the basis of 6% of his hourly rate for all hours worked; an employee who has worked 15 or more years shall receive vacation pay credit on the basis of 8% of his hourly rate for all hours worked.

 ELEV0138-003 01/01/2023

WESTCHESTER COUNTY (Towns of Bedford, Cortland, Lewisboro, Mt. Kisco, North Salem, Pound Ridge, Somers, and Yorktown)

Rates Fringes

ELEVATOR MECHANIC.....\$ 67.35 37.335+a+b

FOOTNOTE:

- a. Vacation: 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.
- b. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

 ENGI0137-005 03/06/2017

BUILDING & RESIDENTIAL CONSTRUCTION

Rates Fringes

Power equipment operators:

GROUP 1-A.....	\$ 53.95	28.52+a
GROUP 1-B.....	\$ 49.68	28.52+a
GROUP 2-A.....	\$ 52.03	28.52+a
GROUP 3-A.....	\$ 50.11	28.52+a
GROUP 3-B.....	\$ 47.67	28.52+a
GROUP 4-A.....	\$ 49.60	28.52+a
GROUP 4-B.....	\$ 41.85	28.52+a
GROUP 5.....	\$ 45.17	28.52+a
GROUP 5-A.....	\$ 56.63	28.52+a
GROUP 5-B.....	\$ 42.83	28.52+a
GROUP 6.....	\$ 44.92	28.52+a

NOTES: Hazmat: 20% above regular rate
 Pumping operation Premium .50

Crane Operators (100-149 ft) 2.00

Crane Operators (149 ft +) 3.00

Loader Operators (over 5 cu y) .50

Shovel Operators (over 4 cu yd) 1.00

FOOTNOTE:

a. New Years Day, Memorial Day, Independence Day, Labor Day
Thanksgiving Day, Christmas Day, plus Lincoln's Birthday,
Washington's Birthday, Good Friday, Columbus Day, November
Election Day, Veteran's Day.

POWER EQUIPMENT OPERATORS CLASSIFICATION

GROUP 1-A: Carrier-trailer hoist; concrete-portable hoist;
crane & hoist engineer-steel (concrete, material, super
structure sub-structure); derrick (steel); elevator
& cage; hoist-single/double or triple drum; hoist-portable
mobile unit; hoist engineer-concrete (crane-derrick-mine
hoist); hoist engineer-material; overhead crane; power
house plant; telephies (cableway); whirly; maintenance
engineer; Lull lift or similar; hydraulic crane 25 ton
and over; cherry picker 25 tons and over; backhoe Oliver
88; Fordson; Dynahoe; dual purpose and similar machines;
Barber Green Loader-Euclid loader or similar type; Conway
or similar mucking machines; dragline; gradall;
shovel; backhoe etc. (crawler or truck); front end loaders;
hydraulic boom; Jersey spreader; lift slab console;
Letournequ or Tounapull (scrapers over 20 yds struck);
mucking machines; pavement breaker (air ram); paver
(concrete); road boring machine; road mix machines; Ross
carrier and similar machines; post hole digger; shovel
(tunnels); side boom; spreader (asphalt);
scoopmobile-tractor-shovel over 1 1/2 yds. trenching
machines Vermeer concrete saw trencher and similar; tractor
type demolition equipment; winch truck (A-frame); hydraulic
crane over 10 ton up to 25 ton); cherry picker over 10 ton
up to 25 ton)

GROUP 1-B: Compressor (steel erection); pulse meter and push
button buzz box; elevator; mechanic (outside) all types;
welder; scrapers 20 yds struck and under; machine pulling
sheep's foot roller; vibratory rollers; roller 4 tons and
over.

GROUP 2-A: Compactor self-propelled; grader; bulldozer D7 and
similar tractors with a draw bar horsepower of 100 or over;
bulldozer D6 and under; welder; scraper 20 yds struck and
under; machine pulling sheep's foot roller; vibratory
rollers.

GROUP 3-A: Asphalt plant; boiler (high pressure); concrete
mixing plants; concrete pump; firemen; forklift; forklift
(electric); joy drill or similar tractor drilling machine;
loader - 1 1/2 yards and under; locomotive (all sizes);

mixer concrete - 21E and over; portable asphalt plant; portable batch plant; portable crusher; quarry master; stone crusher; well drilling machine and well point system; cherry picker under 10 tons; hydraulic crane under 10 tons; concert buffy; one yard an up ride on dumper (benford or similar).

GROUP 3-B: Compressor over 125 cu. feet; conveyor belt machine regardless of size; lighting unit (portable & generator); welding machine (steel erection and excavation); and compressor plant; stud machine; ladder hoist.

GROUP 4-A: Air tractor drill; batch plant; bending machine; concrete breaker; concrete spreader; curb cutter machine; farm tractor (all types); finishing machine-concrete; hepavac clean air machine (all similar types: removal of asbestos etc.); material hopper-sand-stone-cement; mixer-concrete-under 21E; mulching grass spreader; pump-gypsum, etc., pump-plaster-grout -fireproofing; shop mechanic (not employed on job site); roller under 4 ton; spreading and fine grading machine; steel cutting machine; syphon pump-air-steam; tar joint machine; turbo jet burner or similar equipment; vibrator (1 to 5); fine grading machine; roof hoist (tugger hoist); television cameras-water- sewer-gas-etc.

GROUP 4-B: Compressor to 125 feet; dust; dust collector; heater all types; pump; pump station (water and sewer); steam jenny; sweeper; chipper; mulcher.

GROUP 5: Motorized roller (walk behind)

GROUP 5-A: Master Mechanic

GROUP 5-B: Utility Man

GROUP 6: Warehouse Man

ENGI0137-006 03/06/2017

HEAVY & HIGHWAY

Rates Fringes

Power equipment operators:

GROUP 1.....	\$ 58.54	28.15+a
GROUP 1-A.....	\$ 51.68	28.15+a
GROUP 1-B.....	\$ 54.42	28.15+a
GROUP 2-A.....	\$ 49.52	28.15+a
GROUP 2-B.....	\$ 51.05	28.15+a
GROUP 3.....	\$ 48.67	28.15+a
GROUP 4-A.....	\$ 44.29	28.15+a

GROUP 4-B.....	\$ 38.13	28.15+a
GROUP 5.....	\$ 54.69	28.15+a
GROUP 5-A-1.....	\$ 54.69	28.15+a
GROUP 5-A-2.....	\$ 66.22	28.15+a
GROUP 5-A-3.....	\$ 63.97	28.15+a
GROUP 5-A-4.....	\$ 60.03	28.15+a
GROUP 5-A-5.....	\$ 50.65	28.15+a

POWER EQUIPMENT OPERATORS CLASSIFICATIONS (HEAVY & HIGHWAY)

GROUP 1: Boom Truck; Cherry Picker; Clamshell; Crane, (Crawler, Truck); Dragline; Rough Terrain Crane

GROUP 1-A: Auger; Auto Grader; Dynahoe and Dual purpose and similar machines; Boat Captain; Boring Machine (all types); Bull Dozer-all sizes; Central Mix Plant Operator; Chipper-all types; Close circuit t.v.; Compactor with Blade; Concrete Portable Hoist; C.M.I. or similar; Conway or similar mucking machines; Gradall, Shovel Backhoe, etc. Grader; Derrick, (Stone- Steel; Elevator & cage, materials or passengers; Front end loaders over 1 1/2 yds.; Hoist Single, Double, Triple Drum, Hoist Portable Mobile Unit; Hoist Engineer-Concrete (Crane-Derrick-Mine Hoist); Hoist Engineer-Material, Hydraulic Boom; Letourneau or Tournapull (Scrapers over 20 yds. struck); Log Skidder; Movable Concrete Barrier Transfer & Transport Vehicle; mucking machines; overhead crane; paver (concrete); pulsemeter; push button (buzz box) elevator; road mix machines; Robot Hammer (brock or similar), Ross carrier and similar machines; shovels (tunnels); side boom; Slip Form Machine; spreader (asphalt); scoopmobile-tractor-shovel over 1 1/2 yards; trenching machines; telephies- vermeer concrete saw trencher and/or similar; tractor-type demolition equipment, Whirly

GROUP 1-B: Road Paver, Asphalt

GROUP 2-A: Ballast Regulators; Compactor self-propelled; Cow Tracks; Fusion Machine; Rail Anchor Machines; Roller 4 ton and over; Scrapers - 20 yards struck; Switch Tampers; Vibratory roller, etc.

GROUP 2-B: Mechanic (outside) all types

GROUP 3-A: Air tractor drill; asphalt plant; batch plant; boiler (high pressure; concrete breaker; concrete pump concrete spreader; curb cutter machine; farm tractor (all types); finishing machine (concrete); fine grading machine; fireman; forklift; forklift (electric); joy drill or similar tractor drilling machine; loader - 1 1/2 yards and under; locomotive (all sizes), maintenance engineer; machine pulling sheeps foot roller; material hopper; mixer concrete - 21-E and over; mulching grass spreader; portable asphalt plant, portable batch plant, portable crusher;

powerhouse plant; quarry master; roller under 4 ton; spreading and fine grading machine; steel cutting machine; stone crusher; sweeper; turbojet burner or similar; well drilling machine ; winch truck ""A"" frame. John Henry Drill or similar.

GROUP 4-A: Service men (fuel or grease truck).

GROUP 4-B: Oiler; Compressor - compressor plant; paint compressor-steel erection; conveyor belt machine; lighting unit (portable & generator); oiler; pumps - pump station-water-sewer- gypsum- plaster, etc.; roller-motorized (walk-behind); welding machine (steel erection excavation); well point system; bending machine; dust collector; mixer - concrete under 21-E; heater all types; steam jenny; syphon pump-air-steam; tar joint machine; vibrator (1 to 5); Compressor Truck Mounted (2-6)

GROUP 5: Oiler

GROUP 5-A-1: Master Mechanic

GROUP 5-A-2: Engineer - all tower cranes, all climbing cranes and all cranes of 100 ton capacity or greater (3900 Manitowac or similar) irrespective of manufacturer and regardless of how the same is rigged (except for pile rigs).

GROUP 5-A-3: Engineer-- Pile Driver

GROUP 5-A-4: Hoist Engineer- Steel -Sub Structure

GROUP 5-A-5: Jersey-spreader, pavement breaker (air ram); Post Hole Digger

NOTES:

Loader Operator (over 5 cu yds) .50
Shoval Operators (over 4 cu yd) 1.00
Hazmat premium over regular rate 20%

CRANES:

100 ft- 149 ft: receive \$2.00 more than Group 1 rate
149 ft and over receive \$3.00 more than Group 1 rate

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day; Lincoln's Birthday; Good Friday; Memorial Day; Independence Day; Labor Day; Veterans Day; Columbus Day; November Election Day; Thanksgiving Day; and Christmas Day

IRON0040-001 07/01/2022

WESTCHESTER COUNTY

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 55.70	84.79

IRON0046-003 07/01/2022

	Rates	Fringes
IRONWORKER METALLIC LATHERS AND REINFORCING IRONWORKERS.....	\$ 56.90	27.80

IRON0197-001 07/01/2021

	Rates	Fringes
IRONWORKER STONE DERRICKMAN.....	\$ 55.63	55.10

IRON0580-001 07/01/2022

	Rates	Fringes
IRONWORKER, ORNAMENTAL.....	\$ 46.65	61.62

LABO0060-002 07/01/2022

HEAVY/HIGHWAY

	Rates	Fringes
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Laborers:

GROUP 1.....	\$ 47.13	27.22
GROUP 2.....	\$ 45.78	27.22
GROUP 3.....	\$ 45.38	27.22
GROUP 4.....	\$ 45.03	27.22
GROUP 5.....	\$ 44.68	27.22
GROUP 6.....	\$ 38.33	27.22
GROUP 7.....	\$ 46.68	27.22
SHAFT AND TUNNEL IN FREE AIR		
GROUP 1.....	\$ 53.55	34.30+a
GROUP 2.....	\$ 55.70	34.30+a
GROUP 4.....	\$ 62.10	34.30+a

LABORERS CLASSIFICATIONS (HEAVY/HIGHWAY):

GROUP 1: Blasters.

GROUP 2: Burner, Jumbo Driller, Joy Driller, Wagon Driller,
Air Track Driller, Hydraulic Driller, Concrete Form
Aligner, Concrete Form and Curb Form Highway (Steel),
Asphalt Screedman, Asphalt Raker.

GROUP 3: Asphalt Curb Machine Operator, Jeeper Operator,
Pavement Breaker Operator, Power Saw Operator, Jack Hammer
Driller. All types of pneumatic tools gasoline driller,

concrete saw, gunniting, railroad spike puller and sandblasting, pipe layer, deck winches on scows, power buggy operator, power wheelbarrow operator.

GROUP 4: General concrete laborers-anything pertaining to concrete, aggregate or concrete material handling, puddlers, asphalt worker, rock scalers, vibrator operator, bit grinder, concrete grinder, air tampers and all tampers not covered by any other classification, form pin puller, pumps and their operation, service of air power, epoxy and waterproofing worker, fine grade person between forms, barco rammer, guard and guide rail and link fence, steel kings.

GROUP 5: Common laborers, signal person and pit person , truck spotters, powder person, landscape and nursery person, dump person.

GROUP 6: Flagperson

GROUP 7: Asbestos and Toxic Waste laborer

SHAFT AND TUNNEL IN FREE AIR CLASSIFICATIONS

GROUP 1: Outside laborers

GROUP 2: Blaster, Concrete and form setters, drill runners, air tuggers, chippers, pneumatic tools, and source of airpower, pumps and their operations, vibrator operators, Puddlers, Chuck tenders, nippers, concrete laborers tunnel sewer and water pipeliners, boring, Laborers, Powder carriers, signalmen, and Brakemen

GROUP 4: Miners

FOOTNOTE: a. PAID HOLIDAYS: New Year's Day, Lincoln's Birthday, Washington's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Columbus Day, November Election Day, Veterans' Day, Thanksgiving Day and Christmas Day.

LABO0235-001 05/01/2016

BUILDING

	Rates	Fringes
LABORER.....	\$ 33.30	26.25

LABO0235-002 05/01/2016

RESIDENTIAL

	Rates	Fringes
LABORER.....	\$ 26.80	19.55

PAIN0009-003 11/01/2022

	Rates	Fringes
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PAINTER

GLAZIERS.....	\$ 47.30	50.52
Painters, Paperhanger, Drywall Finishers & Lead Abatement Worker.....	\$ 43.00	38.11
Spray, Scaffold, Sandblasting.....	\$ 46.00	38.11

PAIN0806-001 10/01/2022

Rates Fringes

Painters:

Structural Steel and Bridge.	\$ 54.50	52.73
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PLUM0021-003 05/01/2022

Rates Fringes

Plumber and Steamfitter

Zone 1.....	\$ 60.21	44.08
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ROOF0008-003 05/01/2022

Rates Fringes

ROOFER.....	\$ 45.25	37.62
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SFNY0669-002 01/01/2023

Rates Fringes

SPRINKLER FITTER.....	\$ 48.98	29.69
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SHEE0038-001 07/01/2022

Rates Fringes

Sheet metal worker.....	\$ 48.77	45.20
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TEAM0456-001 07/01/2018

HEAVY & HIGHWAY CONSTRUCION

Rates Fringes

Truck drivers:

GROUP 1.....	\$ 43.47	29.17+a
GROUP 2.....	\$ 40.72	29.17+a
GROUP 3.....	\$ 41.17	29.17+a
GROUP 4.....	\$ 41.34	29.17+a
GROUP 5.....	\$ 40.72	29.17+a
GROUP 6.....	\$ 41.47	29.17+a

GROUP 7.....	\$ 42.22	29.17+a
GROUP 8.....	\$ 42.59	29.17+a
GROUP 9.....	\$ 42.09	29.17+a
GROUP 10.....	\$ 42.72	29.17+a
GROUP 11.....	\$ 42.47	29.17+a

Hazardous/Toxic Waste - An additional 20% of the basic hourly wage rate set forth in this wage determination.

CLASSIFICATION DESCRIPTIONS

- GROUP 1: Lowboy (carrying equipment)
- GROUP 2: Straight jobs: 6-Wheeler, 10-Wheeler, A-Frame Trucks (inside cab), Winch Truck (inside cab), Dynamite Truck, Seeding Truck, Mulching Truck, Agitator Truck, Water Truck, Cement Trucks (all types), Suburbans, Station Wagons, Cars, Pickups.
- GROUP 3: Fuel and tire trucks.
- GROUP 4: Tractor trailers (all types)
- GROUP 5: 14 Wheeler
- GROUP 6: Athey wagon, Belly dumps, Articulated Dumps, Trailer wagons.
- GROUP 7: Darts.
- GROUP 8: RXS
- GROUP 9: Off Road Equipment (Under 40 Tons): Euclid
- GROUP 10: Off Road Equipment (Over 40 Tons) Euclid, DJB
- GROUP 11: Off Road Equipment (Under 40 Tons) DJB

a. PAID HOLIDAYS: New Year's Day, Lincoln's Birthday, President's Day, Decoration Day, Independence Day, Labor Day, November Election Day, Thanksgiving Day, Day after Thanksgiving and Christmas Day, provided employee works two or more days in the calendar week in which the holiday falls.

PAID VACATION: 4 weeks paid vacation after 20 years of service and 30 days of employment in current contract year; 3 weeks after 10 years of seniority service; 3 weeks after 10 years and 60 days of employment in contract year, 3 weeks and 1 day after 16 years of seniority service, 3 weeks and 2 days after 17 years of seniority service; 3 weeks and 3 days after 18 years of seniority service; 3 weeks and 4 days after 19 years of seniority service; The third week and every additional day shall be granted to employee in the calendar year in which he completes his tenth or other years of seniority service; 2 weeks after 130 days of employment in the calendar year; 2 weeks after 5 years and 90 days seniority service in calander year; 1 week and 1 additional day for each additional 18 days of employment not exceeding 10 days in any one calander year after 90 days of employment. Casual employees 1 day for every 18 days of employment. An employee who does not qualify for vacation shall be paid pro rata on a daily basis. Holiday shall be counted as days worked for vacation

benefits.

LEGAL SERVICES FUND: Employer shall contribute \$.20 to the fund on the same basis for all hours paid to employees in the form of holiday pay or vacation pay. In addition to the benefits paid for Health-Welfare and Pension for up to 40 hours worked an additional \$.25 is paid for each hour worked. The employer shall grant 3 calendar days off without loss of pay to an employee who has death in his/her immediate family, inclusive of the day of the funeral.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of

each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISIO"

NO TEXT ON THIS PAGE

NOTICE TO BIDDERS

This contract is subject to a new 2021 Project Labor Agreement

This contract is subject to the attached Project Labor Agreement (“PLA”) entered into between the City and the Building and Construction Trades Council of Greater New York (“BCTC”) affiliated Local Unions. By submitting a bid, the Contractor agrees that if awarded the Contract the PLA is binding on the Contractor and all subcontractors of all tiers.

The bidder to be awarded the contract will be required to execute a Letter of Assent prior to award. The Contractor shall include in any subcontract a requirement that the subcontractor, and sub-subcontractors of all tiers, become signatory to and bound to the PLA with respect to the subcontracted work. The Contractor will also be required to have all subcontractors of all tiers execute a Letter of Assent prior to such subcontractors performing any Program Work.

Bidders are advised that the City of New York and City agencies have entered into multiple PLAs. The terms of each PLA, while similar, are not identical. Please also note that there are revisions between the 2021 DEP Renovation PLA attached to this bid and the prior 2015 DEP Renovation PLA.

All bidders are urged to review the entire 2021 DEP Renovation PLA prior to submitting a bid.

To the extent that the terms of the PLA conflict with any other terms of the invitation for bids, including the Standard Construction Contract, the terms of the PLA shall govern. For example, the PLA section that authorizes the scheduling of a four-day week, ten hours per day on straight time at the commencement of the job, PLA Article 12, Section 1(A), overrides the Standard Construction Contract’s provision concerning a five-day work week with a maximum of eight hours in a day, Standard

Construction Contract Article 37.2.1. Where, however, the invitation for bids, including the Standard Construction Contract, requires the approval of the City/Department, the PLA does not supersede or eliminate that requirement.

This Contract is subject to the apprenticeship requirements of Labor Law § 222 and to apprenticeship requirements established by the Department pursuant to Labor Law § 816-b. Please be advised that the involved trades have apprenticeship programs that meet the statutory requirements of Labor Law § 222(e) and the requirements set by the Department pursuant to Labor Law § 816-b, Contractors and subcontractors who agree to perform the Work pursuant to the PLA are participating in such apprenticeship programs within the meaning of Labor Law § 222(e) and the Department's directive.

If this Contract is subject to the Minority-Owned and Women-Owned Business Enterprise ("M/WBE") program implemented pursuant to New York City Administrative Code § 6-129, the specific requirements of M/WBE participation for this Contract are set forth elsewhere in this bid package. If such requirements are included with this Contract, the City strongly advises Contractors to read those provisions, as well as PLA Article 4, Section 4. A list of certified M/WBE firms may be obtained from the Department of Small Business Services (DSBS) website at <http://mtprawwswsbtpl-1.nyc.gov/>, emailing MWBE@sbs.nyc.gov, or by calling the DSBS certification hotline at (212) 513-6311, or by visiting or writing the DSBS at One Liberty Plaza, 11th Floor, New York, New York, 10006.

The local collective bargaining agreements (CBAs) that are incorporated into the PLA as PLA Schedule A Agreements are available from the Department's Agency Chief Contract Officer upon the request of any prospective bidder.

Please note that the "PLA Schedule A" is distinct from the Department's Schedule A that is a part of this invitation for bids.

**2021 DEP Renovation Project Labor Agreement
Frequently Asked Questions**

1. **Q.** Does a Contractor need to be signatory with the unions in the NYC Building and Construction Trades Council (“BCTC”) in order to bid on projects under the PLA?

A. No, any contractor may bid by signing and agreeing to the terms of the PLA. The contractor need not be signatory with these unions by any other labor agreement or for any other project.

2. **Q.** Does a Contractor agreeing to the PLA and signing the Letter of Assent create a labor agreement with these unions outside of the project covered by the PLA?

A. No, the PLA applies only to those projects that the Contractor agrees to perform under the PLA and makes no labor agreement beyond those projects. Contractors do not need to sign any additional agreements (*e.g.*, a collective bargaining agreement) with a union aside from the Letter of Assent to work on a PLA project.

3. **Q.** Do the provisions of the PLA apply equally to subcontractors as well as contractors and how does the PLA affect the subcontractors that a bidder may utilize on the project?

A. Yes, the PLA applies to subcontractors and all subcontractors performing Program Work must agree to become party to the PLA. Subject to the Agency’s approval of subcontractors pursuant to Article 17 of the Standard Construction Contract, a Contractor may use any subcontractor, union or non-union, as long as the subcontractor signs the Letter of Assent. See PLA Article 2, Section 8.

4. **Q.** Are bidders required to submit Letters of Assent signed by proposed subcontractors with their bid in order to be found responsive?

A. No, bidders do not have to submit signed Letters of Assent from their subcontractors with their bid. However, subcontractors performing Program Work will be required to sign the Letter of Assent prior to being approved by the Agency.

5. **Q.** May a Contractor or subcontractor use any of its existing employees to perform this work?

A. Generally, labor will be referred to the Contractor from the respective signatory local unions. However, Contractors and subcontractors may use up to 12% of their existing, qualifying labor force for this work. Certified M/WBEs for which participation goals are set pursuant to NYC Administrative Code § 6-129 that are not signatory to any Schedule A collective bargaining agreements (“CBAs”) may use their existing employees for the 2nd, 4th, 6th and 8th employee (per trade) needed on the job if their contracts are valued at or under \$2,000,000. Any additional workers will be referred to the Contractor in accordance with the 12% referral requirements set forth in the PLA. See PLA Article 4, Section 2.

6. **Q.** Must the City set M/WBE participation goals for the particular project or contract in order for a certified M/WBE to utilize the provisions of PLA Article 4, Section 2(C)?

A. No. PLA Article 4, Section 2(C) specifies what categories of M/WBEs are eligible to take advantage of this provision (i.e., those M/WBEs for which the City is authorized to set participation goals under § 6-129). For purposes of Article 4, Section 2(C), it is not necessary for the project to be subject to § 6-129 or for the City to have actually set participation goals for the particular contract or project. The result is the same where a project receives State funding and therefore is subject to the requirements of Article 15-A of the Executive Law.

7. **Q.** May a Contractor bring in union members from locals that are not signatory unions?

A. Referrals will be from the respective signatory locals and/or locals listed in Schedule A of the PLA. Contractors may utilize ‘traveler provisions’ contained in the local CBAs where such provisions exist and/or in accordance with the provisions of PLA Article 4, Section 2.

8. **Q.** Does a non-union employee working under the PLA automatically become a union member?

A. No, the non-union employee does not automatically become a union member by working on a project covered by the PLA and nothing in the PLA requires employees to join a union or pay dues or fees to a union as a condition of working on the covered project. This Agreement is not, however, intended to supersede independent requirements in applicable local union agreements as to contractors that are otherwise signatory to those agreements and as to employees of such employers performing covered work. Non-union employees will be enrolled in the appropriate benefit plans and earn credit toward various union benefit programs except in certain circumstances as set forth in the PLA. See PLA Article 4, Section 6 and Article 11.

9. **Q.** Are all Contractors and subcontractors working under the PLA, including non-union Contractors and Contractors signatory to CBAs with locals other than those that are signatories to the PLA, required to make contributions to designated employee benefit funds?

A. Except in certain circumstances, as described in the following paragraph, Contractors and subcontractors working under the PLA will be required to contribute on behalf of all employees covered by the PLA to established jointly trustee employee benefit funds designated in the Schedule A CBAs and required to be paid on public works under any applicable prevailing wage law. The Agency may withhold from amounts due the Contractor any amounts required to be paid, but not actually paid into any such fund by the Contractor or a subcontractor. See PLA Article 11, Section 2.

Non-union Contractors with bona fide private benefit plans that satisfy the requirements of Labor Law 220 will not be required to pay into union benefit funds for their employees working pursuant to Article 4, Section 2 (B) and (C) (“Core Employees”) who are already covered under their bona fide private benefit plans. Supplemental

benefit funds in excess of the annualized value of the private benefit plans will be paid directly to workers as additional wages in compliance with Labor Law § 220. At the time of contract award, the Contractor shall make available to the contracting Agency a complete set of plan documents for each private benefit plan into which contributions will be made and/or coverage provided. The Contractor shall also provide certification from a certified public accountant as to the annualized hourly value of such benefits consistent with the requirements of Labor Law § 220. See PLA Article 11, Section 2.

10. **Q.** When do Core Employees become eligible for union benefits?

A. Union benefit plans have their own plan documents that determine eligibility and workers will become eligible for certain benefits at different points in time. Contractors who will have Core Employees should speak with the respective union(s) as to benefit eligibility thresholds. Employees that may remain unaffiliated with any local union at the completion of their employment may apply for any distributions to which they may be entitled from the funds in accordance with the applicable rules and governing documents of the unions and the employee benefit funds.

11. **Q.** What happens if a Contractor or subcontractor fails to make a required payment to a designated employee benefit fund?

A. The PLA sets forth a process for unions to address a Contractor or a subcontractor's failure to make required payments. The process includes potentially the direct payment by the City to the benefit fund of monies owed and the corresponding withholding of payments to the Contractor. See PLA Article 11, Section 2.

Upon notification by a union or fringe benefit fund that a Contractor is delinquent in its payment of benefits and a determination by the Agency that the union or fund has submitted appropriate documentation of such delinquency, the Agency will thereafter require the Contractor to submit cancelled checks or other equivalent proof of payment of benefit contributions with certified payroll reports for work covered by this PLA on which the Contractor is engaged.

The City strongly advises Contractors to read these provisions carefully and to include appropriate provisions in subcontracts addressing these possibilities.

12. **Q.** Does signing on to the PLA satisfy the Apprenticeship Requirements established for this bid?

A. Yes. By agreeing to perform the Work subject to the PLA, the bidder demonstrates compliance with the apprenticeship requirements imposed by this Invitation for Bids.

13. **Q.** Who decides on the number of workers needed?

A. Except as expressly limited by a specific provision of the PLA, a Contractor retains full and exclusive authority for the management of their operations, including the determination as to the number of employees to be hired and the qualifications therefore and the promotion, transfer, and layoff of its employees. See PLA Article 6, Section 1.

14. **Q.** What happens if a union does not provide a worker within 48 hours from the request (Saturdays, Sundays, and holidays excepted)?
- A.** In the event that a Local Union does not fill any request for qualified employees within a 48-hour period after such requisition is made by a Contractor (Saturdays, Sundays and holidays excepted), a Contractor may employ qualified applicants from any other available source.
15. **Q.** May a Contractor discharge a union referral for lack of productivity?
- A.** Except as expressly limited by a specific provision of the PLA, a Contractor retains full and exclusive authority for the management of their operations, including the right to discipline or discharge for just cause its employees. See PLA Article 6, Section 1.
16. **Q.** May a contractor assign a management person to site?
- A.** Yes. Managers are not subject to the provisions of the PLA, so there is no restriction on management and/or other non-trade personnel, as long as such personnel do not perform trade functions. See Article 3, Section 1.
17. **Q.** What type of work can Stewards perform?
- A.** All Stewards must be working Stewards (*i.e.*, they must be performing Program Work). In addition, Stewards may perform other tasks such as receiving complaints or grievances from other employees of the Steward's trade. Stewards may not determine when overtime is worked. Stewards are entitled to the same wages as other employees of that trade. See PLA Article 5, Sections 2 and 3.
18. **Q.** Can a Contractor utilize apprentices?
- A.** Contractors are permitted to utilize apprentices so long as the ratios between journeyman and apprentice do not exceed the allowable ratios set by the New York State Department of Labor ("NYSDOL"). Should a Contractor request that apprentices be provided for Program Work, the referring Local Union shall comply with that request so long as it is consistent with the maximum ratios permitted by NYSDOL.
19. **Q.** What is HireNYC Construction Careers?
- A.** HireNYC Construction Careers is an initiative to advance career opportunities within the construction industry. The initiative has a target goal of 30% of all hours worked on PLA projects are performed by workers who reside in NYCHA housing or zip codes where 15% or more of the residences are below poverty. When a Contractor requests employees, the trades will take into account the target goals when they refer additional workers.

20. **Q.** Does the PLA provide a standard work day across all the signatory trades?
- A.** Yes, all signatory trades will work an eight (8) hour day, Monday through Friday with a day shift at straight time as the standard work week. The PLA also permits a Contractor to schedule a four-day (within Monday through Friday) work week, ten (10) hours per day at straight time if announced at the commencement of the project. See PLA Article 12, Section 1. This is an example where the terms of the PLA override provisions of the Standard Construction Contract (compare with section 37.2 of the Standard Construction Contract). The standard work week may be reduced to 35 or 37 ½ hours of work in those limited circumstances where the City states in the bid documents that the Contractor will not be given access to the site to accommodate an 8-hour day. The 8 hour, 7 ½ hour or 7-hour work day must be established at the commencement of the project by the Agency and may not be altered by the Contractor.
21. **Q.** Does the PLA create a common holiday schedule for all the signatory trades?
- A.** Yes, the PLA recognizes nine common holidays. See PLA Article 12, Section 4.
22. **Q.** Are workers entitled to holiday pay if they do not work on the holiday?
- A.** No. Workers are only entitled to pay if they work on the holiday. See PLA Article 12, Section 4.
23. **Q.** Does the PLA provide for a standard policy for ‘shift work’ across all signatory trades?
- A.** Yes, second and third shifts may be worked with a standard 5% premium pay. In addition, a day shift does not have to be scheduled in order to work the second and third shifts at the 1.05 hourly pay rate. See PLA Article 12, Section 3.
24. **Q.** May the Contractor schedule overtime work, including work on a weekend?
- A.** Yes, the PLA permits the Contractor to schedule overtime work, including work on weekends. See PLA Article 12, Sections 2, 3, and 5. To the extent that the Agency’s approval is required before a Contractor may schedule or be paid for overtime, that approval is still required notwithstanding the PLA language.
25. **Q.** Are overtime payments affected by the PLA?
- A.** Yes, all overtime pay incurred Monday through Saturday will be at time and one half (1 ½). There will be no stacking or pyramiding of overtime pay under any circumstances. See PLA Article 12, Section 2. Sunday and holiday overtime will be paid according to each trade’s CBA.
26. **Q.** Are there special provisions for Saturday work when a day is ‘lost’ during the week due to weather, power failure or other emergency?
- A.** Yes, when this occurs the Contractor may schedule Saturday work at weekday rates. See PLA Article 12, Section 5.

27. **Q.** Does the PLA contain special provisions for the staffing of temporary services?
- A.** Yes. Where temporary services are required by specific request of the Agency or construction manager, they shall be provided by the Contractor's existing employees during working hours in which a shift is scheduled for employees of the Contractor. The need for temporary services during non-working hours will be determined by the Agency or construction manager. There will be no stacking of trades on temporary services. See PLA Article 15.
28. **Q.** What do the workers get paid when work is terminated early in a day due to inclement weather or otherwise cut short of 8 hours?
- A.** The PLA provides that employees who report to work pursuant to regular schedule and not given work will be paid two hours of straight time. Work terminated early for severe weather or emergency conditions will be paid only for time actually worked. In other instances where work is terminated early, the worker will be paid for a full day. See PLA Article 12, Sections 6 and 8. The usual reporting pay requirement of two hours for employees who report to their work location pursuant to their regular schedule does not apply when the National Weather Service issues a Weather Advisory and the Contractor speaks to the employee at least four hours before their shift starting time. See PLA Article 12, Section 6.
29. **Q.** Should a local collective bargaining agreement of a signatory union expire during the project will a work stoppage occur on a project subject to the PLA?
- A.** No. All the signatory unions are bound by the 'no strike' agreement as to the PLA work. Work will continue under the PLA and the otherwise expired local CBA(s) until the new local CBA(s) are negotiated and in effect. See PLA Articles 7 and 19.
30. **Q.** May a Contractor working under the PLA be subject to a strike or other boycott activity by a signatory union at another site while the Contractor is a signatory to the PLA?
- A.** Yes. The PLA applies ONLY to work under the PLA and does not regulate labor relations at other sites even if those sites are in close proximity to PLA work.
31. **Q.** If a Contractor has worked under other PLAs in the New York City area, are the provisions in this PLA generally the same as the others?
- A.** While PLAs often look similar to each other, and particular clauses are often used in multiple agreements, each PLA is a unique document and should be examined accordingly.
32. **Q.** What happens if a dispute occurs between the Contractor and an employee during the project?
- A.** The PLA contains a grievance and arbitration process to resolve disputes between the Contractor and the employees. See PLA Article 9.

33. **Q.** What happens if there is a dispute between locals as to which local gets to provide employees for a particular project or a particular aspect of a project?

A. The PLA provides for jurisdictional disputes to be resolved in accordance with the NY Plan. A copy of the NY Plan is available upon request from the Agency. The PLA provides that work is not to be disrupted or interrupted pending the resolution of any jurisdictional dispute. The work proceeds as assigned by the Contractor until the dispute is resolved. See PLA Article 10.

34. **Q.** Does the PLA contain special provisions for JOCS or task order-based Contracts?

A. The PLA does not apply to Task Orders or Work Orders that do not exceed \$250,000 issued under JOCS or Requirements Contracts. See PLA Article 3, Section 1.

35. **Q.** How do the referral rules work for Operating Engineers Locals 14 and 15?

A. If there is Program Work within the jurisdiction of Operating Engineers Locals 14 or 15, the contractor shall request labor from the appropriate local union. If the locals provide labor consistent with the referral provisions outlined in Article 4, Section 2, the terms of the Local 14 CBA or Local 15 CBA will apply to that work. However, if the locals do not provide labor for that work, the terms of the PLA will apply to such work.

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**PROJECT LABOR AGREEMENT
COVERING SPECIFIED
RENOVATION & REHABILITATION
OF DEP BUILDINGS AND STRUCTURES**

2021 – 2024

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**PROJECT LABOR AGREEMENT COVERING SPECIFIED
RENOVATION & REHABILITATION OF DEP
BUILDINGS & STRUCTURES**

ARTICLE 1 – PREAMBLE

WHEREAS, the City of New York, acting through the New York City Department of Environmental Protection, desires to provide for the cost efficient, safe, quality, and timely completion of certain rehabilitation and renovation work (“Program Work,” as defined in Article 3) in a manner designed to afford the lowest costs to the Agency, and the public it represents, and the advancement of permissible statutory objectives;

WHEREAS, this Project Labor Agreement will foster the achievement of these goals, inter alia, by:

(1) providing a mechanism for responding to the unique construction needs associated with this Program Work and achieving the most cost-effective means of construction, including direct labor cost savings, by the Building and Construction Trades Council of Greater New York and Vicinity and the signatory Local Unions and their members waiving various shift and other hourly premiums and other work and pay practices which would otherwise apply to Program Work;

(2) expediting the construction process and otherwise minimizing the disruption to the Agency’s ongoing operations at the facilities that are the subject of the Agreement;

(3) avoiding the costly delays of potential strikes, slowdowns, walkouts, picketing and other disruptions arising from work disputes, reducing jobsite friction on common situs worksites, and promoting labor harmony and peace for the duration of the Program Work;

(4) standardizing the terms and conditions governing the employment of labor on Program Work;

(5) permitting wide flexibility in work scheduling and shift hours and times to allow maximum work to be done during off hours yet at affordable pay rates;

(6) permitting adjustments to work rules and staffing requirements from those which otherwise might obtain;

(7) providing comprehensive and standardized mechanisms for the settlement of work disputes, including those relating to jurisdiction;

(8) fostering increased participation by Minority and Women-owned Business

2021 DEP RENOVATION PROJECT LABOR AGREEMENT

Enterprises (“MWBEs”);

- (9) encouraging the development of pathways to construction careers;
- (10) ensuring a reliable source of skilled and experienced labor; and
- (11) securing applicable New York State Labor Law exemptions.

WHEREAS, the Building and Construction Trades Council of Greater New York and Vicinity, its participating affiliated Local Unions and their members, desire to assist the City in meeting these operational needs and objectives as well as to provide for stability, security and work opportunities which are afforded by this Project Labor Agreement; and

WHEREAS, the Parties desire to maximize Program Work safety conditions for both workers and the community in the project area.

NOW, THEREFORE, the Parties enter into this Agreement:

SECTION 1. PARTIES TO THE AGREEMENT

This is a Project Labor Agreement (“Agreement”) entered into by the New York City Department of Environmental Protection (“DEP”), including in its capacity as construction manager of covered projects and/or on behalf of any third-party construction manager which may be utilized, and the Building and Construction Trades Council of Greater New York and Vicinity (“Council” or “BCTC”) (on behalf of itself) and the signatory affiliated Local Unions (“Unions” or “Local Unions”). The Council and each signatory Local Union hereby warrant and represents that it has been duly authorized to enter into this Agreement.

ARTICLE 2 - GENERAL CONDITIONS

SECTION 1. DEFINITIONS

A. The term “Agency” means the New York City Department of Environmental Protection;

B. The term “Agreement” means this project labor agreement (“PLA”), the applicable Schedule “A” Collective Bargaining Agreements (each a “CBA”) identified in Schedule “A”, and

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each Exhibit hereto;

C. The term “BCTC” refers to the Building and Construction Trades Council of Greater New York and Vicinity. The terms “BCTC” and “Council” are used interchangeably;

D. The term “Contractor(s)” shall include any Construction Manager, General Contractor and all other contractors, and subcontractors of all tiers engaged in Program Work within the scope of this Agreement as defined in Article 3. When the Agency acts as Construction Manager, unless otherwise provided, it has the rights and obligations of a “Construction Manager” in addition to the rights and obligations of the Agency;

E. The term “Core Employee” means an employee that has been on a contractor’s payroll consistent with Article 4, Section 2(B) and (C);

F. The term “Minor Repair” means routine repair, service, or maintenance that is recurrent, day to day, periodic scheduled or routine work required to preserve or restore a building, facility or system to working order;

G. The term “HireNYC Construction Careers” refers to the PLA initiative to advance career opportunities for Program Hires;

H. The term “Program Work” is the work covered by this Agreement as defined in Article 3;

I. The term “Program Hire” means an individual that resides in a zip code where at least 15% of the individuals residing in such zip code are below the federal poverty rate and residents of NYCHA housing regardless of zip codes; and

J. The term “Union(s)” or “Local Union(s)” refers to the various participating unions affiliated with the BCTC, singularly and collectively.

2021 DEP RENOVATION PROJECT LABOR AGREEMENT

SECTION 2. CONDITIONS FOR AGREEMENT TO BECOME EFFECTIVE

This Agreement shall not become effective unless each of the following conditions are met: the Agreement is executed by (1) the Council, on behalf of itself, (2) the participating affiliated Local Unions; and (3) the Commissioner of DEP or their designee.

SECTION 3. ENTITIES BOUND & ADMINISTRATION OF AGREEMENT

This Agreement shall be binding on all participating Unions and their affiliates, the Construction Manager (in its capacity as such) and all Contractors of all tiers performing Program Work, as defined in Article 3. The Contractors shall include in any subcontract that they let for performance during the term of this Agreement a requirement that their subcontractors, of all tiers, become signatory and bound by this Agreement with respect to that subcontracted work falling within the scope of Article 3 and all Contractors (including subcontractors) performing Program Work shall be required to sign a “Letter of Assent” in the form annexed hereto as Exhibit “A”. This Agreement shall be administered by the Agency or a Construction Manager or such other designee as may be named by the Agency or Construction Manager, on behalf of all Contractors.

SECTION 4. SUPREMACY CLAUSE

This Agreement, together with the local Collective Bargaining Agreements (each a “CBA”) appended hereto as Schedule “A”, represents the complete understanding of all signatories and supersedes any national agreement, local agreement or other CBA of any type which would otherwise apply to this Program Work, in whole or in part, except for Program Work which falls within the jurisdiction of the Operating Engineers Locals 14 and 15. If Program Work falling within the jurisdiction of Operating Engineers Locals 14 and 15 is accepted by and performed by said locals, only then will such work be performed under the terms and conditions set out in the Schedule “A” agreements of Operating Engineers Locals 14 and 15. The CBAs of the affiliated local unions that cover the particular type of construction work to be performed by the contractor,

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and as set forth in the Schedule “A” list of agreements, shall be deemed the Schedule “A” Collective Bargaining Agreements (“Schedule “A” CBA”) under this Agreement. Where association and independent CBAs for a particular type of construction work are both set forth in Schedule “A”, association members shall treat the applicable association agreement as the Schedule “A” CBA and independent contractors shall treat the applicable independent agreement as the Schedule “A” CBA. Subject to the foregoing, where a subject covered by the provisions of this project labor agreement is also covered by a Schedule “A” CBA, the provisions of this project labor agreement shall prevail. It is further understood that no Contractor shall be required to sign any other agreement as a condition of performing Program Work. No practice, understanding or agreement between a Contractor and a Local Union which is not set forth in this Agreement shall be binding with respect to Program Work unless endorsed in writing by the Construction Manager or such other designee as may be designated by the Agency. Nothing in this Agreement requires employees to join a union or pay dues or fees to a union as a condition of working on the covered project. This Agreement is not, however, intended to supersede independent requirements in applicable local union agreements as to contractors that are otherwise signatory to those agreements and as to employees of such employers performing covered work.

It is further agreed that, where there is a conflict, the terms and conditions of this Agreement shall supersede and override terms and conditions of any and all other national, area, or local collective bargaining agreements, except for all work performed under the NTL Articles of Agreement, the National Stack/Chimney Agreement, and the Joint National Agreement for Instrument Control Systems Technicians, with the exception of Article 2, Section 7, and Articles 7, 9, and 10 of this Agreement, which shall apply to such work.

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SECTION 5. LIABILITY

The liability of any Contractor and the liability of any Union under this Agreement shall be several and not joint. The Construction Manager and any Contractor shall not be liable for any violations of this Agreement by any other Contractor; and the Council and Local Unions shall not be liable for any violations of this Agreement by any other Union.

SECTION 6. THE AGENCY

The Agency (or Construction Manager where applicable) shall require in its bid specifications for all Program Work within the scope of Article 3 that all successful bidders, and their subcontractors of all tiers, become bound by, and signatory to, this Agreement. The Agency (or Construction Manager) shall not be liable for any violation of this Agreement by any Contractor. It is understood that nothing in this Agreement shall be construed as limiting the sole discretion of the Agency or Construction Manager in determining which Contractors shall be awarded contracts for Program Work. It is further understood that the Agency or Construction Manager has sole discretion at any time to terminate, delay or suspend the Program Work, in whole or part, on any project.

SECTION 7. AVAILABILITY AND APPLICABILITY TO ALL SUCCESSFUL BIDDERS

The Unions agree that this Agreement will be made available to, and will fully apply to, any successful bidder for (or subcontractor of) Program Work who becomes signatory thereto, without regard to whether that successful bidder (or subcontractor) performs work at other sites on either a union or non-union basis and without regard to whether employees of such successful bidder (or subcontractor) are, or are not, members of any unions. This Agreement shall not apply to the work of any Contractor which is performed at any location other than the site of Program Work.

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SECTION 8. SUBCONTRACTING

Contractors will subcontract Program Work only to a person, firm or corporation who is or agrees to become party to this Agreement.

ARTICLE 3 - SCOPE OF THE AGREEMENT

SECTION 1. WORK COVERED

A. Program Work shall be limited to designated rehabilitation and renovation construction contracts bid and let by the Agency (or its Construction Manager where applicable) after the effective date of this Agreement with respect to rehabilitation and renovation work performed for the Agency on City-owned property under contracts advertised for public solicitation prior to December 31, 2024. Subject to the foregoing, and the exclusions below, such Program Work shall mean any and all contracts that predominantly involve the renovation, alteration, repair, rehabilitation or expansion of an existing City-owned building or structure at a Wastewater Resource Recovery Facility, a water filtration plant, or a pumping station within the five boroughs of New York City. Examples of Program Work include, but are not limited to, the renovation, repair, alteration and rehabilitation of an existing temporary or permanent structure, or an expansion of above ground structures located in the City on a City-owned building. Program Work shall also include job order contracts (“JOCS”), demolition work, painting services. Low voltage work, site work, elevator work, mold, asbestos and lead abatement, carpentry services, and carpet removal and installation shall be included as Program Work only when incidental to such building renovation and/or rehabilitation of City-owned buildings or structures and included in a contract that predominantly involves such renovation and/or rehabilitation. Program Work shall also include the installing and removing of centrifuges on City-owned property, but not any other work under such contracts, in connection with contracts that involve the maintenance or repair of centrifuges, in accordance with Exhibit “E”. Program Work shall also include contracts bid and

2021 DEP RENOVATION PROJECT LABOR AGREEMENT

let by the Agency for the rehabilitation and upgrade of wells and well stations located in Southeast Queens as part of the Queens Groundwater Project, including the construction of new buildings and other above or below-ground structures, the installation of equipment, piping and drainage structures including subsurface installations, the installation of water treatment system elements, control systems, plumbing, electrical, HVAC and site and road work required for the construction, operation or maintenance of the wells and other related facilities.

B. It is understood that, except where the Agency specifically applies this Agreement to such work in its bid documents, Program Work does not include, and this Agreement shall not apply to, any other work, including:

1. Contracts that are let under a different project labor agreement with one of the Agency, and/or other Agencies and Authorities that have entered separate PLAs, such as NYCHA, H+H and SCA;

2. Contracts let and work performed in connection with projects carried over, recycled from, or performed under bids or rebids relating to work that were bid prior to the effective date of this Agreement or after December 31, 2024;

3. Contracts procured on an emergency basis;

4. Prime contracts that do not exceed \$3,000,000;

5. Contracts for work on streets and bridges and for the closing or environmental remediation of landfills;

6. Contracts with not-for-profit corporations where the City is not awarding or performing the work performed for that entity;

7. Contracts with governmental entities where the City is not awarding or performing the work performed for that entity;

8. Contracts with electric utilities, gas utilities, telephone companies, and

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railroads, except that it is understood and agreed that these entities may only install their work to a demarcation point, *e.g.*, a telephone closet or utility vault, the location of which is determined prior to construction and employees of such entities shall not be used to replace employees performing Program Work pursuant to this Agreement;

9. Contracts for installation of information technology that are not otherwise Program Work;

10. Task Orders or Work Orders issued under JOCS or Requirements Contracts that do not exceed \$250,000, and JOCS or Requirements Contracts where the monetary value of such contracts predominantly involves such Task Orders or Work Orders;

11. Contracts that predominantly involve Minor Repair work, as defined in Article 2, Section 1(F) above. Such work is to be paid under the applicable prevailing wage law for service or maintenance work, which, where a particular trade does not maintain separate wage rates for service and maintenance or other work, may be the same prevailing wage law rates for the particular trade jurisdiction; and

12. Up to five percent (5%) of work performed by certified MWBE subcontractors on prime contracts that are valued at \$25,000,000 or more and for which participation goals are set forth in the contract and where such MWBE subcontractor is not signatory to any Schedule "A" agreement ("Exempt Work"). Exempt Work shall be no more than \$500,000 or 15% (whichever is greater) of the value of the subcontracts for work in any particular union's jurisdiction under any prime contract.

SECTION 2. TIME LIMITATIONS

In addition to falling within the scope of Article 3, Section 1, to be covered by this Agreement, Program Work must be (1) advertised and let for bid after the effective date of this Agreement, and (2) let for bid prior to December 31, 2024, the expiration date of this Agreement.

2021 DEP RENOVATION PROJECT LABOR AGREEMENT

It is understood that this Agreement, together with all of its provisions, shall remain in effect for all such Program Work until completion, even if not completed by the expiration date of the Agreement. If Program Work otherwise falling within the scope of Article 3, Section 1 is not let for bid by the expiration date of this Agreement, this Agreement may be extended to that work by mutual agreement of the parties.

SECTION 3. EXCLUDED EMPLOYEES

The following persons are not subject to the provisions of this Agreement, even though performing Program Work:

A. Superintendents, supervisors (except field surveyors on construction contracts, general and forepersons specifically covered by a craft's Schedule "A" agreement are included), engineers, professional engineers and/or licensed architects engaged in inspection and testing, quality control/assurance personnel, timekeepers, mail carriers, clerks, office workers, messengers, guards, technicians, non-manual employees, and all professional, engineering, administrative and management persons;

B. Employees of the Agency, New York City, or any other municipal or State agency, authority or entity, or employees of any other public employer, even though working on the project site while covered Program Work is underway;

C. Employees and entities engaged in off-site manufacture, modifications, repair, maintenance, assembly, painting, handling or fabrication of project components, materials, equipment or machinery, or involved in deliveries to and from the Program site, except to the extent they are lawfully included in the bargaining unit of a Schedule "A" agreement;

D. Employees of the Construction Manager (except that in the event the Agency engages a Contractor to serve as Construction Manager, then those employees of the Construction Manager performing manual, on site construction labor will be covered by this Agreement);

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E. Employees engaged in on-site equipment warranty work unless employees are already working on the site and are certified to perform warranty work;

F. Employees engaged in geophysical testing other than boring for core samples;

G. Employees engaged in laboratory, specialty testing, or inspections, pursuant to a professional services agreement between the Agency, or any of the Agency's other professional consultants, and such laboratory, testing, inspection or surveying firms;

H. Employees engaged in on-site maintenance of installed equipment or systems which maintenance is awarded as part of a contract that includes Program Work, but which maintenance occurs after installation of such equipment or system and is not directly related to construction services; and

I. Employees who perform work classified as Minor Repairs, and routine service and/or maintenance work.

SECTION 4. NON-APPLICATION TO CERTAIN ENTITIES

This Agreement shall not apply to those parents, affiliates, subsidiaries, or other joint or sole ventures of any Contractor which do not perform Program Work. It is agreed that this Agreement does not have the effect of creating any joint employment, single employer or alter ego status among the Agency (including in its capacity as Construction Manager) or any Contractor. The Agreement shall further not apply to any New York City or other municipal or State agency, authority, or entity other than the Agency and nothing contained herein shall be construed to prohibit or restrict the Agency or its employees, or any State, New York City or other municipal or State authority, agency or entity and its employees, from performing on or off-site work related to Program Work.

As the contracts involving Program Work are completed and accepted, the Agreement shall not have further force or effect on such items or areas except where inspections, additions, repairs,

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modifications, check-out and/or warranty work are assigned in writing (copy to Local Union involved) by the Agency (or Construction Manager) for performance under the terms of this Agreement.

ARTICLE 4 - UNION RECOGNITION AND EMPLOYMENT

SECTION 1. PRE-HIRE RECOGNITION

The Contractors recognize the signatory Unions as the sole and exclusive bargaining representatives of all employees who are performing on-site Program Work, with respect to that work.

SECTION 2. UNION REFERRAL

A. The Contractors agree to request, employ and hire craft employees, including Program Hires as defined in Article 2, Section 1(I), for Program Work covered by this Agreement through the job referral systems and hiring halls established in the Local Unions' area CBAs set forth in Schedule "A". Notwithstanding this, Contractors shall have sole right to determine the competency of all referrals; to determine the number of employees required; to select employees for layoff (subject to Article 5, Section 3); and the sole right to reject any applicant referred by a Local Union, subject to the show-up payments. In the event that a Local Union does not fill any request for qualified employees within a 48-hour period after such requisition is made by a Contractor (Saturdays, Sundays and holidays excepted), a Contractor may employ qualified applicants from any other available source. In the event that the Local Union does not have a job referral system, the Contractor shall give the Local Union first preference to refer applicants, subject to the other provisions of this Article. The Contractor shall notify the Local Union of craft employees hired for Program Work within its jurisdiction from any source other than referral by the Union. Any employee hired by a Contractor because a Local Union does not fill a request for qualified employees within a 48-hour period (Saturdays, Sundays and holidays excepted) are not

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covered by this Agreement for purposes of Article 11, Section 2, unless they are or become a member of an affiliated Union.

B. A Contractor may request by name, and the Local will honor, referral of persons who have applied to the Local for Program Work (“Core Employees”) and who meet the following qualifications:

- (1) possess any license required by New York State law for the Program Work to be performed;
- (2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and
- (3) were on the Contractor’s active payroll for at least 60 out of the 180 calendar days prior to the contract award.

No more than twelve per centum (12%) of the employees covered by this Agreement, per Contractor by craft, shall be hired through the special provisions above. Under this provision, name referrals begin with the eighth employee needed and continue on that same basis.

C. Notwithstanding Section 2(B), above, certified MWBE contractors for which participation goals are set forth in New York City Administrative Code §6-129, that are not signatory to any Schedule “A” CBAs, with subcontracts valued at or under two-million dollars (\$2,000,000), may request by name, and the Local will honor, referral of the second (2nd), fourth (4th), sixth (6th), and eighth (8th) Core Employee, who have applied to the Local for Program Work and who meet the following qualifications:

- (1) possess any license required by New York State law for the Program Work to be performed;
- (2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and
- (3) were on the Contractor’s active payroll for at least 60 out of the 365 calendar days prior to the contract award.

D. Where a certified MWBE Contractor voluntarily enters into a CBA with a BCTC Union, the employees of such Contractor at the time the CBA is executed shall be allowed to join

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the Union for the applicable trade subject to satisfying the Union's basic standards of proficiency for admission.

SECTION 3. NON-DISCRIMINATION IN REFERRALS

The Council represents that each Local Union hiring hall and referral system will be operated in a non-discriminatory manner and in full compliance with all applicable federal, state and local laws and regulations which require equal employment opportunities. Referrals shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements and shall be subject to such other conditions as are established in this Article. No employment applicant shall be discriminated against by any referral system or hiring hall because of the applicant's union membership, or lack thereof.

SECTION 4. MINORITY, FEMALE, LOCAL AND SECTION 3 REFERRALS

In the event a Local Union either fails or is unable to refer qualified minority or female applicants in percentages equaling the workforce participation goals adopted by the City and set forth in the Agency's (or, if applicable, Construction Manager's) bid specifications, within 48 hours of the request for same, the Contractor may employ qualified minority or female applicants from any other available source.

The Local Unions agree to prioritize the referral of Program Hires in accordance with Article 13 and to the extent consistent with the law, rules applicable to the union referral systems and joint apprentice programs. Those unions that do not currently provide for zip code preferences in their referral systems will undertake to implement such preferences consistent with this Agreement and their governing documents. Please see Exhibit "C" for a non-exhaustive list of eligible zip codes. Employees from these zip codes that are already on a contractor's workforce,

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including Core Employees, and referral of apprentices, in accordance with Article 13, Section 1(A) below, shall count towards the referral goals of this Section.

For any Program Work that may become subject to requirements under Section 3 of the Housing and Urban Development Act of 1968, as amended by the Housing and Community Development Act of 1992, and any rules, including new or revised rules, that may be published thereunder, the Local Unions acknowledge the Section 3 obligations of the Construction Manager or Contractor, as applicable, and agree to the zip code and NYCHA preferences described above to help implement this Article in a manner that would allow the Construction Manager or Contractor to meet its Section 3 obligations to the greatest extent feasible, and to post any required notices in the manner required by Section 3. The parties also acknowledge that the Construction Manager and Contractor may also fulfill its Section 3 requirements on Program Work by promoting opportunities for excluded employees, as defined by Article 3, Section 3 of this Agreement, on Program Work and, to the extent permitted by Section 3, by promoting opportunities for craft and other employees on non-Program Work.

SECTION 5. CROSS AND QUALIFIED REFERRALS

The Local Unions shall not knowingly refer to a Contractor an employee then employed by another Contractor working under this Agreement. The Local Unions will exert their utmost efforts to recruit sufficient numbers of skilled and qualified crafts employees to fulfill the requirements of the Contractor.

SECTION 6. CRAFT FOREPERSONS AND GENERAL FOREPERSONS

The selection of craft forepersons and/or general forepersons and the number of forepersons required shall be solely the responsibility of the Contractor except where otherwise provided by specific provisions of an applicable Schedule "A" CBA, and provided that all craft forepersons shall be experienced and qualified journeypersons in their trade as determined by the

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appropriate Local Union. All forepersons shall take orders exclusively from the designated Contractor representatives. Craft forepersons shall be designated as working forepersons at the request of the Contractor, except when an existing local CBA prohibits a foreperson from working when the craft persons, they are leading exceed a specified number.

SECTION 7. ON CALL REPAIR REFERRALS

A. When the Agency awards a contract under this Agreement that requires the Contractor to have employees available on short notice to make time-sensitive repairs with such contract requiring the Contractor to respond within as little as two hours from the time the Contractor is contacted by the Agency (“On Call, Repair Contract”), the Contractor will, within ten (10) days of being awarded an On Call, Repair Contract subject to this Agreement, notify the appropriate affiliated Union that would perform the work for a contractor that the Contractor has been awarded such a contract and immediately enter into good faith negotiations with such relevant affiliated Union to establish a procedure to receive time sensitive referrals from such affiliated Union(s).

B. In the event the Contractor and the relevant affiliated Union(s) are unable to negotiate a specific, mutually agreeable procedure for on call repair referral procedure within twenty (20) days of commencement of negotiations or prior to commencement of performance of the contract, whichever is earlier, the Contractor and the relevant affiliated Unions will follow the following procedure:

1. Upon notification by a Contractor that it has been awarded an On Call, Repair Contract pursuant to paragraph A above, each relevant affiliate Union shall provide the Contractor with the name and twenty-four (24) hour contact information of an On Call, Repair Contract contact person for urgent on call repair referrals.

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2. The relevant affiliated Unions shall prepare a list of individuals eligible and prepared for referral on an immediate basis to respond to the on call repair contractor, which may include the affiliated Unions' service, repair and maintenance division workers where appropriate for repairs that can be made within 24 to 48 hours and paid at the appropriate prevailing wage rates for service and repair or maintenance work, which, where a particular trade does not maintain separate wage rates for service and maintenance or other work, may be the same prevailing wage law rates for the particular trade. Such list shall be provided to and in the possession of the designated-on call repair contact person for the affiliated Union and available for immediate reference.

3. Individuals on such list must be able to comply with the Contractor's response time pursuant to contract requirements.

4. The Union's On Call, Repair Contract contact person shall respond to a contractor's request for referrals within a reasonable time of the request so that compliance with the contract shall be possible.

C. In the event that the Contractor makes a request for an on call referral that is compliant with this procedure and a Union is not able to respond to the request, that Union will be deemed to have waived the forty-eight (48) hour referral rule contained in Section 2 above and the Contractor may employ qualified applicants from any other available source that can meet contract requirements for that time-sensitive on call repair work only; provided, however, that any work related to the repair work that is not of a time sensitive nature under the contract shall comply with Section 2. If a Union fails to timely refer a worker and the Contractor employs other workers, the Contractor will e-mail the Agency within 72 hours and the Agency will forward that e-mail to the designated Labor Management Committee contacts.

ARTICLE 5 - UNION REPRESENTATION

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SECTION 1. LOCAL UNION REPRESENTATIVE

Each Local Union representing on-site employees shall be entitled to designate in writing (copy to Contractor involved and Construction Manager) one representative, and/or the Business Manager, who shall be afforded access to the Program Worksite during such time as bargaining unit work is occurring and subject to otherwise applicable policies pertaining to visitors to the site.

SECTION 2. STEWARDS

A. Each affiliated Union shall have the sole discretion to designate any journey person as a Steward and an alternate Steward. The Union shall notify the Owner and/or Construction Manager as well as the Contractor of the identity of the designated Steward (and alternate) prior to the assumption of such duties. Stewards shall not exercise supervisory functions and will receive the regular rate of pay for their craft classifications. All Stewards shall be working Stewards.

B. In addition to their work as an employee, the Steward shall have the right to receive complaints or grievances and to discuss and assist in their adjustment with the Contractor's appropriate supervisor. Each Steward shall be concerned with the employees of the Steward's trade and, if applicable, subcontractors of their Contractor, but not with the employees of any other trade Contractor. No Contractor shall discriminate against the Steward in the proper performance of Union duties.

C. The Stewards shall not have the right to determine when overtime shall be worked, or who shall work overtime except pursuant to a Schedule "A" CBA provision providing procedures for the equitable distribution of overtime.

SECTION 3. LAYOFF OF A STEWARD

Contractors agree to notify the appropriate Union 24 hours prior to the layoff of a Steward, except in cases of discipline or discharge for just cause. If a Steward is protected against layoff by

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a Schedule "A" provision, such provision shall be recognized to the extent the Steward possesses the necessary qualifications to perform the work required, except in cases of discipline or discharge for just cause. In any case in which a Steward is discharged or disciplined for just cause, the Local Union involved shall be notified immediately by the Contractor.

ARTICLE 6 - MANAGEMENT'S RIGHTS

SECTION 1. RESERVATION OF RIGHTS

Except as expressly limited by a specific provision of this Agreement, Contractors retain full and exclusive authority for the management of their operations including, but not limited to, the right to: direct the work force, including determination as to the number of employees to be hired and the qualifications therefore; the promotion, transfer, layoff of its employees; require compliance with the directives of the Agency including standard restrictions related to security and access to the site that are equally applicable to Agency employees, guests, or vendors; or the discipline or discharge for just cause of its employees; assign and schedule work; promulgate reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work; and, the requirement, timing and number of employees to be utilized for overtime work. No rules, customs, or practices which limit or restrict productivity or efficiency of the individual, as determined by the Contractor, Agency and/or Construction Manager and/or joint working efforts with other employees shall be permitted or observed.

SECTION 2. MATERIALS, METHODS & EQUIPMENT

There shall be no limitation or restriction upon the Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices. Contractors may, without

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restriction, install or use materials, supplies or equipment regardless of their source; provided, however, that where there is a Schedule "A" that includes a lawful union standards and practices clauses, then such clause as set forth in Schedule "A" agreements will be complied with, unless there is a lawful Agency specification (or specification issued by a Construction Manager which would be lawful if issued by the Agency directly) that would specifically limit or restrict the Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices, and which would prevent compliance with such Schedule "A" clause. The on-site installation or application of such items shall be performed by the craft having jurisdiction over such work; provided, however, it is recognized that other personnel having special qualifications may participate, in a supervisory capacity, in the installation, check-off or testing of specialized or unusual equipment or facilities as designated by the Contractor. There shall be no restrictions as to work which is performed off-site for Program Work.

ARTICLE 7 - WORK STOPPAGES AND LOCKOUTS

SECTION 1. NO STRIKES-NO LOCK OUT

There shall be no strikes, sympathy strikes, picketing, work stoppages, slowdowns, hand billing, demonstrations or other similar disruptive activity at the Program Work site for any reason by any Union or employee against any Contractor or employer. There shall be no other Union or concerted or employee activity which disrupts or interferes with the operation of the Program Work or the objectives of the Agency at any Program Work site. In addition, failure of any Union or employee to cross any picket line established by any Union, signatory or non-signatory to this Agreement, or the picket or demonstration line of any other organization, at or in proximity to a Program Work site where the failure to cross disrupts or interferes with the operation of Program

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Work is a violation of this Article. Should any employees breach this provision, the Unions will use their best efforts to try to immediately end that breach and return all employees to work. There shall be no lockout at a Program Work site by any signatory Contractor, Agency or Construction Manager.

SECTION 2. DISCHARGE FOR VIOLATION

A Contractor may discharge any employee violating Section 1, above, and any such employee will not be eligible thereafter for referral under this Agreement for a period of 100 days.

SECTION 3. NOTIFICATION

If a Contractor contends that any Union has violated this Article, it will notify the Local Union involved advising of such fact, with copies of the notification to the Council. The Local Union shall instruct and order, the Council shall request, and each shall otherwise use their best efforts to cause, the employees (and where necessary the Council shall use its best efforts to cause the Local Union), to immediately cease and desist from any violation of this Article. If the Council complies with these obligations, it shall not be liable for the unauthorized acts of a Local Union or its members. Similarly, a Local Union and its members will not be liable for any unauthorized acts of the Council. Failure of a Contractor or the Construction Manager to give any notification set forth in this Article shall not excuse any violation of Section 1 of this Article.

SECTION 4. EXPEDITED ARBITRATION

Any Contractor or Union alleging a violation of Section 1 of this Article may utilize the expedited procedure set forth below (in lieu of, or in addition to, any actions at law or equity that may be brought).

A. A party invoking this procedure shall notify J.J. Pierson or Richard Adelman; who shall alternate (beginning with Arbitrator J.J. Pierson) as Arbitrator under this expedited arbitration procedure. If the Arbitrator next on the list is not available to hear the matter

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within 24 hours of notice, the next Arbitrator on the list shall be called. Copies of such notification will be simultaneously sent to the alleged violator and Council.

B. The Arbitrator shall thereupon, after notice as to time and place to the Contractor, the Local Union involved, the Council and the Construction Manager, hold a hearing within 48 hours of receipt of the notice invoking the procedure if it is contended that the violation still exists. The hearing will not, however, be scheduled for less than 24 hours after the notice required by Section 3, above.

C. All notices pursuant to this Article may be provided by telephone, telegraph, hand delivery, or fax, confirmed by overnight delivery, to the Arbitrator, Contractor, Construction Manager and Local Union involved. The hearing may be held on any day including Saturdays or Sundays. The hearing shall be completed in one session, which shall not exceed 8 hours duration (no more than 4 hours being allowed to either side to present their case and conduct their cross examination) unless otherwise agreed. A failure of any Union or Contractor to attend the hearing shall not delay the hearing of evidence by those present or the issuance of an award by the Arbitrator.

D. The sole issue at the hearing shall be whether a violation of Section 1, above, occurred. If a violation is found to have occurred, the Arbitrator shall issue a Cease-and-Desist Award restraining such violation and serve copies on the Contractor and Union involved. The Arbitrator shall have no authority to consider any matter in justification, explanation or mitigation of such violation or to award damages (any damages issue is reserved solely for court proceedings, if any). The Award shall be issued in writing within 3 hours after the close of the hearing and may be issued without an Opinion. If any involved party desires an Opinion, one shall be issued within 15 calendar days, but its issuance shall not delay compliance with, or enforcement of, the Award.

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E. The Agency and Construction Manager (or such other designee of the Agency) may participate in full in all proceedings under this Article.

F. An Award issued under this procedure may be enforced by any court of competent jurisdiction upon the filing of this Agreement together with the Award. Notice of the filing of such enforcement proceedings shall be given to the Union or Contractor involved, and the Construction Manager.

G. Any rights created by statute or law governing arbitration proceedings which are inconsistent with the procedure set forth in this Article, or which interfere with compliance thereto, are hereby waived by the Contractors and Unions to whom they accrue.

H. The fees and expenses of the Arbitrator shall be equally divided between the involved Contractor and Union.

SECTION 5. ARBITRATION OF DISCHARGES FOR VIOLATION

Procedures contained in Article 9 shall not be applicable to any alleged violation of this Article, with the single exception that an employee discharged for violation of Section 1, above, may have recourse to the procedures of Article 9 to determine only if the employee did, in fact, violate the provisions of Section 1 of this Article; but not for the purpose of modifying the discipline imposed where a violation is found to have occurred.

ARTICLE 8 - LABOR MANAGEMENT COMMITTEE

SECTION 1. SUBJECTS

The Program Labor Management Committee (the "LMC") will meet on a regular basis to:

- 1) promote harmonious relations among the Contractors and Unions;
- 2) enhance safety awareness, cost effectiveness and productivity of construction operations;
- 3) protect the public interests;
- 4) discuss matters relating to staffing and scheduling with safety and productivity as considerations;

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and 5) review efforts to meet applicable participation goals for MWBEs and workforce participation goals for Program Hires, minority and female employees.

SECTION 2. COMPOSITION

The LMC shall be jointly chaired by a designee of the Agency and the President of the Council. It may include representatives of the Local Unions and Contractors involved in the issues being discussed. The parties shall mutually designate an MWBE representative to participate in appropriate Committee discussions. The Committee may conduct business through mutually agreed upon sub-committees.

ARTICLE 9 - GRIEVANCE & ARBITRATION PROCEDURE

SECTION 1. PROCEDURE FOR RESOLUTION OF GRIEVANCES

Any question, dispute or claim arising out of, or involving the interpretation or application of this Agreement (other than jurisdictional disputes or alleged violations of Article 7, Section 1) shall be considered a grievance and shall be resolved pursuant to the exclusive procedure of the steps described below, provided, in all cases, that the question, dispute or claim arose during the term of this Agreement. Grievances shall include the City contract number and the Program Work address; such information is posted at the work site if already commenced and is available in the City Record and Notice to Proceed for projects not already commenced.

Local Union grievances as to whether a scope of work is included or excluded from this Agreement shall be submitted to the LMC in the first instance rather than Step 1 below. To be timely, such notice must be given no later than five days prior to the bid opening date advertised in the City Record and bid documents for that contract, or any adjourned date publicly noticed if the grievance is challenging a determination by an Agency that the contract is not subject to this Agreement. Compliance with this limit shall operate as a statute of limitations and shall be a condition precedent to arbitration. For other grievances as to contractor and/or subcontractor scope

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of work issues, notice of such challenges shall be submitted to the LMC within 7 calendar days after the act, occurrence or event giving rise to the grievance. If the scope of work grievance is not resolved within 21 days of its submission to the LMC, then the grievance may proceed directly to Step 3 below.

Step 1:

(a) When any employee covered by this Agreement feels aggrieved by a claimed violation of this Agreement, the employee shall, through the Local Union business representative or job steward give notice of the claimed violation to the work site representative of the involved Contractor and the Construction Manager. To be timely, such notice of the grievance must be given within 7 calendar days after the act, occurrence or event giving rise to the grievance. The business representative of the Local Union or the job steward and the work site representative of the involved Contractor shall meet and endeavor to adjust the matter within 7 calendar days after timely notice has been given. If they fail to resolve the matter within the prescribed period, the grieving party, may, within 7 calendar days thereafter, pursue Step 2 of the grievance procedure by serving the involved Contractor with written copies of the grievance setting forth a description of the claimed violation, the date on which the grievance occurred, and the provisions of the Agreement alleged to have been violated. Grievances and disputes settled at Step 1 are non-precedential except as to the specific Local Union, employee and Contractor directly involved unless the settlement is accepted in writing by the Construction Manager (or designee) as creating a precedent.

(b) Should any signatory to this Agreement have a dispute (excepting jurisdictional disputes or alleged violations of Article 7, Section 1) with any other signatory to this Agreement and, if after conferring, a settlement is not reached within 7 calendar days, the dispute shall be

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reduced to writing and proceed to Step 2 in the same manner as outlined in subparagraph (a) for the adjustment of employee grievances.

Step 2:

A Step 2 grievance shall be filed with the Agency, the BCTC, the Contractor, and, if the grievance is against a subcontractor, the subcontractor. The Business Manager or designee of the involved Local Union, together with representatives of the involved Contractor and/or a contractor association representative where appropriate, Council, the Construction Manager (or designee), and, if the grievance is against a subcontractor, the subcontractor, shall meet in Step 2 within 7 calendar days of service of the written grievance to arrive at a satisfactory settlement. The BCTC shall schedule the Step 2 meeting.

Step 3:

(a) If the grievance shall have been submitted but not resolved in Step 2, any of the participating Step 2 entities may, within 21 calendar days after the initial Step 2 meeting, submit the grievance in writing (copies to other participants, including the Construction Manager or designee) to the BCTC. In the event the matter is not resolved at Step 2, either J.J. Pierson or Richard Adelman, who shall act, alternately (beginning with Arbitrator J.J. Pierson), as the Arbitrator under this procedure, shall be designated at the Step 2 hearing and the BCTC will notify the arbitrator of his designation. After such notification by the BCTC, the local demanding arbitration shall within a reasonable time request the arbitrator to schedule the matter for an arbitration hearing date. The Labor Arbitration Rules of the American Arbitration Association shall govern the conduct of the arbitration hearing, at which all Step 2 participants shall be parties. The decision of the Arbitrator shall be final and binding on the involved Contractor, Local Union and employees and the fees and expenses of such arbitrations shall be borne equally by the involved Contractor and Local Union.

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(b) Failure of the grieving party to adhere to the time limits set forth in this Article shall render the grievance null and void. These time limits may be extended only by written consent of the Construction Manager (or designee), involved Contractor and involved Local Union at the particular step where the extension is agreed upon. The Arbitrator shall have authority to make decisions only on the issues presented to him and shall not have the authority to change, add to, delete or modify any provision of this Agreement.

SECTION 2. LIMITATION AS TO RETROACTIVITY

No arbitration decision or award, with the exception of those related to compliance with requirements to pay prevailing wages and supplements in accordance with federal or State law, may provide retroactivity of any kind exceeding 60 calendar days prior to the date of service of the written grievance on the Construction Manager and the involved Contractor or Local Union.

SECTION 3. PARTICIPATION BY AGENCY AND/OR CONSTRUCTION MANAGER

The Agency and Construction Manager (or such other designee of the Agency) shall be notified by the involved Contractor of all actions at Steps 2 and 3 and, at its election, may participate in full in all proceedings at these Steps, including Step 3 arbitration.

ARTICLE 10 - JURISDICTIONAL DISPUTES

SECTION 1. NO DISRUPTIONS

There will be no strikes, sympathy strikes, work stoppages, slowdowns, picketing or other disruptive activity of any kind arising out of any jurisdictional dispute. Pending the resolution of the dispute, the work shall continue uninterrupted and as assigned by the Contractor. No jurisdictional dispute shall excuse a violation of Article 7.

SECTION 2. ASSIGNMENT

All Program Work assignments shall be made by the Contractor to unions affiliated with the BCTC consistent with the New York Plan for the Settlement of Jurisdictional Disputes ("New

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York Plan”) and its Greenbook decisions, if any. Where there are no applicable Greenbook decisions, assignments shall be made in accordance with the provisions of the New York Plan and local industry practice.

SECTION 3. NO INTERFERENCE WITH WORK

There shall be no interference or interruption of any kind with the Program Work while any jurisdictional dispute is being resolved. The work shall proceed as assigned by the Contractor until finally resolved under the applicable procedure of this Article. The award shall be confirmed in writing to the involved parties. There shall be no strike, work stoppage or interruption in protest of any such award.

ARTICLE 11 - WAGES AND BENEFITS

SECTION 1. CLASSIFICATION AND BASE HOURLY RATE

All employees covered by this Agreement shall be classified in accordance with the work performed and paid the hourly wage rates applicable for those classifications as required by the applicable prevailing wage laws.

SECTION 2. EMPLOYEE BENEFITS

A. The Contractors agree to pay on a timely basis contributions on behalf of all employees covered by this Agreement to those established jointly trustee employee benefit funds designated in the applicable CBA in Schedule “A” (in the appropriate Schedule “A” amounts), provided that such benefits are required to be paid on public works under any applicable prevailing wage law. Bona fide jointly trustee fringe benefit plans established or negotiated through collective bargaining during the life of this Agreement may be added if similarly required under applicable prevailing wage law. Contractors, not otherwise contractually bound to do so, shall not be required to contribute to benefits, trusts or plans of any kind which are not required by the prevailing wage law provided, however, that this provision does not relieve Contractors signatory

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to local collective bargaining agreement with any affiliated union from complying with the fringe benefit requirements for all funds contained in the CBA. Furthermore, employees that may remain unaffiliated with any local union at the completion of their employment under the terms of this Agreement may apply for any distributions to which they may be entitled from the funds in accordance with the applicable rules and governing documents of the unions and the employee benefit funds that they have participated in under the terms of this Agreement.

B. 1. Notwithstanding Section 2 (A) above, and subject to 2 (B)(2) below, Contractors who designate Core Employees pursuant to Article 4, Section 2 (B) and (C) that are not signatory to a Schedule “A” agreement and who maintain bona fide private benefit plans that satisfy the requirements of Section 220 of the New York State Labor Law, may satisfy the above benefit obligation with respect to those employees by providing those employees with coverage under their private benefit plans (to the extent consistent with Section 220). The total benefit payments to be made on behalf of each such employee must be equal to the total Section 220 supplement amount and any shortfall must be paid by cash supplement to the employee.

2. A contractor that will satisfy its Section 220 obligations in accordance with subsection 2(B)(1) above shall make available to the Agency at the time of contract award a complete set of plan documents for each non-Schedule “A” benefit plan into which contributions will be made and/or coverage provided pursuant to the provisions of Section 2(B)(1) above. The Contractor shall also provide certification from a certified public accountant as to the annualized hourly value of such benefits consistent with the requirements of Section 220.

3. The City shall verify that the alternate benefit plan(s), together with any cash supplement to the employee, is compliant with Section 220 prior to awarding the Contractor a contract covered by this Agreement. In the event the Contractor’s alternate benefit plan(s), together with any cash supplement to the employee, is determined to be compliant with Section

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220 and will be utilized by the Contractor on behalf of Article 4, Section 2(B) and (C) Core Employees, the Local Unions have no duty to enforce the Contractor's obligations on the alternate benefit plan(s) as they are not party to the alternate plan(s) or privy to the terms and conditions of the plan obligations. In the event the City determines the alternate benefit plan(s), together with any cash supplement to the employee, is not compliant with Section 220, the Contractor may, upon executing a Letter of Assent, satisfy its obligations for all employees, including Core Employees, by contributing to the Schedule "A" benefit plans in accordance with the terms of the Schedule "A" agreements.

C. The Contractors agree to be bound by the written terms of the legally established jointly trustee Trust Agreements specifying the detailed basis on which payments are to be paid into, and benefits paid out of, such Trust Funds but only with regard to Program Work done under this Agreement and only for those employees to whom this Agreement requires such benefit payments.

D. 1. To the extent consistent with New York City's Procurement Policy Board Rules with respect to prompt payment, as published at www.nyc.gov/ppb, §4-06(e), and in consideration of the unions' waiver of their rights to withhold labor from a contractor or subcontractor delinquent in the payment of fringe benefits contributions ("Delinquent Contractor"); the Agency agrees that where any such union and/or fringe benefit fund shall notify the Agency, the General Contractor, and the Delinquent Contractor in writing with back-up documentation that the Delinquent Contractor has failed to make fringe benefit contributions to it as provided herein and the Delinquent Contractor shall fail, within ten (10) calendar days after receipt of such notice, to furnish either proof of such payment or notice that the amount claimed by the union and/or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to

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the General Contractor that relates solely to the work performed by the Delinquent Contractor which the union or fringe benefit fund claims to be due it, and shall remit the amount when and so withheld to the fringe benefit fund and deduct such payment from the amounts then otherwise due and payable to the General Contractor, which payment shall, as between the General Contractor and the Agency, be deemed a payment by the Agency to the General Contractor; provided however, that in any month, such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. The union or its employee benefit funds shall include in its notification of delinquent payment of fringe benefits only such amount it asserts the Delinquent Contractor failed to pay on the specific project against which the claim is made and the union or its employee benefit funds may not include in such notification any amount such Delinquent Contractor may have failed to pay on any other City or non-City project.

2. In addition, where a union or employee benefit fund gives notice to the City that a Contractor is Delinquent as defined in subsection 2(D)(1) above and the City determines that the notice includes appropriate back-up documentation that the Contractor is delinquent, the City will promptly, but not later than twenty (20) days after receipt of the notice, provide a copy of said notice to City Agencies. In the event the City determines there is insufficient back-up documentation, it will notify the appropriate union and/or fringe benefit fund promptly, but not later than twenty (20) days after receipt of the Delinquency Notice, and shall include notice of what additional documentation is requested. Any determination by the City that there is insufficient back-up must be reasonable. This provision is intended to enhance compliance with the prevailing wage law and this Agreement with respect to the payment of fringe benefits and is not intended as a substitute for the resolution of a disputed claim pursuant to any applicable law or agreement.

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The City and the relevant Agency(s) will thereafter require the Delinquent Contractor to provide cancelled checks or other equivalent proof of payment of benefit contributions that have come due, to be submitted with certified payroll reports for all Program Work covered by this Agreement on which the Delinquent Contractor is engaged, for at least a one-year period or such earlier period if the Contractor is ultimately determined not to be a Delinquent Contractor. Such proof of payment when required is a condition of payment of the Delinquent Contractor's invoices by any entity, including, but not limited to, the City, the relevant Agency(s), Construction Manager, General Contractor, the prime or higher-level subcontractor, as is appropriate under the Delinquent Contractor's engagement. The union and the funds shall upon request receive copies of the certified payrolls, cancelled checks, or other proof of payment from the City and/or the relevant Agency(s).

E. In the event the General Contractor or Delinquent Contractor shall notify the Agency as above provided that the claim of the union or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor that the union and/or fringe benefit fund claims to be due it, pending resolution of the dispute pursuant to the union's Schedule "A" agreement, and the amount shall be paid to the party or parties ultimately determined to be entitled thereto, or held until the Delinquent Contractor and union or employee benefit fund shall otherwise agree as to the disposition thereof; provided however, that such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. In the event the Agency shall be required to withhold amounts from a General Contractor for the benefit of more than one fringe benefit fund, the amounts so withheld in the manner and amount prescribed above shall be applied to or for such fund in the order in

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which the written notices of nonpayment have been received by the Agency, and if more than one such notice was received on the same day, proportionately based upon the amount of the union and/or fringe benefit fund claims received on such day. Nothing herein contained shall prevent the Agency from commencing an interpleader action to determine entitlement to a disputed payment in accordance with section one thousand six of the civil practice law and rules or any successor provision thereto.

F. Payment to a fringe benefit fund under this provision shall not relieve the General Contractor or Delinquent Contractor from responsibility for the work covered by the payment. Except as otherwise provided, nothing contained herein shall create any obligation on the part of the Agency to pay any union or fringe benefit fund, nor shall anything provided herein serve to create any relationship in contract or otherwise, implied or expressed, between the union/fund and/or fringe benefit and the Agency.

ARTICLE 12 - HOURS OF WORK, PREMIUM PAYMENTS, SHIFTS AND HOLIDAYS **SECTION 1. WORK WEEK AND WORKDAY**

A. The standard work week shall consist of 40 hours of work at straight time rates, Monday through Friday, 8 hours per day, plus ½ hour unpaid lunch period. The standard work week may be reduced to 35 or 37 ½ hours of work at straight time rates, Monday to Friday, 7 or 7 ½ hours per day, plus ½ hour unpaid lunch period in those limited circumstances where the Agency states in the bid documents that the Contractor will not be given access to the site to accommodate an 8-hour day. The 8 hour, 7 ½ hour or 7-hour workday must be established at the commencement of the project and may not be altered by the Contractor.

B. In accordance with project needs, there shall be flexible start times with advance notice from Contractor to the Union. The Day Shift shall commence between the hours of 6:00 a.m. and 9:00 a.m. and shall end between the hours of 2:30 p.m. and 5:30 p.m., for an 8-hour day,

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and up to 7:30 p.m. for a 10-hour day. The Evening Shift shall commence between the hours of 3:00 p.m. and 6:00 p.m., unless different times are necessitated by the Agency's phasing plans on specific projects. The Night Shift shall commence between the hours of 11:00 p.m. and 2:00 a.m., unless different times are necessitated by the Agency's phasing plans on specific projects. Subject to the foregoing, starting and quitting times shall occur at the Program Work site designated by the Contractor.

C. Scheduling - Except as provided above, Monday through Friday is the standard work week; 8 hours of work plus ½ hour unpaid lunch. Notwithstanding any other provision of this Agreement, a Contractor may schedule a four-day work week, 10 hours per day ("4/10") at straight time rates, plus a ½ hour unpaid lunch, at the commencement of the job.

D. Notice - Contractors shall provide not less than 5 days prior notice to the Local Union involved as to the work week and work hour schedules to be worked or such lesser notice as may be mutually agreed upon.

SECTION 2. OVERTIME

Overtime shall be paid for any work (i) over an employee's regularly scheduled work day, i.e., work over eight (8) hours in a day where 5/8s is scheduled, work over ten (10) hours in a day where 4/10s is scheduled, or work over seven (7) or seven and one half (7½) hours where such hours are scheduled pursuant to Article 12, section 1(A) and (ii) over forty (40) hours in a week, or over thirty five (35) or thirty seven and one-half (37 ½) where such hours are scheduled pursuant to Article 12, section 1(A). Overtime shall be paid at time and one half (1½) Monday through Saturday. All overtime work performed on Sunday and Holidays will be paid pursuant to the applicable Schedule "A". There shall be no stacking or pyramiding of overtime pay under any circumstances. There will be no restriction upon the Contractor's scheduling of overtime or the nondiscriminatory designation of employees who shall be worked, including the use of employees,

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other than those who have worked the regular or scheduled work week, at straight time rates. The Contractor shall have the right to schedule work so as to minimize overtime or schedule overtime as to some, but not all, of the crafts and whether or not of a continuous nature.

SECTION 3. SHIFTS

A. Flexible Schedules - Scheduling of shift work, including Saturday and Sunday work, shall be within the discretion of the Contractor in order to meet Program Work schedules and existing Program Work conditions including the minimization of interference with the mission of the Agency. It is not necessary to work a day shift in order to schedule a second or third shift, or a second shift in order to schedule a third shift, or to schedule all of the crafts when only certain crafts or employees are needed. Shifts must have prior approval of the Agency or Construction Manager and must be scheduled with not less than five workdays' notice to the Local Union or such lesser notice as may be mutually agreed upon.

B. Second and/or Third Shifts - The second shift shall start between 3 p.m. and 6 p.m. and the third shift shall start between 10 p.m. and 2 a.m., subject to different times necessitated by the Agency phasing plans on specific projects. There shall be no reduction in shift hour work. With respect to second and third shift work there shall be a 5% shift premium, or the rate required by the applicable prevailing wage laws, whichever is less. No other premium or other payments for such work shall be required unless such work is in excess of the employee's regularly scheduled work week, i.e., forty (40) hours in the week or thirty-five (35) or thirty-seven and one half (37 ½) pursuant to Article 12, Section 1(A). All employees within the same classification performing Program Work will be paid at the same wage rate regardless of the shift or work, subject only to the foregoing provisions.

C. Flexible Starting Times - Shift starting times will be adjusted by the Contractor as necessary to fulfill Program Work requirements subject to the notice requirements of paragraph A.

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SECTION 4. HOLIDAYS

A. Schedule - There shall be nine (9) recognized holidays on the project:

New Year's Day

Martin Luther King Day President's Day

Memorial Day Veteran's Day

Labor Day Thanksgiving Day

Independence Day Christmas Day

All said holidays shall be observed on the calendar date except those holidays which occur on Saturday shall be observed on the previous Friday and those that occur on Sunday shall be observed on the following Monday.

B. Payment - Regular holiday pay, if any, for work performed on such a PLA recognized holiday shall be in accordance with the applicable Schedule "A" for work performed on a holiday, even where the PLA holiday differs from the CBA holidays.

C. Exclusivity - No holidays other than those listed in Section 4(A) above shall be recognized or observed.

SECTION 5. MAKE-UP DAYS

When severe weather, power failure, fire or natural disaster or other similar circumstances beyond the control of the Contractor prevent work from being performed on a regularly scheduled weekday, the Contractor may schedule a Saturday make-up day (or Friday make-up day in the case of a 4/10 schedule) and such time shall be scheduled and paid as if performed on a weekday. Any other Saturday work shall be paid at time and one-half (1½). The Contractor shall notify the Local Union on the missed day or as soon thereafter as practicable if such a make-up day is to be worked.

SECTION 6. REPORTING PAY

A. Employees who report to the work location pursuant to their regular schedule and who are not provided with work shall be paid two hours reporting pay at straight time rates. An employee whose work is terminated early by a Contractor due to severe weather, power failure, fire or natural disaster or for similar circumstances beyond the Contractor's control, shall receive pay only for such time as is actually worked. In other instances, in which an employee's work is terminated early (unless provided otherwise elsewhere in this Agreement), the employee shall be paid for their full shift. Contractors shall not be permitted to call, text or email or voicemail employees in advance of their regularly scheduled shift starting time to avoid reporting pay. Notwithstanding the above, in the event that the National Weather Service issues a weather advisory for the area in which the work location is situated, and the entire project is shut down as a result of the Weather Advisory, the Contractor shall be permitted to speak to employees no less than four (4) hours in advance of their shift starting time, unless the Local Union consents to a shorter notice in writing, to advise them not to report to work due to the National Weather Service advisory, and employees who are so notified shall not receive two (2) hours reporting pay if they report to the work location. The Contractor shall make every effort to notify each employee directly and confirm that notification has been received. Voice, text, and email messages left for employees without confirmation of delivery and receipt by employee do not constitute sufficient notice under this provision.

B. When an employee, who has completed their scheduled shift and left the Program Work site, is "called out" to perform special work of a casual, incidental or irregular nature, the employee shall receive overtime pay at the rate of time and one-half of the employee's straight time rate for hours actually worked.

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C. When an employee leaves the job or work location of their own volition or is discharged for cause or is not working as a result of the Contractor's invocation of Section 7 below, they shall be paid only for the actual time worked.

D. Except as specifically set forth in this Article there shall be no premiums, bonuses, hazardous duty, high time or other special premium payments or reduction in shift hours of any kind.

E. There shall be no pay for time not actually worked except as specifically set forth in this Article and except where an applicable Schedule "A" requires a full weeks' pay for forepersons.

SECTION 7. PAYMENT OF WAGES

A. Termination - Employees who are laid off or discharged for cause shall be paid in full for that which is due them at the time of termination. The Contractor shall also provide the employee with a written statement setting forth the date of lay off or discharge.

SECTION 8. EMERGENCY WORK SUSPENSION

A Contractor may, if considered necessary for the protection of life and/or safety of employees or others, suspend all or a portion of Program Work. In such instances, employees will be paid for actual time worked, except that when a Contractor requests that employees remain at the job site available for work, employees will be paid for that time at their hourly rate of pay.

SECTION 9. INJURY/DISABILITY

An employee who, after commencing work, suffers a work-related injury or disability while performing work duties, shall receive no less than a full day's pay in accordance with the employee's regularly scheduled workday under Article 12, Section (1)(A). Further, the employee shall be rehired at such time as able to return to duties provided there is still Program Work available for which the employee is qualified and able to perform.

SECTION 10. TIME KEEPING

A Contractor may utilize systems to check employees in and out. Each employee must check in and out and sign a daily sign-in sheet, or other attendance methodology approved in writing by the Agency. The Contractor will provide adequate facilities for checking in and out in an expeditious manner.

SECTION 11. MEAL PERIOD

A Contractor shall schedule an unpaid period of not more than 1/2-hour duration at the work location between the 3rd and 5th hour of the scheduled shift. A Contractor may, for efficiency of operation, establish a schedule which coordinates the meal periods of two or more crafts, or which provides for staggered lunch periods within a craft or trade. If an employee is required to work through the meal period, the employee shall be compensated in a manner established in the applicable Schedule "A".

SECTION 12. BREAK PERIODS

There will be no rest periods, organized coffee breaks or other non-working time established during working hours. Individual coffee containers will be permitted at the employee's work location. Where 4/10s are being worked there shall be a morning and an afternoon coffee break.

SECTION 13. MULTIPLE CONTRACTS AT SAME SITE

When a Contractor performs Program Work under more than one contract at the same site (e.g., a Wastewater Resource Recovery Facility), the Contractor may direct an employee to perform work at that site under more than one contract, including performing work under more than one contract during the same shift.

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ARTICLE 13 - APPRENTICES AND WORKFORCE DEVELOPMENT

SECTION 1. APPRENTICE RATIOS AND REFERRALS

A. Recognizing the need to maintain continuing supportive programs designed to develop adequate numbers of competent workers in the construction industry and to provide craft entry opportunities for minorities, women and economically disadvantaged non-minority males, Contractors will employ apprentices in their respective crafts to perform such work as is within their capabilities and which is customarily performed by the craft in which they are indentured. Contractors may utilize apprentices and such other appropriate classifications in the maximum ratio permitted by the New York State Department of Labor (“NYS DOL”) or the maximum allowed per trade. Apprentices and such other classifications as are appropriate shall be employed in a manner consistent with the provisions of the appropriate Schedule “A” agreement. The parties encourage, as an appropriate source of apprentice recruitment consistent with the rules and operations of the affiliated unions’ apprentice-programs, the use of the Edward J. Malloy Initiative for Construction Skills, Non-Traditional Employment for Women, New York Helmets to Hardhats, and Pathways to Apprenticeship (P2A). Should a Contractor request that apprentices be provided for Program Work, the referring Local Union shall comply with that request so long as it is consistent with the maximum ratios permitted by NYSDOL.

SECTION 2. WORKFORCE DEVELOPMENT

A. The parties to this Agreement recognize the mutual interest in increasing training and career opportunities for Program Hires. The parties are committed to (i) increasing opportunities for Program Hires in these zip codes in pre-apprenticeship and apprenticeship programs, and (ii) using the work opportunities provided by this Agreement to increase the career opportunities for qualified Program Hires, and (iii) to assure the continued availability of a skilled and qualified, readily available construction workforce for this program and future work. The

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parties agree to the Workforce Development Program set forth in Exhibit “D”.

B. Specifically, the parties have established an initiative entitled HireNYC Construction Careers, which is an initiative to advance career opportunities for Program Hires.

C. The HireNYC Construction Careers initiative will work with the Mayor’s Office of Workforce Development (“WKDEV”) and its Workforce Centers to recruit Program Hires interested in employment in the construction industry.

D. HireNYC Construction Careers intends to capitalize on the work opportunities presented by this Agreement to create a pathway to career opportunities in the construction workforce. To this end the HireNYC Construction Careers initiative includes a workforce goal of at least 30% of all hours worked under this Agreement, including by subcontractors pursuant to Article 3, Section 1(B)(12), to be worked by workers residing within the specified zip codes or NYCHA housing. In order to encourage recruitment of new workers, HireNYC Construction Careers has established a goal that at least 30% of all of those hours are to be worked by apprentices from those zip codes or NYCHA housing.

E. The Contractors and Unions agree to cooperate and participate in the implementation of HireNYC Construction Careers to assist Program Hires with educational and training opportunities related to access to pre-apprenticeship, apprenticeship, and project work as set forth in this Agreement.

F. Reporting Requirements:

- i. The Contractors shall report the residence zip code information on all certified payroll reports.
- ii. The Local Unions, their referral systems, the affiliated pre-apprentice programs, and Contractors shall cooperate with any protocol developed for monitoring the HireNYC Construction Careers initiative.

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iii. The Local Unions shall provide the WKDEV copies of the following reports when such reports are submitted to NYSDOL: *Apprentice Training Recruitment Notification and Minimum Qualifications (AT 505)*, *Apprentice Training Program Affirmative Action Plan (AT 603)*, *Apprenticeship Agreement (AT 401)*, or such alternate reporting system as the parties may negotiate during the term of this Agreement.

G. The City and BCTC agree that no less than annually, the LMC shall review the implementation of HireNYC Construction Careers, as well as Program Hire opportunities afforded as a result of the initiative. The City and BCTC will collaborate to develop monitoring protocol for the purpose of measuring the success of HireNYC Construction Careers. The City and BCTC may, on mutual consent, modify the goals, procedures and protocols, as necessary to afford continued opportunity to Program Hires.

H. To facilitate the commitments set forth in this Agreement, each Local Union shall designate a HireNYC Construction Careers lead representative to work in partnership with WKDEV to implement these workforce and apprenticeship provisions within the union and across City construction contracts.

ARTICLE 14 - SAFETY PROTECTION OF PERSON AND PROPERTY

SECTION 1. SAFETY REQUIREMENTS

Each Contractor will ensure that applicable OSHA and safety requirements are at all times maintained on the Program Work site and the employees and Unions agree to cooperate fully with these efforts to the extent consistent with their rights and obligations under the law. Employees will cooperate with employer safety policies and will perform their work at all times in a safe manner and protect themselves and the property of the Contractor and Agency from injury or harm, to the extent consistent with their rights and obligations under the law. Failure to do so will be

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grounds for discipline, including discharge. The Construction Manager and/or Contractor may adopt, and the Unions shall agree to, the Drug and Alcohol Testing Policy attached as Schedule “B”.

SECTION 2. CONTRACTOR RULES

Employees covered by this Agreement shall at all times be bound by the reasonable safety, security, and visitor rules as established by the Contractors and the Construction Manager for Program Work. Such rules will be published and posted in conspicuous places throughout the Program Work sites. Any site security and access policies established by the Construction Manager or General Contractor intended for specific application to the construction workforce for Program Work and that are not established pursuant to an Agency directive shall be implemented only after notice to the BCTC and its affiliates and an opportunity for negotiation and resolution by the Labor Management Committee.

SECTION 3. INSPECTIONS

The Contractors and Construction Manager retain the right to inspect incoming shipments of equipment, apparatus, machinery and construction materials of every kind.

ARTICLE 15 - TEMPORARY SERVICES

SECTION 1.

Temporary services, i.e. all temporary heat, climate control, water, power and light, shall only be required upon the determination of the Agency or Construction Manager, and when used shall be staffed and assigned to the appropriate trade(s) with jurisdiction. Temporary services shall be provided by the appropriate Contractors’ existing employees during working hours in which a shift is scheduled for employees of the Contractor. The Agency or Construction Manager may determine the need for temporary services requirements during non-working hours, and when used shall be staffed and assigned to the appropriate trades(s), and which may be limited to one person

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per applicable trade where practicable. There shall be no stacking of trades on temporary services, provided this does not constitute a waiver of primary trade jurisdiction. In the event a temporary system component is claimed by multiple trades, the matter shall be resolved through the New York Plan for Jurisdictional Disputes.

ARTICLE 16 - NO DISCRIMINATION

SECTION 1. COOPERATIVE EFFORTS

The Contractors and Unions agree that they will not discriminate against any employee or applicant for employment because of creed, race, color, religion, sex, sexual orientation, national origin, marital status, citizenship status, disability, gender identity, age or any other status provided by law, in any manner prohibited by law or regulation.

SECTION 2. LANGUAGE OF AGREEMENT

Any words signifying any gender shall be interpreted to mean any or all gender identities.

ARTICLE 17 - GENERAL TERMS

SECTION 1. PROJECT RULES

A. The Construction Manager and the Contractors shall establish such reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work. These rules will be explained at the pre-job conference and posted at the Program Work sites and may be amended thereafter as necessary. Notice of amendments will be provided to the appropriate Local Union. Failure of an employee to observe these rules and regulations shall be grounds for discipline, including discharge. The fact that no order was posted prohibiting a certain type of misconduct shall not be a defense to an employee disciplined or discharged for such misconduct when the action taken is for cause.

B. The parties adopt and incorporate the BCTC's Standards of Excellence as annexed hereto as Exhibit "B".

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SECTION 2. TOOLS OF THE TRADE

The welding/cutting torch and chain fall are tools of the trade having jurisdiction over the work performed. Employees using these tools shall perform any of the work of the trade. There shall be no restrictions on the emergency use of any tools or equipment by any qualified employee or on the use of any tools or equipment for the performance of work within the employee's jurisdiction.

SECTION 3. SUPERVISION

Employees shall work under the supervision of the craft foreperson or general foreperson.

SECTION 4. TRAVEL ALLOWANCES

There shall be no payments for travel expenses, travel time, subsistence allowance or other such reimbursements or special pay except as expressly set forth in this Agreement.

SECTION 5. FULL WORKDAY

Employees shall be at their work area at the starting time established by the Contractor, provided they are provided access to the work area. The signatories reaffirm their policy of a fair day's work for a fair day's wage.

SECTION 6. COOPERATION AND WAIVER

The Construction Manager, Contractors and the Unions will cooperate in seeking any NYSDOL, or any other government, approvals that may be needed for implementation of any terms of this Agreement. In addition, the Council, on their own behalf and on behalf of its participating affiliated Local Unions and their individual members, intend the provisions of this Agreement to control to the greatest extent permitted by law, notwithstanding contrary provisions of any applicable prevailing wage, or other, law and intend this Agreement to constitute a waiver of any such prevailing wage, or other, law to the greatest extent permissible only for work within the scope of this Agreement, including specifically, but not limited to those provisions relating to

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shift, night, and similar differentials and premiums. This Agreement does not, however, constitute a waiver or modification of the prevailing wage schedules applicable to work not covered by this Agreement.

ARTICLE 18 - SAVINGS AND SEPARABILITY

SECTION 1. THIS AGREEMENT

In the event that the application of any provision of this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or if such application may cause the loss of project funding or any New York State Labor Law exemption for all or any part of the Program Work, the provision or provisions involved (and/or its application to particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the remainder of the Agreement shall remain in full force and effect to the extent allowed by law (and to the extent no funding or exemption is lost), unless the part or parts so found to be in violation of law or to cause such loss are wholly inseparable from the remaining portions of the Agreement and/or are material to the purposes of the Agreement. In the event a court of competent jurisdiction finds any portion of the Agreement to trigger the foregoing, the parties will immediately enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the court determination and the intent of the parties hereto for contracts to be let in the future.

SECTION 2. THE BID SPECIFICATIONS

In the event that the Agency's (or Construction Manager's) bid specifications, or other action, requiring that a successful bidder (and subcontractor) become signatory to this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or may cause the loss of project funding or any New York State Labor Law exemption for all or any part of the Program Work, such requirement (and/or its application to particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and

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void, but where practicable the Agreement shall remain in full force and effect to the extent allowed by law and to the extent no funding or exemption is lost. In such event, the Agreement shall remain in effect for contracts already bid and awarded or in construction only where the Agency and Contractor voluntarily accepts the Agreement. The parties will enter into negotiations as to modifications to the Agreement to reflect the court or other action taken and the intent of the parties for contracts to be let in the future.

SECTION 3. NON-LIABILITY

In the event of an occurrence referenced in Section 1 or Section 2 of this Article, neither the Agency, the Construction Manager, any Contractor, nor any Union shall be liable, directly or indirectly, for any action taken, or not taken, to comply with any court order or injunction, other determination, or in order to maintain funding or a New York State Labor Law exemption for Program Work. Bid specifications will be issued in conformance with court orders then in effect and no retroactive payments or other action will be required if the original court determination is ultimately reversed.

SECTION 4. NON-WAIVER

Nothing in this Article shall be construed as waiving the prohibitions of Article 7 as to signatory Contractors and signatory Unions.

ARTICLE 19 - FUTURE CHANGES IN SCHEDULE "A" AREA CONTRACTS

SECTION 1. CHANGES TO AREA CONTRACTS

A. Schedule "A" to this Agreement shall continue in full force and effect until the Contractor and/or Union parties to the Area CBAs that are the basis for the Schedule "A" notify the Mayor's Office of Contract Services ("MOCS"), Agency and Construction Manager in writing by providing a copy of the updated CBA(s) incorporating the changes agreed to in that Area CBA which are applicable to work covered by this Agreement and their effective dates.

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B. It is agreed that any provisions negotiated into Schedule “A” CBAs will not apply to work under this Agreement if such provisions are less favorable to those uniformly required of contractors for construction work normally covered by those agreements; nor shall any provision be recognized or applied on Program Work if it may be construed to apply exclusively, or predominantly, to work covered by this Agreement.

C. Any disagreement between signatories to this Agreement over the incorporation into Schedule “A” of provisions agreed upon in the renegotiation of Area CBAs shall be resolved in accordance with the procedure set forth in Article 9 of this Agreement.

SECTION 2. LABOR DISPUTES DURING AREA CONTRACT NEGOTIATIONS

The Unions agree that there will be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity or other violations of Article 7 affecting the Program Work by any Local Union involved in the renegotiation of Area Local CBAs nor shall there be any lock-out on such Program Work affecting a Local Union during the course of such renegotiations.

ARTICLE 20 - WORKERS’ COMPENSATION ADR SECTION 1.

An Alternative Dispute Resolution (“ADR”) program may be negotiated and participation in the ADR program will be optional by trade.

ARTICLE 21 - HELMETS TO HARDHATS SECTION 1.

The Contractors and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Contractors and Unions agree to utilize the services of the New York City Helmets to Hardhats Program (“H2H”) to serve as a resource for preliminary orientation, assessment of

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construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

SECTION 2.

The Unions and Contractors agree to coordinate with H2H to create and maintain an integrated database of veterans interested in working on this project and of apprenticeship and employment opportunities for this project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

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IN WITNESS WHEREOF the parties have caused this Agreement to be executed and effective as
of the 26th day of April, 2021.

FOR BUILDING AND CONSTRUCTION TRADES COUNCIL
OF GREATER NEW YORK AND VICINITY

BY: Gary LaBarbera
Gary LaBarbera
President

FOR NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Vincent Sapienza
Vincent Sapienza
Commissioner

APPROVED AS TO FORM:

Steve Stein
ACTING CORPORATION COUNSEL
NEW YORK CITY

LIST OF SIGNATORY UNIONS
International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, AFL-CIO, Local Lodge No.5
Bricklayers and Allied Craftworkers, Local Union No. 1
Building Concrete & Excavating Laborers, Local Union No. 731
N.Y.C. and Vicinity District Council of Carpenters
Cement Masons, Local Union No. 780
Concrete Workers District Council No. 16
Asbestos, Lead & Hazardous Waste, Laborers Local Union No. 78
Construction & General Building Laborers Local Union No. 79
Derrickmen and Riggers Local Union No. 197
International Brotherhood of Electrical Workers, Local Union No. 3
International Union of Elevator Constructors, Local Union No. 1
Heat & Frost Insulators & Allied Workers, Local Union No. 12
Heat & Frost Insulators & Allied Workers, Local Union No. 12A
Pavers & Road Builders, Laborers Local Union No. 1010
New York State Iron Workers District Council
Structural Iron Workers, Local Union No. 40
Structural Iron Workers, Local Union No. 361
Mason Tenders District Council
Metallic Lathers & Reinforcing Ironworkers, Local No. 46
Ornamental Iron Workers, Local Union No. 580
Glaziers No. 1087, District Council 9
Painters, District Council No. 9
Metal Polishers, Local Union No. 8A-28A; District Council No. 9
Drywall Tapers Local Union No 1974, District Council 9
Bridge & Structural Steel Painters, Local Union No. 806, District Council 9
Operative Plasterers Local Union No. 262
UA Plumbers Local Union No. 1
Private Sanitation, Teamsters Local Union No. 813
Roofers & Waterproofers, Local Union No. 8
Sheet Metal Workers, Local Union No. 28
Sheet Metal Workers, Local Union No. 137
UA Steamfitters, Local Union No. 638
Teamsters, Local Union No. 282
Tile, Marble & Terrazzo, B.A.C. Local Union No. 7

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SCHEDULE "A" - CBAs

Union	Current Agreement w/
Architectural and Ornamental Iron Workers Local Union 580, AFL-CIO	Allied Building Metal Industries, Inc.
Building, Concrete, Excavating & Common Laborers Local 731	Independent
Building, Concrete, Excavating & Common Laborers Local 731	Members of the General Contractors Association of New York, Inc.
Bricklayers Local 1 of the International Union of Bricklayers and Allied Craftworkers	Independent
District Council No. 9, I.U.P.A.T Glaziers Local 1087	Window and Plate Glass Dealers Association
Drywall Tapers and Painters Local 1974, affiliated with International Union of Painters & Allied Trades and Drywall Taping Contractor's Association & Association of Wall-Ceiling & Carpentry Industries NY, Inc.	Independent
Enterprise Association of Steamfitters and Apprentices Local 638	Mechanical Contractors Association of NY, Inc.
Enterprise Association of Steamfitters and Apprentices Local 638	Independent
Elevator Constructors Local 1 of NY and NJ	ThyssenKrupp Elevator Corporation
Elevator Constructors Local 1 of NY and NJ	Independent
Highway Road and Street Laborers Local Union 1010 of the District Council of Pavers and Road Builders of the Laborers' International Union of North America AFL-CIO	Independent
Highway Road and Street Laborers Local Union 1010 of the District Council of Pavers and Road Builders of the Laborers' International Union of North America AFL-CIO	Member of the General Contractors Association of New York, Inc.
International Association of Heat and Frost Insulators and Allied Workers Local No. 12 of New York City	Independent
International Association of Heat and Frost Insulators and Allied Workers Local No. 12 of New York City	The Insulation Contractors Association of New York City, Inc.

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International Association of Heat and Frost Insulators and Allied Workers Local No. 12A of New York City	Independent
International Association of Heat and Frost Insulators and Allied Workers Local No. 12A of New York City	Environmental Contractors Association, Inc.
International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, AFL-CIO, Local Lodge No. 5	Boilermakers Association of Greater New York
Local Union No. 3 International Brotherhood of Electrical Workers, AFL-CIO	New York Electrical Contractors Association
International Brotherhood of Teamsters, Local 282, High Rise Contract	Building Contractors Association & Independents
Local 46 Metallic Lathers Union and Reinforcing Iron Workers of NY and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers	Cement League
Local 46 Metallic Lathers Union and Reinforcing Iron Workers of NY and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers	Independent
Local 8 Roofers, Waterproofers & Allied Workers	Roofing and Waterproofing Contractors Association of New York and Vicinity
Local Union 1 of the United Association of Journeymen and Apprentices of the Pipe Fitting Industry of the United States and Canada	Association of Contracting Plumbers of the City of New York
Local Union Number 40 & 361 of Bridge, Structural Ornamental and Reinforcing Iron Workers AFL-CIO	Independent
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Building Contractors Association
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Interior Demolition Contractors Association
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Independent
Mason Tenders DC & Laborers' International Union – Local 78 & 79	NYCDCA

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Mason Tenders DC & Laborers' International Union – Local 78 & 79	Environmental Contractors Association
Mason Tenders DC & Laborers' International Union – Local 78 & 79	ABMC
Operative Plasterers' and Cement Masons' International Association Local No. 262	Independent
Painters and Allied Trades AFL-CIO, District Council No. 9 (Painting and Protective Coatings CBA)	Independent
Painters and Allied Trades AFL-CIO, District Council No. 9 (Painting and Protective Coatings CBA)	The Association of Master Painters & Decorators of NY, Inc. and The Association of Wall, Ceiling & Carpentry Industries of NY, Inc. and The Window and Plate Glass Dealers Association
Sheet Metal Workers' International Association, Local 28	Sheet Metal & Air Conditioning Contractors Association of New York City, Inc.
Sheet Metal Workers' International Association, Local 137	The Greater New York Sign Association
Structural Steel and Bridge Painters Local 806, DC 9 International Union of Painters and Allied Trades, AFL-CIO	New York Structural Steel Painting Contractors Association
The Cement Masons' Union, Local 780	Cement League
The District Council of Cement and Concrete Workers (comprised of Local 6A; Local 18A and Local 20)	Cement League
The District Council of Cement and Concrete Workers (comprised of Local 6A; Local 18A and Local 20)	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Heavy Carpenters	GCA
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Dockbuilders Local No. 1556	Concrete Contractors of NY
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Dockbuilders Local 1556	Independent

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The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Millwright Local 740	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Timbermen Local 1556	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Timbermen Local 1556	GCA
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Heavy Carpenters	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Manufacturing Woodworkers Association of Greater New York Incorporated
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Hoisting Trade Association of New York, Inc.
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Test Boring Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	Building Contractors Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Association of Wall-Ceiling & Carpentry Industries of New York, Incorporated
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners	The Cement League
The District Council of NYC and Vicinity of the United Brotherhood of Carpenters and Joiners of America	New York City Millwright Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners	Greater New York Floor Covering Association

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The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Association of Architectural Metal & Glass
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Concrete Contractors of NY
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Building Construction Carpenters	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Local 2287	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Shop Carpenters	Independent
The Tile Setters and Tile Finishers Union of New York and New Jersey, Local 7 of the International Bricklayers and Allied Craftworkers	The Greater New York and New Jersey Contractors Association
United Derrickmen & Riggers Association, Local 197 of NY, LI, Westchester & Vicinity	Contracting Stonesetters Association Inc.
United Derrickmen & Riggers Association Local 197 of NY, LI, Westchester and Vicinity	Building Stone and Pre-cast Contractors Association

2021 DEP RENOVATION PROJECT LABOR AGREEMENT

Exhibit A - Project Labor Agreement - Letter of Assent

Dear: _____

The undersigned party confirms that it agrees to be a party to and be bound by the New York Agency, Project Labor Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms. The terms of the Project Labor Agreement, its Schedules, Addenda and Exhibits are hereby incorporated by reference herein.

The undersigned, as a Contractor or Subcontractor (hereinafter Contractor) on the Project known as the 2021 Department of Environmental Protection Project Labor Agreement and located at _____ (hereinafter PROJECT), for and in consideration of the award to it of a contract to perform work on said PROJECT, and in further consideration of the mutual promises made in the Project Labor Agreement, a copy of which was received and is acknowledged, hereby:

- (1) Accepts and agrees to be bound by the terms and conditions of the Agreement, together with any and all schedules; amendments and supplements now existing or which are later made thereto:
- (2) Agrees to be bound by the legally established collective bargaining agreements; local trust agreements for employee benefit funds; and trust documents for joint apprentice programs as well as apprentice program rules and procedures but only to the extent of Program Work and as required by the PLA.
- (3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor but only to the extent of Program Work as required by the PLA.
- (4) Certifies that it has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of said Agreement. The Contractor agrees to employ labor that can work in harmony with all other labor on the Project and shall require labor harmony from every lower tier subcontractor it has engaged or may engage to work on the Project. Labor harmony disputes/issues shall be subject to the Labor Management Committee provisions.
- (5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a Subcontractor (of any tier), to it, a duly executed Agreement to be Bound in from identical to this document.

Provide description of the Work, identify craft jurisdiction(s) and all contract numbers below:

Local Union: _____

Description of Work: _____

Contract Number(s): _____

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Dated: _____

(Name of Contractor or subcontractor)

(Name of CM; GC; Contractor or
Higher Level Subcontractor)

(Authorized Officer & Title)

(Address)

(Signature)

(Phone) (Fax)

Contractor's State License

Sworn to before me this
____ day of _____,

Notary Public

**Exhibit B - NEW YORK CITY BUILDING AND CONSTRUCTION TRADES COUNCIL
STANDARDS OF EXCELLENCE**

The purpose of this Standard of Excellence is to reinforce the pride of every construction worker and the commitment to be the most skilled, most productive and safest workforce available to construction employers and users in the City of New York. It is the commitment of every affiliated local union to use our training and skills to produce the highest quality work and to exercise safe and productive work practices.

The rank-and-file members represented by the affiliated local unions acknowledge and adopt the following standards:

- *Provide a full day's work for a full days pay;*
- *Safely work towards the timely completion of the job;*
- *Arrive to work on time and work until the contractual quitting time;*
- *Adhere to contractual lunch and break times;*
- *Promote a drug and alcohol free work site;*
- *Work in accordance with all applicable safety rules and procedures;*
- *Allow union representatives to handle job site disputes and grievances without resort to slowdowns, or unlawful job disruptions;*
- *Respect management directives that are safe, reasonable and legitimate;*
- *Respect the rights of co-workers;*
- *Respect the property rights of the owner, management and contractors.*

The Unions affiliated with the New York City Building and Construction Trades Council will expect the signatory contractors to safely and efficiently manage their jobs and the unions see this as a corresponding obligation of the contractors under this Standard of Excellence. The affiliated unions will expect the following from its signatory contractors:

- *Management adherence to the collective bargaining agreements;*
- *Communication and cooperation with the trade foremen and stewards;*
- *Efficient, safe and sanitary management of the job site;*
- *Efficient job scheduling to mitigate and minimize unproductive time;*
- *Efficient and adequate staffing by properly trained employees by trade;*
- *Efficient delivery schedules and availability of equipment and tools to ensure efficient job progress;*
- *Ensure proper blueprints, specifications and layout instructions and material are available in a timely manner*
- *Promote job site dispute resolution and leadership skills to mitigate such disputes;*
- *Treatment of all employees in a respectful and dignified manner acknowledging their contributions to a successful project.*

The affiliated unions and their signatory contractors shall ensure that both the rank and file members and the management staff shall be properly trained in the obligations undertaken in the Standard of Excellence.

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Exhibit “C” - HireNYC Construction Careers Zip Code List

(August 2020 version)
 Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate
 (Zip codes within ~100 mile radius of NYC)

Zip Code	Borough	Neighborhood
10001	Manhattan	Midtown South
10002	Manhattan	Chinatown
10009	Manhattan	East Village
10025	Manhattan	Manhattan Valley
10026	Manhattan	Central Harlem
10027	Manhattan	Manhattanville
10029	Manhattan	East Harlem
10030	Manhattan	Central Harlem
10031	Manhattan	Hamilton Heights
10032	Manhattan	Inwood and Washington Heights
10033	Manhattan	Washington Heights
10034	Manhattan	Inwood
10035	Manhattan	East Harlem
10037	Manhattan	Central Harlem
10038	Manhattan	Lower Manhattan
10039	Manhattan	Central Harlem
10040	Manhattan	Inwood and Washington Heights
10301	Staten Island	St. George
10302	Staten Island	Port Richmond
10303	Staten Island	Mariner's Harbor
10304	Staten Island	Stapleton
10310	Staten Island	West Brighton
10451	Bronx	Concourse Village
10452	Bronx	High Bridge
10453	Bronx	University Heights
10454	Bronx	Mott Haven
10455	Bronx	Longwood
10456	Bronx	Melrose
10457	Bronx	Central Bronx
10458	Bronx	Bedford Park
10459	Bronx	Morrisania
10460	Bronx	East Tremont
10462	Bronx	Parkchester
10463	Bronx	Kingsbridge
10466	Bronx	Wakefield
10467	Bronx	Norwood
10468	Bronx	Bronx Park and Fordham
10472	Bronx	Unionport
10473	Bronx	Soundview
10474	Bronx	Hunts Point

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PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate

(Zip codes within ~100 mile radius of NYC)

Zip Code	Borough	Neighborhood
11101	Queens	Long Island City
11102	Queens	Northwest Queens
11106	Queens	Ravenswood
11203	Brooklyn	East Flatbush
11204	Brooklyn	Borough Park
11205	Brooklyn	Fort Greene
11206	Brooklyn	East Williamsburg
11207	Brooklyn	East New York
11208	Brooklyn	East New York / Cypress Hills
11211	Brooklyn	Williamsburg
11212	Brooklyn	Brownsville
11213	Brooklyn	Crown Heights
11214	Brooklyn	Bensonhurst
11216	Brooklyn	Central Brooklyn
11218	Brooklyn	Kensington
11219	Brooklyn	Borough Park
11220	Brooklyn	Sunset Park
11221	Brooklyn	Bushwick
11223	Brooklyn	Gravesend
11224	Brooklyn	Coney Island
11225	Brooklyn	Prospect Lefferts Gardens
11226	Brooklyn	Prospect Park South
11230	Brooklyn	Midwood
11232	Brooklyn	Sunset Park
11233	Brooklyn	Ocean Hill
11235	Brooklyn	Brighton Beach
11237	Brooklyn	Bushwick and Williamsburg
11239	Brooklyn	Starrett City
11354	Queens	Downtown Flushing
11355	Queens	Queensboro Hill
11368	Queens	South Corona
11369	Queens	East Elmhurst
11373	Queens	Elmhurst
11416	Queens	Southwest Queens
11417	Queens	Ozone Park
11418	Queens	Richmond Hill
11430	Queens	Ozone Park
11432	Queens	Jamaica Center
11433	Queens	South Jamaica
11435	Queens	Briarwood
11691	Queens	Far Rockaway
11692	Queens	Arverne

Data Source: 2013-2017 American Community Survey 5-year estimates

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PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate
(Zip codes within 100 mile radius of NYC)

Zip Code	State	City or Town
06401	CT	Ansonia
06510	CT	New Haven
06511	CT	New Haven
06513	CT	New Haven
06515	CT	New Haven
06519	CT	New Haven
06604	CT	Bridgeport
06605	CT	Bridgeport
06607	CT	Bridgeport
06608	CT	Bridgeport
06610	CT	Bridgeport
06702	CT	Waterbury
06704	CT	Waterbury
06705	CT	Waterbury
06706	CT	Waterbury
06708	CT	Waterbury
06710	CT	Waterbury
06810	CT	Danbury
07002	NJ	Bayonne
07017	NJ	East Orange
07018	NJ	East Orange
07022	NJ	Fairview
07026	NJ	Garfield
07029	NJ	Harrison
07047	NJ	North Bergen
07050	NJ	Orange
07055	NJ	Passaic
07060	NJ	Plainfield
07062	NJ	Plainfield
07087	NJ	Union City
07093	NJ	West New York
07102	NJ	Newark
07103	NJ	Newark
07104	NJ	Newark
07105	NJ	Newark
07106	NJ	Newark
07107	NJ	Newark
07108	NJ	Newark
07111	NJ	Irvington
07112	NJ	Newark
07114	NJ	Newark
07201	NJ	Elizabeth
07202	NJ	Elizabeth
07206	NJ	Elizabethport
07208	NJ	Elizabeth
07304	NJ	Jersey City
07305	NJ	Jersey City
07306	NJ	Jersey City
07307	NJ	Jersey City
07310	NJ	Jersey City

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PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate

(Zip codes within ~100 mile radius of NYC)

Zip Code	State	City or Town
07501	NJ	Paterson
07502	NJ	Paterson
07503	NJ	Paterson
07504	NJ	Paterson
07505	NJ	Paterson
07513	NJ	Paterson
07514	NJ	Paterson
07522	NJ	Paterson
07524	NJ	Paterson
07608	NJ	Teterboro
07703	NJ	Fort Monmouth
07712	NJ	Asbury Park
07727	NJ	Farmingdale
07734	NJ	Keansburg
07740	NJ	Long Branch
07820	NJ	Allamuchy
07939	NJ	Lyons
08031	NJ	Bellmawr
08045	NJ	Lawnside
08095	NJ	Winslow
08102	NJ	Camden
08103	NJ	Camden
08104	NJ	Camden
08105	NJ	Camden
08110	NJ	Pennsauken
08217	NJ	Elwood
08224	NJ	New Gretna
08608	NJ	Trenton
08609	NJ	Trenton
08611	NJ	Trenton
08618	NJ	Trenton
08638	NJ	Trenton
08701	NJ	Lakewood
08751	NJ	Seaside Heights
08808	NJ	Broadway
08861	NJ	Perth Amboy
08901	NJ	New Brunswick
10545	NY	Maryknoll
10550	NY	Mount Vernon
10601	NY	White Plains
10701	NY	Yonkers
10703	NY	Yonkers
10705	NY	Yonkers
10801	NY	New Rochelle
10927	NY	Haverstraw
10932	NY	Howells
10940	NY	Middletown
10950	NY	Monroe
10952	NY	Monsey
10963	NY	Otisville
10977	NY	Spring Valley

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PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate
(Zip codes within ~100 mile radius of NYC)

Zip Code	State	City or Town
11096	NY	Inwood
11550	NY	Hempstead
11556	NY	Uniondale
11713	NY	Bellport
11798	NY	Wyandanch
11951	NY	Mastic Beach
11970	NY	South Jamesport
12401	NY	Kingston
12416	NY	Chichester
12419	NY	Cottkill
12427	NY	Elka Park
12428	NY	Ellenville
12432	NY	Glasco
12457	NY	Mount Tremper
12475	NY	Ruby
12489	NY	Wawarsing
12490	NY	West Camp
12491	NY	West Hurley
12516	NY	Copake
12550	NY	Newburgh
12561	NY	New Paltz
12583	NY	Tivoli
12589	NY	Walkkill
12594	NY	Wingdale
12601	NY	Poughkeepsie
12701	NY	Monticello
12725	NY	Claryville
12729	NY	Cuddebackville
12732	NY	Eldred
12733	NY	Fallsburg
12743	NY	Highland Lake
12747	NY	Hurleyville
12749	NY	Kauneonga Lake
12751	NY	Kiamesha Lake
12754	NY	Liberty
12758	NY	Livingston Manor
12759	NY	Loch Sheldrake
12762	NY	Mongaup Valley
12763	NY	Mountain Dale
12779	NY	South Fallsburg
12780	NY	Sparrow Bush
19007	PA	Bristol
19123	PA	Philadelphia
19125	PA	Philadelphia
19134	PA	Philadelphia
19135	PA	Philadelphia
19136	PA	Philadelphia
19137	PA	Philadelphia

Data Source: 2013-2017 American Community Survey 5-year estimates

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EXHIBIT "D" - MEMORANDUM OF UNDERSTANDING

MEMORANDUM OF UNDERSTANDING, entered into as of _____, between the City of New York ("City") with an office located at City Hall, New York, NY 10007, the Building and Construction Trades Council of Greater New York and Vicinity ("BCTC"), on its behalf and on behalf of its affiliated unions, with its principal place of business located at 350 West 31st Street, New York, NY 10001, and the Building Trade Employers' Association of New York City ("BTEA"), on its behalf and on behalf of its affiliated contractors, with its principal place of business located at 1325 Avenue of the Americas, New York, NY 10019.

WHEREAS, since 2009, the City, the BCTC, and the BTEA have entered into Memoranda of Understanding (each an "MOU"), contemporaneous to the City entering to Project Labor Agreements with the BCTC (each a "PLA"), setting goals on new apprenticeship opportunities for graduates of direct entry pre-apprenticeship programs for low-income New Yorkers, minorities, high school students, women, veterans, NYCHA residents, and qualified employees of Minority- and Women-Owned Business Enterprises ("M/WBEs") that become signatory to the union, and have provided increased opportunities for New Yorkers to have access to good union construction careers;

WHEREAS, in 2014, the City and the BCTC entered into an MOU related to the New York City Build It Back Program and committed to encourage contractors and subcontractors to employ Sandy-impacted residents and for the City and the BCTC to work together with community-based organizations to recruit and train New York City residents, with an emphasis on Sandy-impacted low income residents;

WHEREAS, the BCTC and the BTEA committed to: (i) promote the representation of veterans, women, high school graduates of the City's public schools, and New Yorkers in need of economic opportunity in apprenticeship programs jointly sponsored by BCTC unions and BTEA contractors, and (ii) improve workforce training and development for entrance into the construction industry;

WHEREAS, in 2014, the City of New York issued *Career Pathways: One City Working Together*, with a commitment to maximize local job opportunities through the City's contracts, and as such the City is committed to ensuring that low-income New Yorkers have access to the good jobs and careers that are created through the City's capital investments and through this MOU and contemporaneous PLA, the City the BCTC, and with the cooperation of the BTEA contractors can connect low-income New Yorkers to good prevailing wage construction careers;

WHEREAS, through this MOU and contemporaneous PLAs, the City, the BCTC, and the BTEA commit to recruiting in low-income communities, providing opportunities through pre-apprenticeship and apprenticeship programs for access to construction careers, and ensuring residents of low-income communities, including apprentices, are provided opportunities to work on publicly-funded and -assisted construction projects;

WHEREAS, pursuant to Local Law 1 of 2013, the City is also committed to its M/WBE program, and in partnership with the M/WBE Leadership Association seeks to encourage eligible companies to certify as M/WBEs, and provides a wide range of training and technical assistance to build the capacity of its certified companies to bid successfully for the City's contracts and subcontracts;

WHEREAS, an important element in the success of pre-apprenticeship and apprenticeship

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programs, as well as in creating work opportunities for contractors and sub-contractors in New York City, is the availability of work on publicly funded and assisted projects; and

WHEREAS, the parties to this MOU desire to publicly state their intentions with respect to apprenticeship programs and the creation of contracting and other economic opportunities in the construction industry.

NOW, THEREFORE, the City, the BCTC, and the BTEA state as follows:

1. Scope. This MOU:

a. States the intentions of the City, the BCTC, and the BTEA regarding:

- a. the provision of opportunities in apprenticeship programs jointly sponsored by BCTC unions and BTEA contractors;
- b. the City's application of apprenticeship requirements in City construction contracts from the time of execution through December 31, 2024;
- c. the joint goal of the City, the BCTC, and the BTEA to create employment opportunities, including apprenticeships, in the construction industry; and

b. Shall terminate on December 31, 2024

2. To facilitate the commitments set forth in this MOU, each Local Union shall designate a HireNYC Construction Careers lead representative to work in partnership with the Mayor's Office of Workforce Development ("WKDEV") to implement these workforce and apprenticeship provisions within the union and across City construction contracts.

3. The BCTC and the BTEA shall work collaboratively with the City to reserve at least 500 new apprenticeship positions each calendar year through both the general recruitment and direct entry programs for New York City residents living in zip codes where at least 15% of the individuals in such zip code are below the federal poverty rate and NYCHA residents regardless of zip code.

4. The BCTC and BTEA shall work collaboratively with the City to reserve new apprenticeship positions each year for direct entry.

- a.** New York State Department of Labor ("NYSDOL") approved Direct Entry programs may be used by sponsors of Registered Apprenticeship programs as another way to bring apprentices into their programs. It is a tool to help sponsors reach underrepresented populations. Direct Entry provides individuals who successfully complete an apprenticeship preparation program, and who meet the minimum requirements for a NYS Registered Apprenticeship program, with the direct opportunity for an interview with the sponsor of a program bypassing the general recruitment scheduled for the Apprentice Programs.

5. Apprenticeship programs jointly sponsored by Local Unions and employers affiliated with the BTEA shall, subject to approval by the NYSDOL and to the extent consistent with applicable consent decrees, court orders or similar mandates, reserve up to the following percentages of

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their new apprenticeships (some apprentices may be counted in more than one category) for direct entry each year:

- a. 20% for graduates of New York City public high school who have completed pre-apprenticeship training provided by The Edward J. Malloy Initiative for Construction Skills ("C-SKILLS");
 - b. 10% for veterans of the U.S. Armed Forces who are referred by New York City Helmets to Hardhats ("NYC H2H"), provided, however, that any veterans whose qualifications allow them to enter unions as journeypersons shall be counted toward the fulfillment of this percentage;
 - c. 15% for women who have completed pre-apprenticeship training provided by Nontraditional Employment for Women ("NEW");
 - d. 10% for NYCHA and Section 8 residents who have completed pre-apprenticeship training provided by C-SKILLS, NEW, the NYCHA Resident Training Academy ("NRTA"), or Pathways to Apprenticeships ("P2A");
 - e. 10% for justice-involved individuals who have completed pre-apprenticeship training provided by C-SKILLS, NEW, NRTA, or P2A; and
 - f. 5% for qualified employees of certified minority- and women-owned business enterprises and other employers not signatory to collective bargaining agreements of unions affiliated with the BCTC which become signatory to such collective bargaining agreements, provided, however, that any such employees whose qualifications allow them to enter unions as journeypersons shall be counted toward the fulfillment of this percentage.
6. To help reach the goals set forth in paragraph 3, 4, and 5, the City, the BCTC and the BTEA will work cooperatively to identify and pursue appropriate sources of public and private funds and resources, as needed, to provide pre-apprenticeship training scaled to support the goals targeting at least seven hundred (700) pre-apprenticeship positions cumulatively for all above named direct entry programs each year. The City will help coordinate recruitment within the zip codes and target populations identified in paragraphs 3, 4 and 5.
 7. The goals in Paragraphs 3, 4, and 5 are aggregate goals for apprenticeship programs jointly sponsored by the Local Unions and BTEA contractors to achieve on an annual basis through their general recruitments and direct entry programs. The City recognizes that different apprenticeship programs face different circumstances and have varying capacities to meet the percentages set forth in each category; notwithstanding that, the BCTC and the BTEA agree to encourage and support meeting the goals in Paragraphs 3, 4, and 5, and to work with apprenticeship programs jointly sponsored by their affiliated unions and contractors to take affirmative steps to achieve that goal.
 8. The City, BCTC, and BTEA acknowledge that on federally funded projects NYCHA, and the City on certain federally funded projects, must comply with Executive Order 11246

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and federal regulations contained at 24 CFR Part 135 ("Section 3") regarding efforts to employ residents of NYCHA developments and other Section 3 populations.

9. The City, the BCTC, and the BTEA will jointly seek any necessary waivers from NYSDOL with respect to direct entry goals for the joint apprentice programs, as well as jointly support and encourage 100% participation of all affiliated joint apprentice programs.
10. Reporting.
 - a. Each Local Union shall provide, or cause to be provided by their Apprentice Directors, copies of the following reports to WKDEV within thirty (30) days of the submission to NYSDOL:
 - i. *Apprentice Training Recruitment Notification and Minimum Qualifications (AT 505)* submissions to NYSDOL;
 - ii. *Apprentice Training Program Affirmative Action Plan (AT 603)* submissions to NYSDOL; and
 - iii. *Apprenticeship Agreement (AT 401)* submissions to NYSDOL.
 - b. Pre-apprenticeship programs funded in part by the City will provide quarterly reports, beginning at the end of the first quarter after the first class is held, to the WKDEV with detailed information as required by NYC's Workforce Common Metrics reporting for all individuals trained in all classes.
 - c. On an annual basis, beginning on January 1, 2021, the City shall provide an electronic report to the BCTC that contains a list of contracts registered in the previous full fiscal year that were subject to either a City Project Labor Agreement or the Apprenticeship Directive. Such list shall contain the following for each contract:
 - i. contracting agency
 - ii. contract name;
 - iii. prime contractor name;
 - iv. registered dollar amount; and
 - v. date of registration.
 - d. Upon mutual agreement, the parties may modify these reporting requirements, as needed.

11. **City of New York Apprenticeship Directive.** As a means of expanding the pool of work available to apprentices and graduates of state-approved apprenticeship programs providing opportunities to the groups of individuals designated in Paragraphs 3 and 5 above, the City states its intention to implement, as may be amended from time to time, the Directive, attached as Exhibit A. The Directive directs City agencies, for construction contracts where either (i) the cost estimate of the contract exceeds \$3 million, or (ii) the cost estimate of the contract exceeds \$2 million on a project with a cost estimate of at least \$5 million, and for such other contracts as the bidding agency determines to be appropriate, to require the contractor and any of its subcontractors with subcontracts worth at least \$2 million to have apprenticeship agreements appropriate for the type and scope of work to be performed that have been registered with, and approved by, the New York State

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Commissioner of Labor, and shall have passed any required probationary period and recertification established by the New York State DOL.

12. The City shall include a statement concerning the applicability of the Directive in every City Record notice of the solicitation or award of a contract for a public works project. Within five (5) days of the issuance of any waiver from the apprenticeship requirement, the City shall notify the BCTC and the BTEA, in writing or electronically, of the granting of such waiver and the reasons therefore.

13. The City, the BCTC, and the BTEA look forward to working together and with the contractor community in a spirit of cooperation and good will toward the goal that all New Yorkers from diverse backgrounds, particularly minorities, women, returning veterans, recent public high school graduates, NYCHA residents, individuals in need of economic opportunity, and justice-involved individuals, are well-prepared for participation in the workforce and can gain access to good careers in the construction industry, in both the private and public sectors.

For the City of New York

By: _____
First Deputy Mayor, Dean Fuleihan

For Building and Construction Trades Council of Greater New York and Vicinity

By: _____
Gary LaBarbera, President

For Building Trades Employers' Association of New York City

By: _____
Louis J. Coletti, President & CEO

EXHIBIT “E” – Centrifuge Division of Labor Document

Division of Labor DEP Centrifuge Contract

BLACK= Union Millwright

RED= Centrifuge Technicians

I. Scheduled Preventative Maintenance of The Centrifuge System

1. Preliminary centrifuge monitoring, operation and readings before scheduled PM

1. As part of the centrifuge system evaluation to produce a PM report and while still in operation, take vibration, temperature readings, monitor torque and back-drive conditions prior to shutdown of the centrifuge system. In addition, evaluate the operation and condition of the pneumatic knife gate and cake cross conveyor. Queries are made with plant operations and maintenance staff asking for a history with operation of the system, mechanical, electrical and issues of the centrifuge system in general.
- ii. If necessary, based on the results of monitoring differential while process sludge, a pressure test is performed on the Rexroth hydraulic pump and or the Rotodiff hydraulic motor to determine if there are internal mechanical issues that require replacement of said components

2. Remove and prepare rotating assembly for yearly maintenance

1. Shut down centrifuge system and coordinate with the owner for lock out tag out of system
11. Remove belt guards and frame case top
- iii. Remove hoses, drive belts and disconnect RTD wiring associated with the rotating assembly Remove the Rotodiff (hydraulic motor)
- 1v. Remove the rotating assembly from the base using overhead crane

3. Disassembly/Assembly of the rotating assembly:

- i. Remove the liquid headwall
- ii. Remove the scroll
- iii. Mechanical de-scaling of rotating assembly rotor, headwall and scroll with a needle gun.
- iv. Inspect all components. Check critical dimensions with instruments and verify to print key components or components that appear worn and or damaged.
- v. Inspect internal bowl strips that run the length of the bowl. Change bushings wear liners & wear shoes. If necessary, remove the bowl strip

welds with a grinder and weld new strips. Weld minor repairs on scroll when necessary. If necessary, repair the hard-face protection on the conveyor blades with addition of hard surface. Clean return tubes on the conveyor .

- vi. Replace o-rings, seals and scroll bearings. Bearings are installed using factory procedure that specifies heat tolerances for bearing inner race and proper placement of bearing race on fit surfaces.
- vii. Prime paint bare steel components
- viii. Assemble and check stack-up dimension of scroll bearings
- ix. Install scroll into outer bowl assembly using conveyor extractor tool, overhead crane.
- x. Check conveyor stack-up dimension
- xi. Assemble headwall
- xii. Check for scroll clearance by rotating scroll with spline shaft
- xiii. Install stellite wear shoes with epoxy adhesive.

4. Service and repair of centrifuge frame top and bottom

- i. Scrape process material from frame bottom and top
- ii. Mechanical de-scaling of the inside frame bottom and top using a needle gun
- iii. If required, welding repair panels on the outer and internal portions of the frame top and bottom. Also, replacing baffles with stainless steel baffles; requiring flame burning off old baffles, grinding to fit and welding new baffles
- iv. Checking case bottom threaded holes and repairing with thread inserts
- v. Painting case top and bottom: prime and applying two part epoxy paint

5. Back -Drive and Main Bearing Lubrication System Maintenance

- 1. Drain back-drive oil and bearing lubrication oil reservoirs
- u. Scrape clean reservoirs internally
- iii. When required, replace heat exchangers, dials, solenoids or fittings
- iv. Replace filters
- v. When required, replace hoses
- vi. Replenish reservoirs with new oil

6. Service main drive and back-drive motors

- a) Remove covers and clean cooling fan
- b) Check run-out and condition of drive end bearing on the main drive motor. If there is an internal problem with the motor, it is sent to a motor repair center for service.
- c) Grease bearings
- d) Check condition of bearing RTD and replace if necessary

7. Service the Voith fluid coupling

- i. Clean fluid coupling exterior surface
- ii. Drain and change the ATF fluid. Inspect condition of the drained fluid for possible internal mechanical issues.
- iii. Remove the fluid coupling with a factory pulling device from the main drive motor

shaft.

- iv. Remove the sheave and bearing housing from the fluid coupling.
- v. Remove the old grease from the bearing housing, clean the bearing with rags and solvent.
- vi. Repack the bearing housing with grease
- vii. Install the fluid coupling on the motor shaft
- viii. Replenish fluid to the factory level.
- ix. Verify the Voith BTS proximity sensor gap. Adjust necessary
- x. Verify the milliamp signal at the BTS junction box terminal. Adjust the gap accordingly to bring the milliamp reading to factory specifications. If this adjustment cannot be done to bring it to factory specification, then the switching element and or the initiator may have to be replaced.

8. After evaluation, and when necessary, rebuild the pneumatic knife gate

- i. Assemble custom scaffolding under the centrifuge on the lower level
- ii. Disassemble all knife gate components
- iii. Replace all components
- iv. Test operation of knife gate and adjust if necessary

9. After evaluation, and when necessary, rebuild the cake cross conveyor system

- i. Assemble staging and scaffolding
- ii. Disassemble all cross conveyor components
- iii. Replace all mechanical and electrical components
- iv. Check electrical and pneumatic connections
- v. Test operation of cross conveyor in manual mode, troubleshoot and adjust if necessary
- vi. Verify operation of cross conveyor while the centrifuge produces cake.

10. After evaluation, and when necessary, replace the hydraulic pump and or the Roto-diff hydraulic motor

- i. Remove the components: hydraulic pump and or Rotodiff
- ii. Install the hydraulic pump: check drive alignment, test units and adjust for mechanical base RPM and squash plate indicator. Verify by monitoring the Viscotherm differential indicator. Also, the RPM can be monitored and checked by verifying the pulse count on the Viscotherm 400 card.
- iii. Install the Rotodiff: torque to specification, verify rotation plate position, and use a dial indicator to verify factory specifications for eccentricity. Shim accordingly if needed to adjust the eccentricity to factory specifications.

11. Install rotating assembly on centrifuge frame

- i. Wipe down main bearing machined surface with solvent. Use a honing stone to

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- remove high spots on the machines surface.
- ii. Prepare the frame machined portion that accepts the pillow blocks; wipe down machined surface with solvent. Use a honing stone to remove high spots on the machines surface.
- iii. Rig the rotating assembly for lifting and lowering with slings and a factory spreader lifting device - making sure that the rotating assembly is precisely balanced horizontally. Lower the rotating assembly on the centrifuge frame.
- iv. Center the rotating assembly so there is proper clearance for the frame baffles.
- v. Perform a preliminary check of the main bearing alignment using double dial indicators, 180 degrees apart. Check for alignment at the 9 & 3 o'clock positions and at the 12 & six o'clock positions. All alignments must be within factory specifications.
- vi. Torque the main bearing fasteners to factory specifications using a torque multiplier.
- vii. Check the rotating assembly stem run-out for eccentricity using a dial indicator. Note and record the readings.
- viii. Install the sheave and gear flange; Heat the components to 275 degrees making sure not to overheat the components. Install fasteners to factory torque specifications.
- ix. Install the main drive belts
- X. Verify alignment of the motor sheave to rotating sheave alignment. Adjust the motor base as necessary to align the sheaves.
- xi.** Install the Rotodiff as outlined previously
- xii.** Grease the internal scroll bearings. Purge the grease until all traces of air bubbles are eliminated.
- xiii.** Inspect the Rotodiff and belt guards. If cracked, bevel-grind the crack area and weld with a MIG welder. Paint the guards with safety yellow.
- xiv.** Flush the supply and return lines of the main bearing lubrication system.
- xv.** Terminate wires for the main bearing RTD
- xvi.** Run the back-drive on local (manual) to ensure that the hydraulic pump is primed. Prime the pump if necessary.

12. Test the centrifuge system.

In addition to testing the mechanical and electrical components as a centrifuge system, this portion of the scheduled PM work entails monitoring, evaluation, and adjustment of the centrifuge system components which is an Andritz specific, technical process. This process will produce de-watered municipal sludge to exacting specifications in: cake dryness, capture of solids and polymer dose.

- i. Remove the electrical and mechanical lock-out tag-outs.
- ii. Verify the centrifuge control panel powers up correctly, verify electrical components conditions:
 - I. Verify that the PLC processor board does not have a fault condition
 - II. Verify that there are LED indications of both the input and out modules

- of the PLC
 - III. Press the "test light" button to acknowledge all indicator lamps work
 - IV. Verify that the proportional amplifier card of the Viscotherm controller does not have fault indications
 - V. Verify that there is bar, bowl rpm & differential indication of the Viscotherm controller
 - VI. Verify that the main bearing temperature and vibration monitor are reading ambient temperature and zero in/sec respectively. If necessary, calibrate the instrument with a 4-20 milliamp signal generator to factory specifications.
 - VII. Verify that there are no fault indications present of the PLC (*if so, troubleshoot the cause of the fault - see Service, diagnostic section*)
 - VIII. Verify that there are no fault conditions on the main drive monitor screen - Eaton MP-3000. (*if so, troubleshoot the cause of the fault - see Service, diagnostic section*).
- iii. Start and test the centrifuge system:
- I. Monitor and verify operation of the main drive bearing lubrication panel:
 - o Check flow to each bearing, adjust to factory specifications
 - o Purge air from the system by switching filters
 - o Check pressure of the oil flow to verify that it is within factory specification
 - II. Monitor and verify operation of the back-drive system.
 - o Verify that the Viscotherm controller displays the rmmmm differential as adjusted in the hydraulic pump replacement section.
 - o Check for unusual noises, vibration and leaks.
 - III. Monitor and verify the time to achieve the full speed of the bowl.
 - o The time to full speed is determined by the Voith fluid coupling ATF level. If necessary, shut down the centrifuge system and adjust the TF level accordingly to increase or decrease the time to full bowl speed.
 - o Monitor the main drive motor amperage and bearing temperature.
 - IV. Monitor the rotating assembly main bearing temperature and centrifuge vibration. Allow the unit to reach full operating temperature and begin vibration readings of the centrifuge frame and rotating assembly. These readings are then taken with flush water and then while sludge is fed into the centrifuge. Readings are taken with factory authorized vibration instruments:
 - o Observe and record horizontal readings of the frame at the centrifuge frame vibration switch, axially at the main drive bearing pillow block, horizontal and

vertical readings of the main bearing pillow block.
Panel vibration readings are also recorded.

- V. In conjunction with DEP operations, the centrifuge is then fed polymer and sludge to begin dewatering operations of sludge.
- o The polymer and sludge pump flows are monitored for proper flow and operation. If a polymer or sludge feed alarm is present during this portion of testing, then the centrifuge system is diagnosed for issues with wiring or component failure. If necessary, and as an aide to troubleshoot an alarm, the PLC program is monitored using PLC factory application software and a laptop computer plugged into the PLC.
 - o The Viscotherm controller is then monitored for: bowl speed, bar pressure and differential. Differential monitoring is simultaneously checked with bar pressure to ensure that the back-drive system is working correctly under automatic control. If necessary, there may have to be adjustments made with the: squash plate indicator, base mechanical speed of the hydraulic pump, electronic base speed of the analog 500 card, boost pressure and base speed. While the Viscotherm controller is in auto control, the 600 card is the adjusted for ramp up speed and base differential.
 - o The bar pressure/torque on automatic control is then adjusted to produce the driest cake possible while using the lowest amount of polymer and still have acceptable solids in the effluent stream. In addition to this, adjustments in sludge flow and or polymer flow may have to be adjusted to achieve the desired product cake dryness and or effluent capture of solids.
- iv. The centrifuge is released to DEP operations for operation. The scheduled preventative maintenance is completed with a full report and recorded readings. This is followed by completion of the DEP issued work orders entailing recorded work hours and an itemized list of parts installed.

II. Service and repair of the centrifuge system: Mechanical and Electrical

Mechanical repair and or corrective action of the centrifuge system: including the centrifuge

rotating assembly, centrifuge frame and cover, back-drive system, lube oil panel system, Voith fluid coupling, pneumatic knife gate and cross conveyor

- I. Diagnose, inspect, repair or replace defective mechanical components of the centrifuge system or component systems
- II. Perform a visual inspection of the failed or failing component while in operation or if necessary, remove and inspect. If necessary, refer to a factory print to verify that critical dimensions are within tolerance. Replace or repair the component as necessary.
- III. If applicable, repair the component or part that may include weld repairs but limited to machining. If machining is necessary, the component would have to be sent to our service center for machining.

Electrical repair of the centrifuge system: including centrifuge system control panel components, motor starter panel components, back-drive system electrical components, lube oil panel system electrical components, Voith BTS circuit, pneumatic knife gate electrical components and cross conveyor electrical components.

- I. Monitor, diagnose, troubleshoot electrical and software issues of the centrifuge system using electrical prints. Replace components as required to repair the electrical issue. When required, make adjustments and or calibrate sub components as specified by individual manufacturers; e.g. Viscotherm 500, 600 cards. Red Lion frequency converters, Newport Digital Displays, Voith BTS circuit, etc.
 - o When required, monitor the PLC program while the centrifuge system is in operation to determine, on a program level, if there is a problem with field devices or the program itself. There are two PLC systems currently in use at NYC DEP centrifuge system installation: Siemens TI Soft Rockwell Automation RS Logix 5000. This requires the licensed program, the application software, a laptop computer; factory

wired serial port connectors and a computer port adapter. Competent knowledge of the PLC application software and basic programming knowledge is necessary for this portion of the electrical diagnostics. In addition and when necessary, downloading of the program software may be necessary if the loaded program was deleted.

III. Evaluation, diagnostics and remedy of process performance as it relates to the centrifuge system

1. Evaluation to determine if the centrifuge system or sludge process conditions will need changes to produce require cake dryness and or solids capture in the effluent stream. In some instances, diagnose total upset in dewatering.

- i. Query DEP operations to determine if there is an upset in process condition: e.g. polymer solution makeup, stratification of sludge holding tanks that would allow supernatant to be fed into the centrifuge (low feed solids), etc.
- ii. If process conditions are within normal plant parameters, determine if the centrifuge system has to be diagnosed:
 - I. Monitor the Viscotherm controller to evaluate minimum differential and regulation of the back-drive.
 - o Determine if there is a mechanical or electrical issue with the regulation of the back-drive while under automatic control
 - o If electrical, determine if the problem is with the proportional amplifier or with the automatic card, 600.
 - o Verify proper adjustment of the squash plate indicator and mechanical base differential of the hydraulic pump.
 - II. If a mechanical issue is suspected with regulation of the back-drive, perform a factory pressure test of the hydraulic pump and or Rotodiff. Replace component/s if necessary
- iii. Determine if there is a regulation issue with sludge feed and or polymer feed.
 - I. Adjust the Siemens PID process controller for sludge feed and or polymer feed. If necessary, replace the controller
- iv. Monitor process conditions after adjustments and or replacement of components to determine if cake dryness and or effluent solids capture are

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acceptable.

Rig rotating assembly onto flatbed truck from centrifuge room floor.

Rig rotating assembly off of flatbed truck onto centrifuge room floor.

SCHEDULE “B” - DRUG AND ALCOHOL POLICY

PREAMBLE

WHEREAS, [CONSTRUCTION MANAGER] (“Construction Manager”), for the construction project located at [PROJECT ADDRESS] (“Project”) desires to provide for a safe, drug and alcohol-free work site for the Project;

WHEREAS, the parties have entered into a separate Project Labor Agreement for the Project and have agreed to negotiate in good faith a Project Drug & Alcohol Testing Policy;

WHEREAS, this Testing Policy is collectively negotiated between the Construction Manager and the New York City Building and Construction Trades Council (“Council”) (the Construction Manager and BCTC are collectively referred to hereafter as the “Parties”);

WHEREAS, the Parties each currently have respective drug and alcohol policies, including the Projects' Zero-Tolerance policy;

WHEREAS, the Parties desire to maximize project safety conditions for the Project personnel and public, as well as deter violations of the Parties' respective drug and alcohol policies;

NOW, THEREFORE, the Parties agree to this Policy as of the date hereof,

ARTICLE 1 - PARTIES

This Drug & Alcohol Testing Policy (“Policy”) is hereby established by the Construction Manager and the Council, on behalf of itself and its affiliated local union members, and the signatory local unions on behalf of themselves and their members.

ARTICLE 2-GENERAL CONDITIONS

SECTION 2.1 - SUMMARY

In order to reinforce the Parties' respective drug and alcohol policies, including the Projects' zero tolerance policy regarding the prohibition of the use of drugs and alcohol, and to deter Project personnel from violating those policies, the Parties agree that all Project Personnel (defined later) will be required to submit to drug and/or alcohol testing randomly, post-accident, and for reasonable suspicion.

Any individual on site that violates this Policy is subject to disciplinary action, including, without limitation, loss of site access privileges.

SECTION 2.2 - REVOCATION OF PROJECT ACCESS PRIVILEGES

Any one of the following occurrences will result in the immediate revocation of a Project Personnel's project access privileges:

1. An individual is found selling or using drugs or alcohol, or otherwise is under the influence of drugs or alcohol, subject to the other terms of this Policy, on a Project Site;
2. An individual has been convicted under any criminal drug or alcohol statute for a violation occurring in the workplace within the past two years;

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3. An individual who refuses to abide by the Projects' drug and alcohol policy, or refuses to submit to a test in accordance with this Policy;
4. An individual who switches, adulterates, or in any way tampers with a specimen required to be submitted in accordance with this Policy.

SECTION 2.3 - DEFINITIONS

Confirmed Positive Test: The presence of drugs, drug metabolites, or alcohol in a person's body that equals or exceeds the established cut off levels as defined in Exhibit 1. For drugs, the sample will have undergone Laboratory screening and confirmation testing and must have been verified as positive by a Medical Review Officer. A positive test result for alcohol obtained through Evidential Breath Testing is considered a Confirmed Positive Test.

Employee Assistance Program (EAP): An EAP is generally considered a workplace-based, confidential program designed to help employees deal effectively with a variety of personal problems, and, of relevance to this policy, substance abuse problems. The EAP promotes assessments and short-term counseling. An EAP shall also include any similar education or rehabilitation program provided by the Councilor its respective members. The Project Personnel that are required to participate in the EAP shall be responsible for the cost of their consultation with an EAP and/or participation in any education or rehabilitation program.

Evidential Breath Testing Device (EBT): A device that is used to measure alcohol in the breath and which meets National Highway Traffic Safety Administration's specifications for precision and accuracy.

Laboratory: A laboratory that is SAMHSA (Substance Abuse and Mental Health Services Administration) certified for the testing of drugs.

Medical Review Officer (MRO): A licensed physician responsible for receiving laboratory results generated by an employer's drug testing plan who has knowledge of substance abuse disorders and medical training to interpret and evaluate a donor's confirmed positive test result together with his/her medical history and all other relevant information.

Previous Worker: All individuals whose employment relationship with the contractor, company or organization no longer exists.

Project Site: The construction area for respective Project.

Reasonable Suspicion: When a qualified trade contractor, the Developer or Construction Manager as set forth in Section 3.7, reasonably believes that an individual has violated this Policy. Reasonable suspicion is based upon (1) specific, current, behavioral or performance indicators, (2) the possible manufacture, distribution, consumption or possession of unauthorized drugs, drug paraphernalia, or alcohol, or (3) documented investigation by an agency retained by, or otherwise independent from, the Developer or Construction Manager.

SECTION 2.4 - INCLUDED SUBJECTS

This Policy shall cover all employees of the Owner, Construction Manager and Project trade contractors, their subcontractors and any other of their respective personnel at any level that are performing any activity at a Project Site, inclusive of managers, superintendents and supervisors, except as specifically excluded by Section 2.5 of this Policy (collectively and singularly, "Project Personnel").

SECTION 2.5 - EXCLUDED SUBJECTS

The following persons are not subject to the provisions of this Policy:

- A. Employees and entities engaged in off-site manufacture, modifications, repair, maintenance, assembly, painting, handling or fabrication of components, materials, equipment or machinery;
- B. Vendors and employees of vendors engaged on a Project Site in equipment testing, inspection, training, warranty work, or engaged in corrections of defective or nonconforming work, unless such employees are expressly included in the bargaining unit of a local signatory to this Agreement;
- C. Employees engaged in ancillary work on a Project which is performed by third parties, such as electric utilities, gas utilities, telephone companies, and railroads, or any other work not constituting Project work;
- D. Employees of any governmental authority (state, local or otherwise);
- E. Employees and contractors engaged in work on the Project Site as part of due diligence or monitoring, which work is ancillary to Project work; and
- F. Emergency responders.

SECTION 2.6 - PRESCRIPTION AND NON-PRESCRIPTION DRUGS

The use of prescription drugs not prescribed directly to Project Personnel is prohibited, including the use of drugs prescribed to a spouse or domestic partner. The use of non-prescription drugs that are sold outside the United States and that contain substances that are illegal or require a prescription in the United States are prohibited, unless prescribed by a licensed physician.

SECTION 2.7 - SEARCHES

In order for the Construction Manager to ensure the safety of Project Personnel and for the Construction Manager to protect its assets, the Construction Manager shall have the right upon good cause (such as reasonable suspicion of a violation of this Policy) to conduct reasonable searches for alcohol, drugs and related paraphernalia anywhere within the boundaries of a Project Site. A search may include any assets owned or leased by any Project Personnel that is on a Project Site, including without limitation, vehicles, lockers, gang boxes, desks and personal property brought onto a Project Site, but excluding personal body searches or physical contact with employees.

ARTICLE 3 - DRUG & ALCOHOL TESTING

SECTION 3.1 - COLLECTION PROCESS

As of the execution date of this PLA, Project Personnel may be required to submit urine samples ("Preliminary Drug Screening") for the purpose of detecting the presence of drugs as part of the random, post-accident or reasonable suspicion testing, in accordance with chain of custody protocols as established by Substance Abuse and Mental Health Services Administration (SAMHSA), utilizing an instant result test cup for Preliminary Drug Screenings, such testing is to be performed on-site by an independent service provider. The results from the instant result test cup will be considered preliminary. The sample will be sent to a SAMHSA certified testing laboratory for confirmation.

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As of the date hereof, all Project Personnel will be required to submit to an Evidential Breath Test (EBT) for the purpose of detecting the presence of alcohol when submitting to random, post-accident or reasonable suspicion testing. Alcohol testing will not be conducted for pre-access testing.

SECTION 3.2 - NEGATIVE PRELIMINARY DRUG SCREENING

Project Personnel with a negative Preliminary Drug Screening will be considered conditionally accepted for Project site access, pending confirming laboratory results. Site access privileges will be revoked if the subsequent laboratory results determine that the sample has tested positive for drugs or that the sample has been adulterated.

SECTION 3.3 POSITIVE PRELIMINARY DRUG SCREENING

If the Preliminary Drug Screening indicates a positive result, the individual will not be allowed access to the Project Site. The sample will be sent to the certified laboratory for analysis and, if applicable, reviewed by the Medical Review Officer (MRO). If the laboratory confirmation results are also positive, the individual will be considered in violation of this Policy and their site access will be revoked for at least 30 days. If the laboratory confirmation results are negative, the Project Personnel's site access will not be revoked.

SECTION 3.4 CONFIRMED POSITIVE TEST RESULTS

A. POSITIVE DRUG TEST

A drug test is considered positive if the test results exceed the limits shown in Exhibit 1, which is attached hereto and incorporated herein by reference. The test will be confirmed through a second analysis process and reviewed by an MRO before results are reported. Project Personnel with confirmed positive drug test results will have their site access revoked. In case of a "false positive" result, any such Personnel shall be entitled to the reimbursement of any wages lost during the suspension caused by any such false positive result.

B. POSITIVE EBT

An EBT is considered positive if the test results exceed .04 BrAC, or as otherwise set forth in Exhibit 1. Project Personnel with a positive alcohol test result will be subject to the remedies set forth in Exhibit 1.

C. REINSTATEMENT OF SITE ACCESS PRIVILEGES

(a) Subject to section 3.4(C)(a) immediately below, if the site access of a Project Personnel has been revoked pursuant to this Policy, then any such person may request that their site access be reinstated after 30 days, provided that all of the following conditions are met to the reasonable satisfaction of the Construction Manager. :

1. The individual has provided proof of wellness from an accredited rehabilitation facility or has provided proof that treatment isn't needed as attested to by a licensed health care provider specializing in the diagnosis and treatment of alcohol and drug abuse.
2. A current drug and alcohol test is obtained within three (3) days of the request for re-access to the site and proof of a negative test result has been received; and
3. The individual agrees to submit to multiple testing for two (2) full years from the date of gaining re-access to the project, the scheduling of which will be determined at the sole discretion of the Construction Manager. If all of these conditions have been met,

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the Construction Manager agrees that it will not unreasonably withhold their consent to any such request.

(b) Unlawful possession, concealment, use, purchase, sale, manufacture, dispensation or distribution of illegal drugs or un-prescribed controlled substances on the Project site will subject the Project Personnel Employee to immediate removal from the Project site and shall bar such Project Personnel Employee from returning for a minimum of three (3) months, which return shall, in any event, be subject to the reasonable approval by Construction Manager.

(c) All of the Parties agree that any such Project Personnel will only be entitled to any such reinstatement of site access privileges one time and that any subsequent violation of this Policy will result in the permanent termination of access to the Project Site.

SECTION 3.5 - RANDOM TESTING

A third-party provider designated by the Construction Manager will randomly select by an objective criteria a testing pool for random drug and/or alcohol testing from all Project Personnel with site access cards. Any individual selected for a random drug and/or alcohol test will be required to submit to an Evidential Breath Test (EBT) and/or drug test. Individuals may be tested more than once during any given time period. The Parties acknowledge and agree that an EBT may be required without a drug test and that a drug test may be required without an EBT, as solely determined by the Construction Manager.

If an individual is unable to attend the first scheduled random drug test as a result of being involved in a work-related task, such drug test will be rescheduled and will be completed at or before the conclusion of such employee's then current work shift. If the second drug test is missed for any reason, the incident will be reviewed by the Construction Manager, who shall have the right to terminate the site access privileges of any such Project Personnel until such time as that Project Personnel has complied with this Policy. If the individual refuses to take the test, their access privileges will be immediately terminated for cause.

SECTION 3.6 - POST ACCIDENT TESTING

After each work-related incident or injury requiring the services of a licensed health care provider, all Project Personnel involved with the incident will be required to submit to a drug and/or alcohol test immediately following the incident. In instances where emergency care is necessary, the drug and/or alcohol test shall be obtained by the care facility, if possible, within 24 hours after treatment is rendered. If more than 48 hours have passed before an injury is reported and treated by a licensed health care provider, an alcohol test will not be required.

In addition, any Project Personnel involved in a non-injury related incident at a Project Site with damages at or in excess of \$200 will be required to submit to a drug and/or alcohol test unless:

- A. It is determined, after conducting an investigation and interviewing all employees involved and any witnesses, that the employee's performance can be completely discounted as a contributing factor to the incident; or
- B. It is determined, after conducting an incident investigation and interviewing all employees and any witnesses that the incident was caused by inadequate equipment or system design, and/or premature failure of equipment or system components.

SECTION 3.7 - REASONABLE SUSPICION TESTING

All Project Personnel will be required to submit to a drug and/or alcohol test when there is

reasonable suspicion the individual has violated this policy.

Reasonable suspicion includes, without limitation, the following:

- A. Violent or irrational behavior;
- B. Emotional or physical unsteadiness;
- C. Sensory or motor-skill malfunctions;
- D. Slurred speech;
- E. The odor of alcohol or drugs on clothing or breath in conjunction with other indicators;
- F. Possession of alcohol, unauthorized drugs or drug paraphernalia; or
- G. Documented evidence of an independent investigation regarding Project Personnel's consumption of what is reasonably believed to be an alcoholic beverage or drugs in violation of the Project's policies and/or this Policy.

Reasonable suspicion testing may only be ordered by supervisory personnel that: (a) have been trained to recognize the above referenced factors; or (b) have received credible documentary evidence from an independent investigator that a Project Personnel has violated a drug and/or alcohol policy. It is agreed that any certified training program shall satisfy the training requirement.

SECTION 3.8 - PRIVACY CONSIDERATIONS

The Parties agree to use reasonable efforts to conduct any testing pursuant to this Policy in accordance with the privacy concerns of Project Personnel. To address these concerns, the Parties agree that:

1. The testing station(s) shall be screened off, or otherwise closed off from public view.
2. All documents and information regarding the testing, including test results, shall be maintained by the respective custodian(s) of record in accordance with their respective privacy policies, which any Project Personnel shall be entitled to review upon timely request.
3. The Parties agree to make a good faith effort to resolve any other privacy concern of Project Personnel regarding this Policy, provided that any such concerns do not interfere with the purpose of this Policy.

ARTICLE 4 – GRIEVANCE

SECTION 4.1 - REPRESENTED WORKERS

Nothing in this Policy shall restrict a member of a signatory local union from filing a grievance in accordance with the member's collective bargaining agreement or a Project Labor Agreement, provided that the grievance shall be limited to whether the removal of a member for violation of this Policy was conducted in compliance with the terms and conditions set forth herein.

SECTION 4.2 - HOLD HARMLESS

The Construction Manager agrees to hold harmless and indemnify the Union/Council and its representatives from any liability that may be incurred as a result of the Company's

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Drug and Alcohol Policy to the extent caused by the negligence or intentional misconduct of the Construction Manager.

IN WITNESS WHEREOF the parties have agreed to this Policy as of _____, 20__.

FOR [CONSTRUCTION MANAGER]

By: _____

Name: [INSERT NAME] _____

Title: [INSERT TITLE] _____

FOR GREATER NEW YORK CITY BUILDING TRADES COUNCIL

By: _____

Name: Gary LaBarbera _____

Title: President

EXHIBIT 1

CLASS OF DRUGS TESTED AND THEIR RESPECTIVE CUT-OFF LIMITS

The cut-off limits established are those recommended by the U.S. Department of Health and Human Services in their mandatory Guidelines for Federal Workplace Drug Testing Programs.

<u>Drug Class</u>	<u>Screening Cut-Off Limit (ng/ml)</u>	<u>Confirmation Cut-off Limit (ng/ml)</u>
Amphetamines	1000	500
Benzoylcegonine (Cocaine Metabolite)	300	150
Cannabinoids (THC)	50	15
*Opiates	2000	10
Phencyclidine (PCP)	25	25

Confirmation screening is done by means of GC/MS analysis.

*The GC/MS confirmation for opiates will be for both codeine and morphine separately. If morphine is equal to or greater than 2,000ng/ml then the GC/MS confirmation analysis for 6-acetylmorphine (6-MAM) is at a cut-off level of 10ng/ml.

Alcohol Screening

All Project Personnel will be required to submit to an EBT under the random, post-accident, and reasonable suspicion test arenas, for the purpose of detecting presence of alcohol. If this test supports a positive result for presence of alcohol, the Project Personnel will be considered in violation of this Policy.

If the results of the EBT are:

1. Above 0.001 BrAC, but at or below 0.020 BrAC, a second test will be conducted within approximately 15 minutes.
 - If the second BrAC test is less than the first BrAC, the results will be deemed negative and the Project Personnel may return to work, if there are no other outstanding issues.
 - If the second BrAC is increasing, but below 0.04 BrAC, the results will be deemed negative, but the Project Personnel will be sent home for the day and the Construction Manager shall be notified. If a Project Personnel is sent home two times within a six-month period pursuant to this Section I, then any such Project Personnel shall be deemed to have tested positive and will be subject to the applicable remedies set forth in Section 2 below.
2. Above 0.02 BrAC, but below 0.06 BrAC, a second test will be conducted after approximately 15 minutes.
 - Notwithstanding anything set forth above to the contrary, a Project Personnel may elect

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to voluntarily go home for the day instead of taking a second test and the results will be deemed negative, provided that any such Project Personnel may not voluntarily go home more than once within a twelve month period.

- If the second BrAC test is at or below 0.02 BrAC, the results will be deemed negative and the Project Personnel may return to work if there are no other outstanding issues.
- If the second BrAC test is above 0.020, but below 0.06, the results will be deemed positive, the Project Personnel will be sent home for the day and their site access will be revoked for at least five [5] calendar days and until such time as the Project Personnel has been evaluated by an EAP professional skilled in substance abuse and confirmed fit for duty.
- Any Project Personnel who is deemed positive two times within two years pursuant to this Section 2 will have their site access privileges terminated and will be entitled to the limited relief set forth in Section 3 .4(c) of the Policy.

3. At or above .06 BrAC, the Project Personnel will have their site access privileges terminated, after which they will be entitled to the limited relief set forth in Section 3.4(C) of the Policy.

**SECTION 01 11 00 – SUMMARY OF WORK
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Location and Description of Work
2. Work Included in the Contract
3. Related Construction Contracts
4. Inspection before Bidding
5. Site Characterization Reports and Information
6. Hazardous Soils Investigation
7. Datum Plane

B. The following index of this Section is presented for convenience:

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SECTION 01 11 00 – SUMMARY OF WORK
CONTRACT KENS-EAST-2

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

B.

1.03 RELATED SECTIONS

A. Not Used.

1.04 REFERENCES

A. Abbreviations / Acronyms:

1. KEC: Kensico-Eastview Connection
2. NYCDEP: New York City Department of Environmental Protection

1.05 DESCRIPTION

A. Location of Work

1. Work is to be performed under this Contract at the following Site:
 - a. The Site is located at the Kensico Reservoir Shaft 18 campus which is owned by the City of New York and operated by NYCDEP.
 - b. The Site is located in the Town of Mt. Pleasant, NY in Westchester County, and is bounded by Columbus Avenue and Kensico Reservoir. Refer to the Contract Drawings for additional location information.
 - c. Work access to the Site shall initially be from the north-west corner of the property, at the intersection of Columbus Avenue and Aerator Road, and transitioned to Westlake Drive during construction.

B. Work Included in this Contract.

1. Contract Name: KENS-EAST-2 – Kensico Site Preparation
2. Work Description: The primary objective of this Contract is to perform Site preparation for the Kensico Site in advance of future KEC Project construction Contracts. The following is a general description of Work under this Contract only, and shall not be construed as a complete description of the Work to be performed.

SECTION 01 11 00 – SUMMARY OF WORK
CONTRACT KENS-EAST-2

3. Principal Items of Work:
 - a. General mobilization and demobilization, including development of construction entrance(s) and Engineers' trailers.
 - b. Overall Site preparation and development, including but not limited to:
 - 1) Tree removal
 - 2) Clearing and grubbing
 - 3) Mass excavation and grading for all areas shown on the Contact Drawings
 - 4) Installation of perimeter construction and security fencing
 - 5) Installation of stormwater controls including erosion and sedimentation controls such as silt fence, haybales, swales, and sediment basins
 - 6) Installation of an Operations Entrance, including grading, security provisions, paving, and utility installation
 - 7) Installation of Site utilities
 - c. Relocation of Westlake Drive to the northern end of City property, including but not limited to:
 - 1) Tree removal
 - 2) Clearing and grubbing
 - 3) Excavation and grading
 - 4) Paving, curbs, striping, and landscaping
 - d. Installation of a new Electrical Building, including but not limited to:
 - 1) Structural Work: Includes structural reinforced precast concrete wall panels that are tied together by connection plates and bear on a strip foundation. Precast prestressed roof slabs that are supported by precast prestressed roof girders, bearing on pilasters in the precast concrete wall panels, support the roof structure. A thin topping slab, a spiral stair accessing the roof, and steel dunnage supporting the mechanical equipment complete the roof top structure.
 - 2) Architectural Work: Includes glass fiber reinforced concrete façade rainscreen system, building cornices/copings,

SECTION 01 11 00 – SUMMARY OF WORK
CONTRACT KENS-EAST-2

standing seam roof and all roofing related systems. Sliding doors, single and double swinging doors, windows and louvers.

- 3) Electrical Work: Includes medium voltage (MV) service entrance switchgear, MV distribution switchgear, unit substation (MV switch, MV transformer & LV switchgear), low voltage generator switchgear, automatic transfer switches, and other distribution equipment such as panelboards, UPS, Mimic panels, etc. Service power transformer(s) and generator(s) will be installed outside the Electrical Building
- 4) Mechanical/Plumbing Work: Includes water supply to the Electrical Building and fire protection measures.
- 5) HVAC Work: Includes roof top heating and cooling units, electric unit heaters, heat pumps, associated ductwork and controls.

C. Other Construction Contracts

1. Contracts anticipated to be in progress or initiated:
 - a. CRO-557: Waterfowl Management Program Building and Paving
 - 1) Includes construction of a new building adjacent to existing Shaft 18, new electrical, plumbing, and HVAC work, paving, and associated Site restoration.
 - 2) Anticipated NTP: 3rd Quarter 2023
 - 3) Anticipated Substantial Completion: 3rd Quarter 2025
 - b. CRO-624: Reconstruction of the Kensico Lab Building as the Kensico Regional Headquarters
 - 1) Includes rehabilitation and conversion of the existing Kensico Laboratory to a new operations facility, and associated Site work and paving.
 - 2) The work location is between the Lower Effluent Chamber and new KEC Electrical Building.
 - 3) Anticipated NTP: 4th Quarter 2023
 - 4) Anticipated Substantial Completion: 4th Quarter 2025
 - c. Future KEC Tunnels, Shafts, and Kensico Rock Excavation Contract(s)

SECTION 01 11 00 – SUMMARY OF WORK
CONTRACT KENS-EAST-2

- 1) Includes Site preparation, shaft construction, and main tunnel boring at the DEP’s “Eastview” Site and construction of a new shaft, rock excavation for future Screen Chamber, and connecting tunnel at the Kensico Site.
 - 2) Anticipated NTP: 2nd Quarter 2024
 - 3) Anticipated Start at Kensico Site: 4th Quarter 2025
 - 4) Anticipated Substantial Completion: 2nd Quarter 2030
- d. Future KEC Buildings Contract(s)
- 1) Includes construction of a new Screen Chamber, new Police Booth, new Eastview Connection Chamber, rehabilitation of the existing Upper Effluent Chamber, new connecting tunnels, and all associated mechanical, electrical, plumbing and HVAC components.
 - 2) Anticipated NTP: 3rd Quarter 2026
 - 3) Anticipated Substantial Completion: 3rd Quarter 2033
2. The Contractor shall coordinate its Work with the prime Contractors for the Contracts listed above.
 3. The Contractor shall coordinate all permits, shop drawings, and submittals with the latest information available from the Contracts listed above to ensure complete and approvable submissions.
 4. As part of its coordination effort, the Contractor shall pay particular attention to permitting restrictions related to maximum disturbed areas, which include a 5-acre limit of disturbance. This limit applies to all Site work at this Site, inclusive of disturbances created by Other Contractors.
 5. For Contracts in progress, drawings, specifications, and schedules will be available for inspection at the Bureau of Engineering Design and Construction, 5th Floor, Low Rise, 96-05 Horace Harding Expressway, Corona, New York 11368-5107.
 6. For Contracts to be started while this Project is in progress, the Contract documents, when completed for bidding purposes, will be available for inspection by the Contractor at the above address.
- D. Inspection before Bidding
1. Before bidding, the Contractor is advised to visit the Site of the Work. The Contractor shall obtain all necessary information of any and all conditions which may affect in any way the performance of their work and

SECTION 01 11 00 – SUMMARY OF WORK
CONTRACT KENS-EAST-2

their bid prices under their Contracts. All pertinent data and dimensions with regard to existing construction shall be verified by the Contractor.

2. The Contractor may examine the drawings of existing facilities used in preparation of the Contract Drawings which will be available upon request. Access to the Site for inspection purposes prior to bidding will only be on the date advertised for the pre-bid tour.

E. Site Characterization Report

1. For the purposes of design, borings have been made, samples taken, and a topographical survey has been made at the proposed Site. The following documents are available for inspection by bidders:
 - a. KENS-EAST-DES Phase I Environmental Site Assessment Report
 - b. KENS-EAST-DES Phase II Environmental Site Assessment Report
 - c. KENS-EAST-DES Phase I Geotechnical Data Report (GDR)
 - d. KENS-EAST-DES Phase II Geotechnical Data Report (GDR)
 - e. topo
2. All such material and information relating to boring records and subsurface conditions are expressly excluded from and are not a part of this Contract and are available for information purposes only.
3. It is suggested but not mandatory that the Contractor visit the Sites and familiarize themselves with existing conditions. The Contractor shall carefully review and correlate the information in the GDR as well as other available data. In addition, Contractor is advised to inspect the rock core and other samples recovered from the borings and correlate them with the boring logs. The cores and samples can be examined during the bid period as detailed in the Invitation for Bid.

F. Hazardous Soil Investigation

1. Soil samples have been taken and analyzed for the purpose of identifying contaminated and/or hazardous materials on the Site. All results and reports pertaining to the investigation are available for upon request. All such material and information relating to hazardous and contaminated soil investigation are expressly excluded from and are not a part of this Contract and are available for information purposes only.

G. Datum Plane

1. All elevations indicated or specified refer to the Site datum plane of North American Vertical Datum of 1988 (NAVD88), unless otherwise noted.

**SECTION 01 11 00 – SUMMARY OF WORK
CONTRACT KENS-EAST-2**

- 1.06 QUALITY ASSURANCE
 - A. Not Used
- 1.07 SUBMITTALS
 - A. Not Used
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Not Used
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
 - A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
 - A. Not Used

- PART 2 PRODUCTS
 - 2.01 MANUFACTURERS
 - A. Not Used
 - 2.02 MATERIALS / EQUIPMENT
 - A. Not Used
 - 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used
 - 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

- PART 3 EXECUTION
 - 3.01 EXAMINATION / PREPARATION
 - A. Not Used
 - 3.02 APPLICATION
 - A. Not Used
 - 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
 - 3.04 STARTUP / DEMONSTRATION
 - A. Not Used

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CONTRACT KENS-EAST-2

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Normal Project Working Hours
2. Emission Control Technology for Non-Road Vehicles
3. Vehicle Idling Time
4. Compliance with Quality of Life Requirements
5. Noise Restrictions
6. Site Security
7. Equipment Shutdowns
8. Land for Contractor’s Use
9. Truck Restrictions
10. Protection of Water Supply
11. Tree Clearing Restrictions
12. Erosion and Sediment Control Maintenance
13. Photovoltaic Panels
14. Endangered Species
15. Con Edison Transmission Tower Access
16. Engineer-Ordered Bailout
17. RMP Regulated Chlorine Processes

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s), or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 11 00 – Summary of Work
- B. Section 01 51 30 – Temporary Electrical System
- C. Section 01 57 00 – Temporary Controls
- D. Section 01 74 17 – Cleaning and Site Maintenance
- E. Section 31 10 10 – Site Clearing
- F. Section 31 25 10 – Dust Soil Erosion and Sediment Control

1.04 REFERENCES

- A. New York City Administrative Code, Section 24-163

1.05 DESCRIPTION

- A. Working Hours
 - 1. “Normal Project Working Hours” for this Contract are between the hours of 7:00 AM through 3:30 PM, Monday through Friday (except for holidays). The Contractor shall have the management, labor, equipment and subcontracted capabilities needed to complete the Work within the Period of Performance indicated in the General Conditions – Schedule A,

SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2

- by working only during “Normal Project Working Hours”. Hours beyond the normal working hours must be reviewed and approved by the Engineer.
2. The Contractor shall abide by all Federal, state and local laws, rules and regulations governing or restricting the performance of the Work, both during and outside Normal Project Working Hours.
 3. The Contractor is advised that strict adherence to the Town of Mt. Pleasant Noise Control Law is mandatory, and that the Contractor shall be responsible for assuring that any required variance(s) from restrictions on construction hours are obtained.
 4. The Work shall be substantially completed (as defined where applicable in Article 14 of the Standard Construction Contract) within the period of performance specified in Schedule “A” of the General Conditions; all in strict accordance with the Contract Documents. The Contractor will make no claim for extra compensation solely because of additional costs to meet the scheduled dates.
 5. If the Contractor for any reason fails to adhere to the official Project schedule, the Contractor shall promptly adopt such other or additional Means and Methods of Construction sufficient to make up for the time lost and assure completion of the Work in accordance with said schedule. The City may require the Contractor to adopt such corrective measures as the Engineer deems necessary, appropriate and adequate to recover lost time; and may also direct the Contractor to propose corrective measures for consideration (without any obligation by City to adopt the same), at no additional cost to the City.
 6. The Contractor is advised that it has the option to work a second shift or additional scheduled overtime, as needed, to complete all intermediate activities, Contract milestones and to meet the date of Substantial Completion of the Work as defined by Article 14 of the Standard Construction Contract and not exceed the period of performance as shown in Schedule A of the General Conditions.
 7. The Contractor shall have sufficient forms, shoring and other construction materials; labor; permanent materials; equipment; tools and supervision available to support a second shift and/or scheduled overtime.
 8. The Contractor is required to obtain prior written approval by the Engineer for working other than Normal Project Working Hours. The Contractor shall submit its written requests to the Engineer for such authorization at least 15 days in advance of such proposed Work, or as deemed reasonable by the City. Approval by the City shall not relieve the Contractor from obtaining all required permits and approvals from the Town of Mt. Pleasant prior to the start of Work outside Normal Project Working Hours. The Contractor shall adhere to all local laws and ordinances that govern or restrict the performance of such work. Requirements for the provision and

SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2

use of temporary light and power outside Normal Project Working Hours are included in Section 01 51 30 – Temporary Electrical System.

- B. Emission Control Technology for Non-Road Vehicles
1. The Contractor shall complete and submit to the Engineer the attached Local Law 77: DEP Monthly Reporting Forms (Exhibit A, attached to this Section) to report on usage of Ultra Low Sulfur Diesel (ULSD) fuel and Best Available Technology in diesel-powered non-road vehicles for reducing emission of pollutants on a monthly basis.
- C. Vehicle Idling time
1. Idling time shall be limited to three consecutive minutes for all delivery, concrete and materials trucks as well as all other diesel powered equipment (hereinafter referred to as a mobile source) except as follows:
 - a. When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control.
 - b. When it is necessary to operate heating, cooling or auxiliary equipment installed on the mobile source when such equipment is necessary to accomplish the intended use of the mobile source.
 - c. To bring the mobile source to the manufacturer’s recommended operating temperature.
 - d. When the outdoor temperature is below twenty (20) degrees Fahrenheit.
 - e. When the mobile source is being repaired.
 2. The Contractor shall meet the requirements of the Section 24-163 (f) of the NYC Administrative Code, regarding vehicle idling time adjacent to schools.
- D. Compliance with Quality of Life Requirements
1. The Contractor will be held to the strictest account in its adherence to all applicable ordinances, rules, and regulations that relate to “Quality of Life.” These include: noise control, vibration control, dust control, particulate control, rodent control, cleanliness and maintenance of the Site and surrounding areas, and adherence to traffic and parking stipulations.
 - a. The Contractor shall submit a Quality of Life Compliance Plan for review and approval by the Engineer. This plan shall address all Work required by the Contractor to satisfy the Quality of Life requirements.
 - b. Work at the Site shall not commence until the Contractor’s Quality of Life Compliance Plan is approved.

SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2

2. When the Contractor is determined to be noncompliant with Quality of Life requirements the Contractor shall be subject to the following measures:
 - a. Where non-compliance with a Quality of Life requirement is not corrected within a timeframe specified by the City, Work may be ordered to stop until such measures as the City deems satisfactory are taken to resolve the problem and prevent future occurrence. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for additional costs or damages by the Contractor.
3. The Contractor shall cooperate fully with the Engineer to prevent, address and resolve any and all Quality of Life issues, which may arise from time to time, by whatever means necessary, all at no additional cost to the City.
4. The Contractor's record of compliance with Quality of Life requirements for this Project and its efforts to coordinate with the Engineer and comply with his/her directions in this regard will be reflected in the Contractor's Evaluation. This Evaluation will become a part of the Contractor's record of doing business with the City of New York and may affect the Contractor's ability to be awarded future projects.

E. Noise Restrictions

1. In addition to the requirements of the City of New York Standard Construction Contract, noise emissions from construction activities shall conform to all Town Code, local laws and regulations. If noise emissions exceed the allowable limits, sound attenuation controls may be necessary, in which case Contractor shall timely acquire and install them at no additional cost to the City.

F. Site Security

1. The Contractor shall maintain a secure perimeter at all times. The Contractor shall temporarily relocate existing secure perimeter components as required to complete the Work including but not limited to an Engineer Ordered Bailout as described in Section O. At no time shall the Contractor remove existing secure perimeter components until alternative security measures are in place. All methods of securing the Site and sequencing the security installations shall be submitted in advance of the Work and require the approval of the Engineer prior to performing the Work.

G. Equipment Shutdowns

1. All equipment shutdowns must be coordinated with and approved by the City a minimum of 48-hours in advance of proposed shutdown.

H. Land for Contractor's Use

SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2

1. The land for Contractor’s use is limited to those areas identified on the Contract Drawings. Over the course of the Work, the Contractor is advised that the land areas for staging will require adjustment and coordination with Other Contractor(s) per Section 01 11 00 – Summary of Work, and as shown on the Contract Drawings for construction sequencing.
 - a. The Contractor(s) for CRO-624 are anticipated to be working in the area immediately around the existing Kensico Lab Building and the new Electrical Building being constructed under this Contract. The Contractor must coordinate all Site activities, staging, and Work to ensure continued and unimpeded access to all facilities at the Kensico Site. In addition, the Contractor shall obtain the latest documents from the CRO-624 contractor(s), including but not limited to: construction schedule, as-built drawings, and submittals to coordinate all facets of Work.
 - b. The contractor(s) for CRO-557 are anticipated to be working in the area near the existing Shaft 18 and Kensico Reservoir. The Contractor must coordinate all Site activities, staging, and Work to ensure continued and unimpeded access to all facilities at the Kensico Site. In addition, the Contractor shall obtain the latest documents from the CRO-557 contractor(s), including but not limited to: construction schedule, as-built drawings, and submittals to coordinate all facets of Work.
 - c. The Contractor(s) for future KEC tunnels, shafts, and Kensico rock excavation is(are) anticipated to begin work at the Kensico site while this Contract is active. The future KEC tunnels, shafts, and Kensico rock excavation contract(s) are expected to occupy areas as shown in the Contract Drawing staging plans. The Contractor shall coordinate all Work activities, including staging and access as required to ensure continued access to all areas of work by DEP as well as the contractor(s) for future KEC tunnels, shafts, and Kensico rock excavation.
2. At no time shall the Contractor stage equipment within 5-ft of the existing Town of Mt. Pleasant sewer line, without prior written approval from the Engineer. The sewer runs along Westlake Drive and is shown on the Contract Drawings. In addition, as required by the Town of Mt. Pleasant, the Contractor must allow unimpeded access as needed for maintenance.
3. Contractor shall not use Existing Westlake Drive for parking until Relocated Westlake Drive is constructed, commissioned, and open to the public. Contractor shall not use Existing Westlake Drive for staging or storage of equipment.

I. Truck Restrictions

SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2

1. No trucks shall be allowed to stand or park on Columbus Avenue in the vicinity of the Site, and shall follow all local restrictions on parking.
- J. Protection of Water Supply
1. All Contractor operations shall be conducted in a manner as to ensure the protection of the water supply. All necessary precautions shall be taken to prevent the introduction of pollutants into the water supply.
- K. Tree Clearing Restrictions
1. The Project area is within the summer range of the Indiana and Northern Long Eared bat.
 2. To avoid potential disturbance to roosting bats and local breeding bird habitat, the Contractor may only conduct tree clearing operations between November 1 and March 31, see Section 31 10 10 – Site Clearing.
 3. The Contractor shall comply with tree clearing restrictions, if any, required by the New York State Department of Environmental Conservation to protect nesting habitat for Bald eagles.
 4. Contractor to coordinate construction schedule with these tree clearing restrictions when determining sequence of construction activities.
- L. Erosion and Sediment Control Maintenance
1. The Contractor shall perform maintenance and repair of Erosion and Sediment Control features as per the SWPPP until the Future Tunnels and Excavation Contractor has signed on to the Kensico Site SWPPP and taken over responsibility of E&SC maintenance and repair. See Section 31 25 10 - Dust Soil Erosion and Sediment Control.
- M. Photovoltaic (PV) Panels
1. The Contractor shall provide photovoltaic panels as per Section 26 31 00. Contractor is to ensure time is allotted for the design, approval, procurement, and installation of such equipment as to not impact schedule and completion of Work.
- N. Con Edison Transmission Tower Access
1. The Contractor shall provide access for Con Ed to transmission towers D109 and D110 at all times throughout the duration of the Contract. In addition, the Contractor shall keep the Emergency Tower Replacement Crane Staging Area available at all times. See Contract Drawings for the location of the Emergency Tower Replacement Crane Staging Area.
- O. Engineered Ordered Bailout

SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2

1. The City will notify the Contractor 48 hours in advance of an Engineer Ordered Bailout, in which the Contractor must demobilize and hand over the Site to the City within this allotted time. The Contractor shall stabilize any active construction areas and establish secured perimeter in accordance with all NYCDEP requirements.

P. RMP Regulated Chlorine Processes

1. Contractor shall reference and comply with Exhibit B.

Q. Phase 1 Grading Completion

1. Phase 1 grading shall be completed in 104 consecutive calendar days from Contract Notice to Proceed to allow for relocation of utility pole.

1.06 ATTACHMENTS

1. Exhibit A - Local Law 77: DEP Monthly Reporting Forms
2. Exhibit B – Quality Assurance for Design and Construction of New and Modified RMP Regulated Chlorine Processes
3. Exhibit C – Kensico Site Bailout Requirements

1.07 QUALITY ASSURANCE

- A. Not Used

1.08 SUBMITTALS

- A. Not Used

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.10 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.11 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2

- 2.02 MATERIALS / EQUIPMENT
 - A. Not Used
- 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

- PART 3 EXECUTION
 - 3.01 EXAMINATION / PREPARATION
 - A. Not Used
 - 3.02 IMPLEMENTATION
 - A. Not Used
 - 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
 - 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
 - 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

**SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2**

EXHIBIT A – LOCAL LAW 77: DEP MONTHLY REPORTING FORMS

SECTION 01 14 00 – WORK RESTRICTIONS CONTRACT KENS-EAST-2

FORM LL-77

LOCAL LAW 77: DEP MONTHLY REPORTING FORM 1

Contractor: _____ Report # _____ Covering the Mo/Yr of: _____
 Contractor Address: _____ Contractor's Phone: _____
 Project Name: _____ Project # _____ Address: _____
 DEP Representative or PM Contact Name: _____ DEP Representative or PM Contact Number: _____

The New York City of Environmental Protection requires its contractors to file this form so that it can report to the DEP on USAGE of Ultra Low Sulfur Diesel (ULSD) fuel in diesel powered non-road vehicles, and the use of Best Available Technology (BAT) for reducing emissions of pollutants, as required by NYC Local Law 77 of 2003.

DEP approved BAT installed
(DEP sticker must be applied to vehicle indicating BAT type and date installed)

Prior Months Used On Site	Days Used This Month	Est. Future Usage Months	Type	Make	Year	Model #	VIN #	HP Rating	Date Installed	Make	Model	LL-77 Category I(a),I(b),I(c), II, III	DEP waiver* required	DEP Decal No.

* Attach copy of DEP Waiver if BAT requirement is waived for any reason during all or part of the contract period.

**SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2**

LOCAL LAW 77: DEP MONTHLY REPORTING FORM 2

Contractor: _____ Report # _____ Covering the Mo/Yr of: _____

Project Name: _____ Project # _____ Address: _____

DEP Representative or PM Contact Name: _____ DEP Representative or PM Contact Number: _____

SUMMARY OF LISTED EQUIPMENT AND BAT

Total pieces of Equipment used on site this Month = _____ Total that used BAT this Month = _____

Total pieces of equipment used on site this Calendar Year = _____ Total that used BAT this Year = _____

DECLARATION OF COMPLIANCE

By signing this document, I certify that the information provided is accurate, and that all non-road diesel-powered vehicles used on the project during the reporting period by my employees and subcontractors are included, and that all BAT retrofits have been selected and installed in accordance with LL 77, including the Use of ULSD (Ultra Low Sulfur Diesel) fuel.

Note 1: Diesel fuel powered nonroad vehicles/equipment's used for fewer than twenty calendar days on the contract are exempt from BAT requirement.

Note 2: DEP will audit sites to ensure forms are accurate. Fines for non-compliance and fraud will be levied by DEP against the Contractor according to the terms of the Law.

Signed: _____

Date: _____

Print: _____

Contractor Name and Title

There are other Prime Contractors on this site whose equipment is not included here.

**SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2**

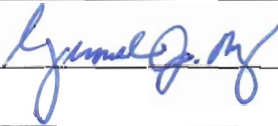
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Date Issued 3/15/08

PAGE 1 OF 6

QUALITY ASSURANCE
FOR DESIGN AND CONSTRUCTION OF NEW AND MODIFIED
RMP REGULATED CHLORINE PROCESSES

Rev. No.	RMP Committee Chair Signature	Date	Summary of Change
1		3/15/08	Initial issue.



Date Issued 3/15/08

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1. PURPOSE

This procedure establishes specific quality assurance (QA) requirements that shall be completed during the execution of new construction projects on processes covered by EPA Risk Management Programs (RMP) or equivalent OSHA Process Safety Management (PSM) regulations. It outlines DEP's approach to meet the regulatory requirements and ensure the quality checks and inspections established by the contract specifications and drawings conform to the applicable regulatory, code and other recognized standards for the type of work. It is consistent with, but provides more detail than, the Mechanical Integrity section of the Process Safety Management / Risk Management Program. These checks and inspections must be completed, documented and placed into the Process Safety Information and Mechanical Integrity Quality Assurance permanent records for the regulated facility. This procedure specifically addresses 40 CFR 68.73(f)(1) and (2) of the following EPA RMP regulations (and equivalent OSHA PSM regulations found at 29 CFR 1910.119(j)):

40 CFR, Part 68.73 Mechanical Integrity

(a) Application. Paragraphs (b) through (f) of this section apply to the following process equipment:

- (1) Pressure vessels and storage tanks;*
- (2) Piping systems (including piping components such as valves);*
- (3) Relief and vent systems and devices;*
- (4) Emergency shutdown systems;*
- (5) Controls (including monitoring devices and sensors, alarms, and interlocks) and*
- (6) Pumps.*

(f) Quality assurance.

- (1) In the construction of new plants and equipment, the owner or operator shall assure that equipment as it is fabricated is suitable for the process application for which they will be used.*
- (2) Appropriate checks and inspections shall be performed to assure that equipment is installed properly and consistent with design specifications and the manufacturer's instructions.*
- (3) The owner or operator shall assure that maintenance materials, spare parts and equipment are suitable for the process application for which they will be used.*

2. SCOPE

This procedure applies to all new construction or major modifications of RMP/PSM regulated chlorination processes (e.g., replacement of all chlorinators/evaporators or installation of any new chlorinators/evaporators that is not a replacement-in-kind) and addresses applicable regulatory requirements, governing codes (Federal, State and Local) and other recognized standards for the type of work (e.g., National Electric Code (NEC), Uniform Building Code (UBC), National Fire Protection Agency (NFPA), American National Standards Institute (ANSI), and Chlorine Institute (CI)). Existing construction projects (where design and



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construction specifications have already been issued for bids) must also meet the regulatory requirements, but these projects may use alternative methods.

All modifications are reviewed under the Management of Change procedure and receipt inspection is performed under the Mechanical Integrity program for maintenance materials, spare parts and equipment for RMP/PSM regulated chlorine processes to address the requirements of 40 CFR 68.73(f)(3) above.

3. PROCEDURE

Fabrication and construction Quality Assurance requirements for specific chlorination process equipment are summarized in **Attachment A** along with the primary codes and standards used as the basis for design and Quality Assurance. Simpler checklists are also provided that may be used by the design/construction project managers (**Attachment B**), the Bureau which owns and operates the process (**Attachment C**) and the Contractor (**Attachment D, E and F**). The following sections describe steps to be taken during design and construction and identify specific roles and responsibilities.

Wherever this procedure refers to *DEP Design Project Manager* or DEP construction *Contract Supervisor*, these individuals may delegate the execution of these responsibilities to other staff or consultants who may be an "RMP QA Specialist" or otherwise have the necessary QA experience. They may choose to select a single individual who will oversee the DEP RMP project efforts through design and construction or to select different individuals for different phases of the project.

3.1 DESIGN OF NEW / MODIFIED CHLORINATION PROCESSES

The *DEP Design Project Manager* and the construction *Contract Supervisor* will ensure that the Design Contract and Construction Management/Resident Engineering Contract specifications (or task definition documents) include all requirements necessary to support RMP/PSM compliance including RMP QA fabrication/ installation execution and submittal of documentation (as well as for all other RMP/PSM requirements, e.g., PSSR, training, etc.) items. At minimum, this will include the QA requirements listed in **Attachment G**.

The *DEP Design Project Manager* (or his/her designee) is responsible for ensuring that all design phase requirements are actually implemented during the design phase and may use **Attachment E** to , or equivalent, to track incorporation of minimum equipment QA requirements into the design.

3.2 QUALITY ASSURANCE PLAN

For design projects initiated after the effective date of this procedure, the *DEP Design Project Manager* (or designee) will ensure that a comprehensive Quality Assurance Plan (QA Plan) will be developed during the design phase. The QA Plan will define all RMP/PSM process QA requirements from ordering through receipt, installation and startup and require a consolidated



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implementation record. Preparing the QA Plan will generally be part of the Design contract. The QA Plan must be submitted to the operating Bureau *RMP Manager* and DEP *Design Project Manager* for review and approval and will then be integrated into the construction contract requirements.

The QA Plan would define:

- The required inspection and testing.
- The type and frequency of testing.
- The type and frequency of inspection.
- The frequency and distribution of testing and inspection reports.
- The observations to be performed.
- The frequency and distribution of observation reports.

For design projects initiated before the effective date of this procedure, the DEP *Contract Supervisor* will achieve compliance in other ways (e.g., assigning RMP QA responsibilities to DEP or construction management staff and using the attached checklists).

3.3 CONSTRUCTION CONTRACT FOR NEW / MODIFIED CHLORINATION PROCESSES

The *DEP Design Project Manager* (or designee) will ensure that the QA fabrication/ installation requirements listed in **Attachment H** (as well as for all other RMP/PSM requirements, e.g., participate in Pre-Startup Safety Review prior to startup and, if conducted during the work, PHA and/or MoC reviews, etc.) are included in the Construction Contract Specifications to supplement contract General Article on Receipt Quality Assurance or will otherwise ensure that these requirements are met.

Construction contracts would require that the contractor establish, implement and maintain their own effective project Contractor Quality Program to meet the QA Plan (to be submitted and approved by DEP) to manage, control, document and assure that their work complies with the requirements of the contract documents and QA Plan.

The Contractor Quality Program shall include procedures, responsibilities and a clearly assigned organization necessary to assure adequate control (inspection) and assure quality for materials, workmanship, fabrication and operations covering both off-site fabrication and on-site construction work. Contractors must assign a person whose function is to manage all quality matters relating to the project and to audit the performance of other individuals who may be doing inspection and testing and to ensure that they are performed in compliance with all applicable standards and the contract documents. The Contractor would be required to have personnel on site performing QA whenever QA activities are required by the QA Plan or specifications during chlorination equipment and piping installation work.



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The Contractor would be required to identify those responsible for the various types of inspections and tests they are required to perform under the QA Plan. The quality assurance personnel of a fabricator are permitted to be inspectors if they are qualified for the tasks they perform (e.g., for code vessel certification by the authority having jurisdiction).

3.4 CONSTRUCTION AND STARTUP

The *Contract Supervisor* is the person responsible for managing and overseeing the Construction contract. The *Contract Supervisor* is assigned by Bureau management based on the type, scale and phase of the project (e.g., Project Manager, Construction Manager, Resident Engineer, Chief, Deputy Chief, etc.). The *Contract Supervisor* (or their designee) will ensure that the Construction Manager, Resident Engineer, the Contractor and any other assigned Contractors or personnel meet all requirements necessary to support RMP/PSM compliance including RMP QA fabrication/ installation execution and submittal of documentation (as well as for all other RMP/PSM requirements, e.g., PSSR, training, etc.) including the items on the Construction QA Checklist in **Attachment B**. The Bureau which owns and operates the process may use **Attachment C** to track the completion of the required QA by the project. The Contractors may use **Attachments D, E and F**, or equivalent, to track their minimum QA requirements.

Verification of construction against the approved design documents is performed throughout the construction phase. Personnel and Consultants assigned to the construction of chlorine processes will perform oversight of construction activities, and assure, on a day-to-day basis, that the contractor is in compliance with construction documents, including quality and safety requirements. This oversight takes the form of: checking contractor supplied documentation; witnessing contractor operations, inspections and tests; performing independent inspections and tests to verify contractor results; or any combination of these activities.

3.5 COMMUNICATION OF QA RESULTS

All deficiencies shall be brought to the immediate attention of the Contractor for correction by the person performing QA inspection or testing. Each Contractor and Consultant and any DEP staff performing QA inspection or testing shall furnish copies of all inspection and testing reports, noting any work not in compliance with the approved construction documents and corrections made to previously reported work to the *Construction Manager/Resident Engineer* and the *Contract Supervisor* on an ongoing basis.

If the deficiency will leave equipment in permanent non-conformance with plans or specifications, the *Resident Engineer* shall prepare a Non-Conformance Report (NCR) using the example BEDC NCR in **Attachment I** or equivalent and submit it to the *Design Engineer* and the *Contract Supervisor* for approval of the Disposition Plan. The *Contract Supervisor* shall forward a copy of all NCRs for RMP/PSM processes to the operating Bureau's *RMP Manager* to determine if this requires Management of Change review. The Contractor must execute the Disposition Plan. Upon completion, the Resident Engineer will sign the bottom "Verification" section of the NCR describing how the proper completion of the Disposition Plan was verified.



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At completion of construction, each Contractor or Consultant with QA obligations shall submit a certification confirming that all inspected work was completed in compliance with the approved construction specifications or, for items identified in NCRs, in conformance with all NCR Disposition Plans. They shall provide a copy of all inspection and testing documentation completed during the construction and startup and all verified NCRs. Work not in compliance with the approved construction documents shall be described in the report and changes shown in as-built drawings.

For construction management projects initiated after the effective date of this procedure, the DEP *Contract Supervisor* (or designee) will include all requisite construction RMP/PSM process QA oversight requirements into the Construction Management contract including a requirement to submit a final Quality Assurance Report to obtain a consolidated implementation record.

4.0 RECORDKEEPING

The *Construction Manager/Resident Engineer*, under direction of the *Contract Supervisor*, has the responsibility to maintain a comprehensive record of the QA activities during the work. At completion of construction, the *Construction Manager/Resident Engineer*, under direction of the *Contract Supervisor*, shall submit a complete copy of the final Quality Assurance documentation to the operating Bureau's *RMP Manager*, including at a minimum:

- A summary or listing of all specifications, procedures and plans governing fabrication, receipt and installation QA.
- QAS Inspection and Testing Plan and reports (e.g., for QAS inspection of scrubber).
- Contractor and Consultant QA certifications complete with all inspection and testing documentation for the facility RMP/PSM records (e.g., receipt QA, Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment, NCRs, ASME Code vessel submittals, pressure tests, calibration tests, other installation testing, etc.).

The above may be in the form of a comprehensive QA Report, if it was included in project design and/or construction specifications. The operating Bureau's *RMP Manager* shall retain these records for the life of the operating equipment.



ATTACHMENT A DESIGN AND CONSTRUCTION QA REQUIRED BY COMPONENT

Design and Construction QA Requirements by Chlorine System Component

Note: In addition to the codes/standards based installation QA, all projects will require Equipment Receipt QA documentation (verify equipment received meets specs and route QA documentation to project QA files) and installation QA documentation (verification of manufacturer required & functional tests before startup and requirements below).

Type of Chlorine Process Equipment	Typical Rated Pressure/Temperature	Applicable Size Range	Primary Code/Standard/Guideline	Ref'd Source in Current Code/Std Defining QA Rqmt.	Design QA Requirement (for Specifications After the Effective Date of This Procedure)	Construction QA Requirement
All Equipment below governed by Chlorine Institute Pamphlet 6 and overall process.	NA	NA	Chlorine Institute Pamphlet 6, Edition 15 <div style="font-size: small; color: gray;">Note: Items in gray are to be performed independent of the contractor. They must be conducted by the Contract Supervisor's designee (e.g., RE) and may be independently checked by DEP QAS.</div>	None	<ul style="list-style-type: none"> > Contractor shall provide manufacturer's Certificate of Conformance for all chlorination equipment expected to normally be in contact with chlorine (not ancillaries, ducts, etc.) per CI Pamphlet 6 – Section 2.2: "Manufacturers or suppliers must certify to their end user, when requested, that their product is suitable for chlorine in the specified service. > Installation and fabrication QA shall be performed in accordance with manufacturer's installation instructions and Chlorine Institute requirements. > Contractor shall submit a chlorination equipment QA Plan describing how receipt inspection and installation QA will be performed for all chlorination system equipment, including a Table listing and referencing manufacturers and standards requirements prior to installation. It shall also include system-wide cleaning, hydrostatic pressure tests, drying, and inert gas pressure tests upon completion of each phase in preparation for startup in accordance with CI Pamphlet 6 – Section 11. > Contractor shall submit written documentation of Receipt Inspection, Fabrication QA and Installation Inspection prior to turnover for startup. 	<ul style="list-style-type: none"> > Review/approve Contractor's QA Plan (if provided) and check that the Table specifies the correct Manufacturer's O&M Manual Installation Instructions and route to Quality Assurance (QA) records. > Verify receipt of manufacturer's Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment expected to normally be in contact with chlorine (not ancillaries, ducts, etc.) and route to QA Records. > Review/approve Contractor submittal of written Receipt Inspection QA and Installation QA documentation prior to turnover for startup that is complete for all chlorination process equipment and confirms all equipment meets specs and installation QA successfully performed. This must include test of each switch/detector/alarm, overall process instrumentation functionality checks, & installed system pressure tests. <li style="background-color: #e0e0e0;">> DEP Contract Supervisor (CS) will ensure independent on-site: <ul style="list-style-type: none"> • Receipt Inspection QA of Major Equipment (chlorinators and evaporators). • Observation of Contractor installation QA of Major Equipment. • Observation of Contractor process instrument functionality tests • Observation of Contractor system cleaning/degreasing, hydrostatic pressure tests, drying, and inert gas pressure tests upon completion of each phase in preparation for startup.



ATTACHMENT A DESIGN AND CONSTRUCTION QA REQUIRED BY COMPONENT

Type of Chlorine Process Equipment	Typical Rated Pressure/Temperature	Applicable Size Range	Primary Code/Standard/Guideline	Ref'd Source in Current Code/Std Defining QA Rqmt.	Design QA Requirement (for Specifications After the Effective Date of This Procedure)	Construction QA Requirement
Chlorinator	To Full Vacuum	All Sizes	Chlorine Institute Pamphlet 6, Edition 15	None	> All items required under "All Equipment governed by CI Pamphlet 6" above.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > DEP CS will ensure independent: <ul style="list-style-type: none"> • Receipt Inspection QA. • Observation of Contractor installation QA in accordance with O&M/Installation Manual.
Chlorine Evaporator	Various	Various	Chlorine Institute Pamphlet 9, Edition 6	ASME Boiler & Pressure Vessel Code, Section VIII, Division I, Part UW-2	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 9. > Provide code cert. of compliance (Form U-1A) & ASME Code "L" stamp on vaporizer vessel to demonstrate it meets the following: <ul style="list-style-type: none"> • W-L: welding meets lethal gas requirements • S-L: fabricated using seamless pipe for lethal gas • HT: whole vessel post weld heat-treated • RT-1: complete vessel satisfies the full radiography requirements (100%) of all welded joints for lethal substances or design pressures exceeding 50 psi. 	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 9. > Verify stamp and route certificate to records. > DEP CS will ensure independent: <ul style="list-style-type: none"> • Receipt Inspection QA. • Observation of Contractor installation QA in accordance with O&M/Installation Manual.
Rupture Disks	Various	Various	Chlorine Institute Pamphlet 6, Ed. 15; ASME Boiler & Pressure Vessel Code, Section VIII, Div. I, Part UG-127	None	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Rupture disks shall meet the requirements of CI Pamphlet 6 - Sections 5.1 and 5.2.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify Materials and trim meets the requirements of CI Pamphlet 6 - Sections 5.1 and 5.2.
Pressure Safety Relief Valves (PSV)	Per Vaporizer Manufacturer	Various	Chlorine Institute Pamphlet 6, Edition 15	ASME Boiler & Pressure Vessel Code, Section VIII, Division I, Part UW-2 and UG-126	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Relief valves shall meet the requirements of CI Pamphlet 6 - Section 5.2.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify Materials and trim meets the requirements of CI Pamphlet 6 - Section 5.2. > Store in a vertical position per API 576.
Pressure Switches	Various	NA	Chlorine Institute Pamphlet 6, Ed. 15; Chlorine Institute Pamphlet 165, Ed. 1	NEMA 4X	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 165.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials meet the requirements of CI Pamphlet 165.
Other Detectors, Switches and Controls (e.g., level, temp.)	Various	NA	Chlorine Institute Pamphlet 6, Ed. 15; Chlorine Institute Pamphlet 165, Ed. 1	NEMA 4X	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Instrumentation and controls shall meet the requirements of CI Pamphlet 6 - Section 6. > Materials shall meet the requirements of CI Pamphlet 165.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify instrumentation and controls meets the requirements of CI Pamphlet 6 - Section 6. > Verify materials meet the requirements of CI Pamphlet 165.



ATTACHMENT A DESIGN AND CONSTRUCTION QA REQUIRED BY COMPONENT

Type of Chlorine Process Equipment	Typical Rated Pressure/ Temperature	Applicable Size Range	Primary Code/Standard/ Guideline	Ref'd Source in Current Code/Std Defining QA Rqmt.	Design QA Requirement (for Specifications After the Effective Date of This Procedure)	Construction QA Requirement
Electrical Enclosures	Various	NA	Chlorine Institute Pamphlet 6, Ed. 15; NEMA Stds Pub. 250, "Enclosures for Electrical Equipment (1000 V Maximum)	NEMA 4X, Fiberglass Reinforced Polyester (FRP)	> Electrical controls shall meet the requirements of CI Pamphlet 6 - Section 6.	> Verify electrical controls meet the requirements of CI Pamphlet 6 - Section 6 and NEMA 250.
Chlorine Pressure Gauge (Liquid Cl ₂)	Up to 800psi (diaphragm)		Chlorine Institute Pamphlet 6, Ed. 15; Chlorine Institute Pamphlet 165, Ed. 1	General Industry Practice	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 and Pamphlet 165.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials meet the requirements of CI Pamphlet 6 and Pamphlet 165.
Chlorine Pressure Gauge (Vapor Cl ₂)	Up to 800psi (diaphragm)		Chlorine Institute Pamphlet 6, Ed. 15; Chlorine Institute Pamphlet 165, Ed. 1	General Industry Practice	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 6 and Pamphlet 165.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 6 and Pamphlet 165.
Misc. Appurtenances: > Basket Strainer	Various	NA	Chlorine Institute Pamphlet 6, Ed. 15	None	> Provide manufacturer's Certificate of Conformance per CI Pamphlet 6 – Section 2.2	> Verify receipt of manufacturer's Certificates of Conformance on Suitability for Chlorine Service and route to Quality Assurance (QA) Records.
Pressure Regulating Valves	Various	Various	Chlorine Institute Pamphlet 6, Ed. 15	None	> All items required under "All Equipment governed by CI Pamphlet 6" above.	> All items required under "All Equipment governed by CI Pamphlet 6" above.
Vacuum Regulating Valves	Various	Various	Chlorine Institute Pamphlet 6, Ed. 15	None	> All items required under "All Equipment governed by CI Pamphlet 6" above.	> All items required under "All Equipment governed by CI Pamphlet 6" above.
Liquid Expansion Chambers	≥ 560 PSI (per DEP requirement)	20% pipe volume	Chlorine Institute Pamphlet 6, Ed. 15 –Section 5.5, Section 10.6, and Drawing 136	1. ASME Boiler & Pressure Vessel Code, Section VIII, Division I, Part UW-2 or 2. DOT Cylinder Specifications (49 CFR 178) or 3. Pipe and Fittings per Chlorine Institute Pamphlet 6- Section 3	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Chambers shall meet the requirements of CI Drawing 136 (either ASME Pressure Vessel, DOT Cylinder or Pipe options). > If ASME, provide code certificate of compliance (Form U-1A) and ASME Code "L" stamp on vessel to demonstrate it meets the following code certifications: • W-L: welding meets lethal gas requirements • S-L: fabricated using seamless pipe for lethal gas • HT: whole vessel post weld heat-treated • RT-1: complete vessel satisfies the full radiography requirements (100%) of all welded joints for lethal substances or design pressures exceeding 50 psi. > If DOT, provide code req. DOT cylinder stamp. > If Pipe, materials shall meet the requirements of CI Pamphlet 6.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify Materials meet the requirements of CI Drawing 136. > For ASME vessel, verify stamp and route certificate to records. > For DOT Cylinder, verify stamp and document for records. > For Pipe, verify materials meet the requirements of CI Pamphlet 6. > DEP CS will ensure independent: • Receipt Inspection QA. • Observation of Contractor installation QA in accordance with O&M/Installation Manual.



ATTACHMENT A DESIGN AND CONSTRUCTION QA REQUIRED BY COMPONENT

Type of Chlorine Process Equipment	Typical Rated Pressure/ Temperature	Applicable Size Range	Primary Code/Standard/ Guideline	Ref'd Source in Current Code/Std Defining QA Rqmt.	Design QA Requirement (for Specifications After the Effective Date of This Procedure)	Construction QA Requirement
Pipe – Vacuum	Vacuum to 6 PSIG 212°F	Through 1–½”	Chlorine Institute Pamphlet 6, Ed. 15	ASTM D3915, Sch. 80 PVC with Screwed Joints (CI Pamphlet 6 refs D1784, but this is superceded by D3915)	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 9.	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 9.
Pipe - Pressure	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	Through 1–½”	Chlorine Institute Pamphlet 6, Ed. 15	ASTM A106, Sch.80 Carbon Steel Seamless ASME/ANSI B36.10; ASME/ ANSI B31.3	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 3.	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 3. > Verify maximum spacing and integrity of pipe and large valves hangers and supports.
Fittings	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	Through 1–½”	Chlorine Institute Pamphlet 6, Ed. 15	ASTM A105 Class 3000 Forged Steel ASME/ ANSI B16.11	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 3.	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 3.
Flanges	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	Through 1–½”	Chlorine Institute Pamphlet 6, Ed. 15	ASTM A105 Class 300 Forged Steel, ASME/ANSI B16.5	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 3.	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 3.
Ammonia-Type Union (2-bolt Flanged Union)	1000psi (per F&P Chem Fd Eq 70-9001 Rev 2)	1”	Chlorine Institute Pamphlet 6, Ed. 15	ASTM A105 Class 300 Forged Steel, ASME/ANSI B16.5	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Materials shall meet the requirements of CI Pamphlet 6 – Section 3 (See Note 4 for Table 3-1).	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Verify materials meet the requirements of CI Pamphlet 6 – Section 3 (See Note 4 for Table 3-1).
Unions	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	Through 1–½”	Chlorine Institute Pamphlet 6, Ed. 15	ASTM A105 Class 300 Forged Steel, ASME/ANSI B16.5	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 3.	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 3.
Bolts	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 6, Ed. 15	ASTM A193, Grade B7	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 3.	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 3.
Nuts	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 6, Ed. 15	ASTM A194, Grade 2H	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 3.	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 3.
Gaskets	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 95	General Industry Practice	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Materials shall meet the requirements of CI Pamphlet 95	> All items required under “All Equipment governed by CI Pamphlet 6” above. > Verify materials meet the requirements of CI Pamphlet 95



ATTACHMENT A DESIGN AND CONSTRUCTION QA REQUIRED BY COMPONENT

Type of Chlorine Process Equipment	Typical Rated Pressure/ Temperature	Applicable Size Range	Primary Code/Standard/ Guideline	Ref'd Source in Current Code/Std Defining QA Rqmt.	Design QA Requirement (for Specifications After the Effective Date of This Procedure)	Construction QA Requirement
Chlorine Auxiliary Valves, Chlorine Manifold Valves	560psi, 140F	1"	Chlorine Institute Pamphlet 6, Ed. 15	General Industry Practice	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 and Drawing 113.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 and Drawing 113.
Globe Valves- Threaded or Socket Welded	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	Through 1-½"	Chlorine Institute Pamphlet 6, Ed. 15	Forged API Class 800	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 4.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 - Section 4.
Globe Valves- Flanged or Butt-Welded	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 6, Ed. 15	Forged or Cast ANSI Classes 150 or 300	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 4.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 - Section 4.
Unlined Ball Valves - Threaded	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	Through 1-½"	Chlorine Institute Pamphlet 6, Ed. 15	Forged or Cast ANSI Classes 150 or 300	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 4.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 - Section 4.
Unlined Ball Valves – Flanged	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 6, Ed. 15	Forged or Cast ANSI Classes 150 or 300	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 4.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 - Section 4.
Unlined Plug Valves - Threaded	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	Through 1-½"	Chlorine Institute Pamphlet 6, Ed. 15	Forged or Cast ANSI Classes 150 or 300	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 4.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 - Section 4.
Unlined Plug Valves – Flanged	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 6, Ed. 15	Cast ANSI Classes 150 or 300	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 4.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 - Section 4.
High Performance Butterfly Valves (Unlined) – Wafer or Lugged	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 6, Ed. 15	Plate or Cast ANSI Classes 150 or 300	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 4.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 - Section 4.
High-Performance Butterfly Valves (unlined) – Flanged	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 6, Ed. 15	Cast ANSI Classes 150 or 300	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 – Section 4.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 – Section 4.
Single-Seated Segmented Ball Valves - Wafer	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 6, Ed. 15	Cast ANSI Classes 150 or 300	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 – Section 4.	> All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 – Section 4.



ATTACHMENT A DESIGN AND CONSTRUCTION QA REQUIRED BY COMPONENT

Type of Chlorine Process Equipment	Typical Rated Pressure/ Temperature	Applicable Size Range	Primary Code/Standard/ Guideline	Ref'd Source in Current Code/Std Defining QA Rqmt.	Design QA Requirement (for Specifications After the Effective Date of This Procedure)	Construction QA Requirement
Single-Seated Segmented Ball Valves - Flanged	Class IV- Gas/Liquid, 300 psig, -20°F to 300°F	All Sizes	Chlorine Institute Pamphlet 6, Ed. 15	Forged or Cast ANSI Classes 150 or 300	<ul style="list-style-type: none"> > All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 – Section 4. 	<ul style="list-style-type: none"> > All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials and trim meet the requirements of CI Pamphlet 6 – Section 4.
Chlorine Flexible Lines	560psig per DEP requirements	Standard – Monel	Chlorine Institute Pamphlet 6, Ed. 15	ASTM B165, Cold Drawn, annealed	<ul style="list-style-type: none"> > All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 7. 	<ul style="list-style-type: none"> > All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 7.
Chlorine Flexible Lines [NOTE: Not used by DEP]	N/A	Standard – Copper	Chlorine Institute Pamphlet 6, Ed. 15	ASTM B88, Seamless, Type K, or heavier, annealed	<ul style="list-style-type: none"> > All items required under "All Equipment governed by CI Pamphlet 6" above. > Materials shall meet the requirements of CI Pamphlet 6 - Section 7. 	<ul style="list-style-type: none"> > All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify materials meet the requirements of CI Pamphlet 6 - Section 7.
Chlorine Emergency Shutoff Valves	N/A		Local Building Code (and generally Int'l Fire Code 2003 or latest ed., Section 3704.2.2.10.3)	General Industry Practice	<ul style="list-style-type: none"> > All items required under "All Equipment governed by CI Pamphlet 6" above. > Performance shall meet the requirements of IFC (2003 or latest edition) Section 3704.2.2.10.3. 	<ul style="list-style-type: none"> > All items required under "All Equipment governed by CI Pamphlet 6" above. > Verify proper installation per manufacturer's instructions and controls meet requirements of IFC (2003 or latest edition) Section 3704.2.2.10.3.
Chlorine Emergency Scrubber	N/A		Local Building Code (and generally International Fire Code 2003 or latest edition, Section 3704, or Uniform Fire Code Article 80), Chlorine Institute Pamphlet 89, Ed. 3	General Industry Practice	<ul style="list-style-type: none"> > Design Engineer shall verify that ventilation flow pattern optimally sweeps incidental releases from the working area around containers. > Manufacturer certifies the design conforms with IFC Section 3704.2.2.7.1 or UFC Article 80 performance requirements (1 ton to < ½ IDLH in 30 min.) or more stringent DEP specs (i.e., worst-case release of 2 tons). > Contractor shall comply with the DEP Inspection and Testing Plan for the Fabrication of Emergency FRP Venturi Chlorine Scrubber. > Contractor shall perform flow pattern and air flow rate performance verification testing. 	<ul style="list-style-type: none"> > Verify receipt of Manufacturer certification of conformance with IFC Section 3704.2.2.7.1 performance requirements or more stringent DEP specifications. > DEP CS will ensure independent: <ul style="list-style-type: none"> • Fabrication and installation QA in accordance with DEP Inspection and Testing Plan for the Fabrication of Emergency FRP Venturi Chlorine Scrubber and manufacturer's requirements. • Observation of Contractor installation QA in accordance with O&M/Installation Manual. • Observation of contractor flow verification testing and receipt of written report.
Top Running, Double Beam Crane	N/A		OSHA 29 CFR 1910.179 ASME B30.17c	Regulatory Requirements	<ul style="list-style-type: none"> > Conduct load test in accordance with ASME standards and provide load test report. 	<ul style="list-style-type: none"> > DEP CS will ensure independent: <ul style="list-style-type: none"> • Observation of Contractor installation QA in accordance with O&M/Installation Manual • Observation of Contractor Load Test. > Verify receipt of load test report.
SCBA	N/A		NIOSH MSHA	Regulatory Requirements	<ul style="list-style-type: none"> > Contractor shall provide manufacturer's Certificate of Conformance. 	<ul style="list-style-type: none"> > Verify receipt of manufacturer's Certificates of Conformance and route to Quality Assurance (QA) Records.



ATTACHMENT A DESIGN AND CONSTRUCTION QA REQUIRED BY COMPONENT

Type of Chlorine Process Equipment	Typical Rated Pressure/ Temperature	Applicable Size Range	Primary Code/Standard/ Guideline	Ref'd Source in Current Code/Std Defining QA Rqmt.	Design QA Requirement (for Specifications After the Effective Date of This Procedure)	Construction QA Requirement
Chlorine Emergency Kit	N/A		Chlorine Institute Pamphlet 1, Edition 6	General Industry Practice	> Contractor shall provide manufacturer's Certificate of Conformance.	> Verify receipt of manufacturer's Certificates of Conformance and route to Quality Assurance (QA) Records. > Verify appropriate emergency kit for container size, e.g. Emergency Kit B for Chlorine Ton containers.
Chlorine Scales	N/A		Manufacturer's Specifications Only	Manufacturer's Specifications	> Contractor shall provide Calibration Certificates.	> Verify receipt of Calibration Certificates and route to Quality Assurance (QA) Records.
Ventilation Fan (Cl2 Storage Room)	N/A		Applicable NEMA Codes	Regulatory Requirements	> All items required under "All Equipment governed by CI Pamphlet 6" above.	> All items required under "All Equipment governed by CI Pamphlet 6" above.
Ventilation Fan (Chlorination Room)	N/A		Applicable NEMA Codes	Regulatory Requirements	> All items required under "All Equipment governed by CI Pamphlet 6" above.	> All items required under "All Equipment governed by CI Pamphlet 6" above.
Ejector	(New ejectors rated @ 300psi @ 90F)		Manufacturer's Specifications Only	Manufacturer's Specifications	> All items required under "All Equipment governed by CI Pamphlet 6" above.	> All items required under "All Equipment governed by CI Pamphlet 6" above.
Windsock	N/A		Manufacturer's Specifications Only	General Industry Practice	> None	> None
Employee Evacuation Alarm	N/A		Manufacturer's Specifications Only	Manufacturer's Specifications	> None	> Functional test and audibility in all areas in and around the chlorination process area confirmed.
Atmospheric Monitoring Equipment for Chlorine	NA	NA	Chlorine Institute Pamphlet 73, Ed. 7	General Industry Standard	> Materials shall meet the requirements of CI Pamphlet 73.	> Verify materials meet the requirements of CI Pamphlet 73.



ATTACHMENT B

Quality Assurance (QA) Checklist for Design/Construction Project Management

Phase / Task Description ^{1,2}		Responsible Person	Delegated To	Compl. (sign & date)
D e s i g n	Design plans/specs integrate requirements of Att. A of <i>QA for Design and Construction of New and Modified RMP/PSM Regulated Chlorine Processes</i> under the “Design QA Requirement” column?			
	Updated list of codes and standards provided with a summary of changes to the list predating the design?			
	“Owning” Bureau engineering and/or operations management review and approval of the preliminary (60%) and final (100%) designs?			
	Provided Owning Bureau documentation to complete PHA and MOC, including all QA documentation and as built drawings?			
P r e	QA Plan submitted (when specified, or see next item below)?			
	Have summary / listing of all specs, procedures and plans governing fabrication, receipt and installation QA prepared and the documents are available to support construction QA?			
C o n s t r u c t i o n	Confirmed contractors performing/documenting receipt inspection QA: > Shipping/packing documents and items themselves checked against Pos/specs to verify the proper material/equipment was received. > All items clearly marked/ID’d, including useful life. > Periodic checks on items in storage subject to deterioration. > All items controlled from the point of receipt through installation. > All items maintained, properly stored and used per manufacturer’s storage/handling requirements to prevent damage, loss, deterioration.			
	Performed/documenting independent receipt QA on major chlorination equipment per <i>Chlorine Equipment QA Checklist</i> ?			
	Confirmed contractors perform required installation QA insp./testing?			
	Directly observed and reported on critical installation QA activities as indicated in <i>Chlorine Equipment QA Checklist</i> ?			
	Verified BEDC Quality Assurance Section (QAS) inspection of any equipment specified in QAS Inspection and Testing Plan?			
	Contractor installation QA and post-installation acceptance tests (e.g., piping pressure tests) including calibrations and instrument / alarm tests documented per design specs and manufacturers instructions?			
	Acquired all Certifications of Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment, ASME Code vessel submittals for all pressure vessels and all other QA records from the contractor per <i>Chlorine Equipment QA Checklist</i> ? [Design responsibility]			
	Received QAS Inspection and Testing Reports from the contractor?			
	Verified completion of all other QA specified in <i>Chlorine Equipment QA Checklist</i> and the comprehensive Quality Assurance Plan (when specified)?			

¹ Refer to *Attachment A* of the DEP procedure Quality Assurance for Design and Construction of New and Modified RMP/PSM Regulated Chlorine Processes for specific guidance for all items on this list.

² This document is intended to be used in conjunction with the *Owner Bureau QA and Contractor QA Checklists* in implementing DEP’s above cited procedure.



ATTACHMENT B

Quality Assurance (QA) Checklist for Design/Construction Project Management

Phase / Task Description ^{1,2}	Responsible Person	Delegated To	Compl. (sign & date)
All Non-Conforming Reports (NCR) submitted for approval of the Disposition Plans? All Disposition Plans completed?			
Manage the QA submittals and records during the project?			
Involve a representative of the owner Bureau's management in substantial completion inspections?			
Received Contractor and Consultant QA final certifications w/all inspection/testing documentation (e.g., receipt QA, Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment, NCR corrective actions completed per NCR Disposition Plans, ASME Code vessel submittals, pressure tests, calibration tests, other installation testing, etc.) covering all construction work and indicating constructed substantially in compliance with specs?			
Transmitted final QA documentation (e.g., Quality Assurance Report, if specified) and other RMP/PSM requirements for startup to the Bureau operations (e.g., maintenance and operating procedures and PSI) for final acceptance?			



ATTACHMENT C Owning Bureau Role in BEDC Quality Assurance (QA) Checklist Obligations

Note: The following is a summary of suggested involvement of the Owning Bureau RMP staff in the *BEDC QA Checklist* obligations. Note that on some projects, the Owning Bureau may take a more active role.

Phase / Task Description ^{1,2}		Owning Bureau Role	Delegated To	Compl. (sign & date)
D e s i g n	Design plans/specs integrate requirements of Att. A of <i>Design and Construction of New and Modified RMP/PSM Regulated Chlorine Processes</i> under the “Design QA Requirement” column?	Review and verify		
	Updated list of codes and standards provided with a summary of changes to the list predating the design?	Review and verify		
	Owning Bureau engineering and/or operations management review and approval of the preliminary (60%) and final (100%) designs?	Participate, comment, approve		
	Obtained documentation to complete PHA and MOC, including all QA documentation and as built drawings.	Review and verify		
P r e	QA Plan submitted (when specified, or see next item below).	Review and verify		
	Have summary / listing of all specs, procedures and plans governing fabrication, receipt and installation QA prepared and the documents available to support construction QA.	Review and verify		
C o n s t r u c t i o n	Confirmed contractors performing/documenting receipt inspection QA: > Shipping/packing documents and items themselves checked against Pos/specs to verify the proper material/equipment was received. > All items clearly marked/ID'd, including useful life. > Periodic checks on items in storage subject to deterioration. > All items controlled from the point of receipt through installation. > All items maintained, properly stored and used per manufacturer's storage/handling requirements to prevent damage, loss, deterioration.	At Bureau's option, audit execution on selected equipment		
	Performed/documented independent receipt QA on major chlorination equipment per <i>Chlorine Equipment QA Checklist</i> ?	Same as above		
	Confirmed contractors perform required installation QA insp./testing?	Same as above		
	Directly observed and reported on critical installation QA activities as indicated in <i>Chlorine Equipment QA Checklist</i> ?	Same as above		
	Verified BEDC Quality Assurance Section (QAS) inspection of any equipment specified in QAS Inspection and Testing Plan?	Same as above		
	Contractor installation QA and post-installation acceptance tests (e.g., piping pressure tests) including calibrations and instrument / alarm tests documented per design specs and manufacturers instructions?	Same as above		
	Acquired all Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment, ASME Code vessel submittals for all pressure vessels and all other QA records from the contractor per <i>Chlorine Equipment QA Checklist</i> ? [Design responsibility]	Same as above		
Received QAS Inspection and Testing Reports from the contractor?	Same as above			

¹ Refer to Attachment A of the DEP procedure *Quality Assurance for Design and Construction of New and Modified RMP/PSM Regulated Chlorine Processes* for specific guidance for all items on this list.

² This document is intended to be used in conjunction with *Quality Assurance Checklist for Project Management and the Contractor Quality Assurance Checklists* in implementing DEP's above cited procedure.



ATTACHMENT C Owning Bureau Role in BEDC Quality Assurance (QA) Checklist Obligations

Phase / Task Description ^{1,2}	Owning Bureau Role	Delegated To	Compl. (sign & date)
Verified completion of all other QA specified in <i>Chlorine Equipment Quality Assurance Checklist</i> and the comprehensive Quality Assurance Plan (when specified)?	Same as above		
All Non-Conforming Reports (NCR) submitted for approval of the Disposition Plans? All Disposition Plans completed?	Same as above		
Managed the QA submittals and records during the project?	Same as above		
Involved a representative of the Owner Bureau's management in substantial completion inspections?	Participate, comment, approve		
Received Contractor and Consultant QA final certifications w/all inspection/testing documentation (e.g., receipt QA, Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment, NCR corrective actions completed per NCR Disposition Plans, ASME Code vessel submittals, pressure tests, calibration tests, other installation testing, etc.) covering all construction work and indicating constructed substantially in compliance with specs?	Verify receipt		
Transmitted final QA documentation (e.g., Quality Assurance Report, if specified) and other RMP/PSM requirements for startup to the Bureau operations (e.g., maintenance and operating procedures and PSI) for final acceptance?	Verify receipt		



ATTACHMENT D Contractor Quality Assurance (QA) Checklist

	Phase / Task Description ^{1,2}	Responsible Person	Delegated To	Compl. (sign & date)
R e c e i p t	Establish a process to ensure the identification, control, and traceability of quality affecting items used in construction and fabrication.			
	Obtain Certifications of Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment from manufacturers.			
	Perform/document receipt inspection QA on all equipment on receipt, including: > Shipping/packing documents and items themselves checked against POs/specs to verify the proper material/equipment was received and they are suitable for process application. > All items clearly marked/ID'd, including useful life. > Periodic checks on items in storage subject to deterioration. > All items controlled from the point of receipt through installation. > All items maintained, properly stored and used per manufacturer's storage/handling requirements to prevent damage, loss, deterioration. > All other receipt QA on major chlorination equipment per <i>Chlorine Equipment QA Checklist</i> .			
	Obtain ASME Code vessel submittals for all pressure vessels and all other QA records from the contractor per <i>Chlorine Equipment QA Checklist</i> .			
	Document the Receipt QA (<i>Att. E of DEP procedure QA for Design and Construction of New & Modified RMP Regulated Chlorine Processes</i> or equiv.).			
	Submit the Receipt QA records upon request and compile all QA records for turnover at substantial completion.			
F a b / P r e l i m i n a r y F i e l d T e s t i n g	Facilitate or complete fabrication QA inspection & testing as and when specified in the DEP QAS Inspection and Testing Plan.			
	Perform on-site fabrication/installation QA inspection & testing comparing the final product (throughout construction) to the plans and specifications and per Chlorine Equipment QA Checklist and manufacturer's installation instructions			
	Inspect equipment installation, perform/document calibrations and instrument / alarm tests per design specs and manufacturers instructions and make preliminary field tests as soon as conditions permit of the equipment and appliances furnished.			
	Complete final installation QA inspection/tests to confirm equipment/appliances properly installed per specs/manufacturer's instructions, meet operating cycles and are free from defects (e.g., overheating, overloading and undue vibration).			
	Perform all necessary corrective actions, adjustments and replacements in preparation for placing the equipment into service.			
Report critical installation QA activities as indicated in <i>Chlorine Equipment QA Checklist</i> and manufacturer's installation instructions.				
F i n a l	Upon completion of the work, subject all equipment and appliances to final field tests (e.g., piping pressure tests) witnessed by the Engineer, to prove that the fully assembled system and all equipment and appliances are properly installed consistent with design specifications and the manufacturer's instructions and are free from defects.			

¹ Refer to Attachment A of the DEP procedure *Quality Assurance for Design and Construction of New and Modified RMP/PSM Regulated Chlorine Processes* for specific guidance for all items on this list.

² This document is intended to be used in conjunction with *Quality Assurance Checklist for Project Management* and the *Owner Bureau QA Checklists* in implementing DEP's above cited procedure.



ATTACHMENT D Contractor Quality Assurance (QA) Checklist

Phase / Task Description ^{1,2}	Responsible Person	Delegated To	Compl. (sign & date)
All Non-Conforming Reports (NCR) submitted for approval of the Disposition Plans? All Disposition Plans completed?			
QA documentation shall include all required activities and demonstrate that the test results meet any relevant standards (e.g., pressure loss on leak test).			
Drawings of constructed or fabricated items shall reflect conditions during construction and at final completion of the project.			
Upon completion of the work, a final QA documentation submittal covering all construction work and indicating constructed substantially in compliance with specs. Includes all receipt inspection QA, Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment, NCR corrective actions completed per NCR Disposition Plans, ASME Code vessel submittals, pressure tests, calibration tests, other fabrication and construction installation testing and QA, as-built and other records of Risk Management Programs documentation required by the specs (e.g., as-built drawings, operating and maintenance procedures, etc.) shall be submitted for approval to the Engineer and the facility representative (including, when specified, a final consolidated Construction QA Report demonstrating completion of all QA specified in Chlorine Equipment QA Checklist and the QA Plan).			
Transmitted other final RMP/PSM requirements for startup (e.g., maintenance and operating procedures and PSI) for final acceptance, when required.			



ATTACHMENT E

Equipment Quality Assurance (QA) Checklist of Minimum Applicable Standards and Certificates

Note: Must be used by the Design Engineer to verify that the requirements are in the specifications and by the construction QA personnel to verify that documentation is received. Verify at minimum that equipment meets the primary standards listed applicable to construction QA. "Certificates Required" are Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment expected to normally be in contact with chlorine (not ancillaries, ducts, etc.).

Equipment	Primary Standards/Requirements Applicable to QA	Certificate Required?	In Spec?	Rec'd?
Chlorinator	<input checked="" type="checkbox"/> Meets Chlorine Institute (CI) Pamphlet 6, Edition 15.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Chlorine Evaporator	<input checked="" type="checkbox"/> Meets the requirements of CI Pamphlet 9, Edition 6. <input checked="" type="checkbox"/> Certificate of compliance Form U-1A provided and has ASME "L" stamp per ASME Boiler & Pressure Vessel Code, Section VII, Division 1, Part UW-2.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Rupture Disks	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15, Sections 5.1 and 5.2. <input checked="" type="checkbox"/> ASME Boiler & Pressure Vessel Code, Section VIII, Div. I, Part UG-127.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Safety Relief Valves (PSV)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 5.2. <input checked="" type="checkbox"/> Stored in a vertical position per API 576.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Switches	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 <input checked="" type="checkbox"/> Meets CI Pamphlet 165, Ed. 1.	<input checked="" type="checkbox"/> Yes (if regular Cl ₂ contact)	<input type="checkbox"/>	<input type="checkbox"/>
Other Detectors, Switches and Controls (e.g., level, temp.)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 6. <input checked="" type="checkbox"/> Meets CI Pamphlet 165, Ed. 1.	<input checked="" type="checkbox"/> Yes (if reg. Cl ₂ contact; may be covered in package system cert.)	<input type="checkbox"/>	<input type="checkbox"/>
Electrical Enclosures	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 6. <input checked="" type="checkbox"/> Meets NEMA Pub. 250, "Enclosures for Electrical Equipment (1000 V Maximum).		<input type="checkbox"/>	
Chlorine Pressure Gauge (Liquid Cl ₂)	<input checked="" type="checkbox"/> Rated to 800 psi. <input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15. <input checked="" type="checkbox"/> Meets CI Pamphlet 165, Ed. 1.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Chlorine Pressure Gauge (Vapor Cl ₂)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15. <input checked="" type="checkbox"/> Meets CI Pamphlet 165, Ed. 1.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Misc. Appurtenances: > Basket Strainer	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15.	<input checked="" type="checkbox"/> Yes (if regular Cl ₂ contact)	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Regulating Valves	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15.	<input checked="" type="checkbox"/> Yes (if regular Cl ₂ contact)	<input type="checkbox"/>	<input type="checkbox"/>
Vacuum Regulating Valves	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15.	<input checked="" type="checkbox"/> Yes (if regular Cl ₂ contact)	<input type="checkbox"/>	<input type="checkbox"/>



ATTACHMENT E

Equipment Quality Assurance (QA) Checklist of Minimum Applicable Standards and Certificates

Equipment	Primary Standards/Requirements Applicable to QA	Certificate Required?	In Spec?	Rec'd?
Liquid Expansion Chambers	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 – Section 5.5, Section 10.6. <input checked="" type="checkbox"/> Meets CI Drawing 136. <input checked="" type="checkbox"/> If using ASME Boiler & Pressure Vessel Code Section VIII, Division I Part UW-2, certificate of compliance (Form U-2) provided and has ASME “L” stamp. <ul style="list-style-type: none"> • W-L: welding meets lethal gas requirements • S-L: fabricated using seamless pipe for lethal gas • HT: whole vessel post weld heat-treated • RT-1: complete vessel satisfies the full radiography requirements (100%) of all welded joints for lethal substances or design pressures exceeding 50 psi. <input checked="" type="checkbox"/> For DOT Cylinder, verify stamp meeting 49 CFR 178. <input checked="" type="checkbox"/> For Pipe, meets CI Pamphlet 6.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Pipe – Vacuum (to 1-1/2”)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 9. <input checked="" type="checkbox"/> ASTM D3915, Sch. 80 PVC with Screwed Joints (CI Pamphlet 6 refs D1784, but this is superseded by D3915)		<input type="checkbox"/>	
Pipe – Pressure (Class IV, to 1-1/2”)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 3. <input checked="" type="checkbox"/> Meets ASTM A106, Sch.80 Carbon Steel Seamless ASME/ANSI B36.10; ASME/ ANSI B31.31 <input checked="" type="checkbox"/> Verify maximum spacing and integrity of pipe and large valves hangers and supports.		<input type="checkbox"/>	
Fittings (Class IV, to 1-1/2”)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 3. <input checked="" type="checkbox"/> Meets ASTM A105 Class 3000 Forged Steel; ASME/ ANSI B16.11		<input type="checkbox"/>	
Flanges (Class IV, to 1-1/2”)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 3. <input checked="" type="checkbox"/> Meets ASTM A105 Class 300 Forged Steel; ASME/ ANSI B16.5		<input type="checkbox"/>	
Ammonia-Type Union (1000 psi; 2-bolt Flanged Union)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 3 (see Note 4, Table 3-1). <input checked="" type="checkbox"/> Meets ASTM A105 Class 300 Forged Steel; ASME/ ANSI B16.5		<input type="checkbox"/>	
Unions (Class IV, to 1-1/2”)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 3. <input checked="" type="checkbox"/> Meets ASTM A105 Class 300 Forged Steel; ASME/ ANSI B16.5		<input type="checkbox"/>	
Bolts (Class IV)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 3. <input checked="" type="checkbox"/> Meets ASTM A193, Grade B7.		<input type="checkbox"/>	
Nuts (Class IV)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 3. <input checked="" type="checkbox"/> Meets ASTM A194, Grade 2H.		<input type="checkbox"/>	
Gaskets (Class IV)	<input checked="" type="checkbox"/> Meets CI Pamphlet 95.	<input checked="" type="checkbox"/> Yes (if regular Cl2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
Chlorine Auxiliary Valves, Chlorine Manifold Valves	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15” above. <input checked="" type="checkbox"/> Meets CI Pamphlet Drawing 113.	<input checked="" type="checkbox"/> Yes (if regular Cl2 contact)	<input type="checkbox"/>	<input type="checkbox"/>



ATTACHMENT E

Equipment Quality Assurance (QA) Checklist of Minimum Applicable Standards and Certificates

Equipment	Primary Standards/Requirements Applicable to QA	Certificate Required?	In Spec?	Rec'd?
Globe Valves- Threaded or Socket Welded (Class IV; to 1 - 1/2")	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged API Class 800.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
Globe Valves- Flanged or Butt-Welded (Class IV)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged ANSI Classes 150 or 300.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
Unlined Ball Valves – Threaded (Class IV; to 1 – 1/2")	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged ANSI Classes 150 or 300.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
Unlined Ball Valves – Flanged (Class IV)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged ANSI Classes 150 or 300.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
Unlined Plug Valves - Threaded (Class IV; to 1 – 1/2")	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged ANSI Classes 150 or 300.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
Unlined Plug Valves – Flanged (Class IV)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged ANSI Classes 150 or 300.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
High Performance Butterfly Valves (Class IV; Unlined) – Wafer or Lugged	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged ANSI Classes 150 or 300.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
High-Performance Butterfly Valves (Class IV; unlined) – Flanged	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged ANSI Classes 150 or 300.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
Single-Seated Segmented Ball Valves – Wafer (Class IV)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged ANSI Classes 150 or 300.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
Single-Seated Segmented Ball Valves – Flanged (Class IV)	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 4. <input checked="" type="checkbox"/> Meets Forged ANSI Classes 150 or 300.	<input checked="" type="checkbox"/> Yes (if regular CI2 contact)	<input type="checkbox"/>	<input type="checkbox"/>
Chlorine Flexible Lines - Monel	<input checked="" type="checkbox"/> Meets CI Pamphlet 6, Ed. 15 - Section 7. <input checked="" type="checkbox"/> Meets ASTM B165, Cold Drawn, annealed.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Chlorine Emergency Shutoff Valves	<input checked="" type="checkbox"/> Installation per manufacturer's instructions. <input checked="" type="checkbox"/> Controls meet Local Building Code (and generally Int'l Fire Code 2003 or latest ed., Section 3704.2.2.10.3).	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>



ATTACHMENT E

Equipment Quality Assurance (QA) Checklist of Minimum Applicable Standards and Certificates

Equipment	Primary Standards/Requirements Applicable to QA	Certificate Required?	In Spec?	Rec'd?
Chlorine Emergency Scrubber	<input checked="" type="checkbox"/> Chlorine Institute Pamphlet 89, Ed. 3. <input checked="" type="checkbox"/> Local Building Code (and generally International Fire Code 2003 or latest edition, Section 3704, or Uniform Fire Code Article 80) <input checked="" type="checkbox"/> Manufacturer certification of conformance with IFC Section 3704.2.2.7.1 performance requirements or more stringent DEP specifications.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Top Running, Double Beam Crane	<input checked="" type="checkbox"/> Installation QA in accordance with OSHA 29 CFR 1910.179, ASME B30.17c, manufacturer O&M/Installation Manual. <input checked="" type="checkbox"/> Load Test performed and report provided.		<input type="checkbox"/>	
SCBA	<input checked="" type="checkbox"/> Manufacturer's Certificates of Conformance w/NIOSH/MSHA.		<input type="checkbox"/>	
Chlorine Emergency Kit	<input checked="" type="checkbox"/> Meets CI Pamphlet 1, Ed. 6. <input checked="" type="checkbox"/> Appropriate emergency kit for container size, e.g. Emergency Kit B for Chlorine Ton containers.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>
Chlorine Scales	<input checked="" type="checkbox"/> Manufacturer's Specifications Only		<input type="checkbox"/>	
Ventilation Fan (Cl ₂ Storage Room)	<input checked="" type="checkbox"/> Applicable NEMA Codes.		<input type="checkbox"/>	
Ventilation Fan (Chlorination Room)	<input checked="" type="checkbox"/> Applicable NEMA Codes.		<input type="checkbox"/>	
Ejector	<input checked="" type="checkbox"/> Manufacturer's Specifications Only.	<input checked="" type="checkbox"/> Yes (may be a part of Chlorinator system certificate)	<input type="checkbox"/>	<input type="checkbox"/>
Windsock	<input checked="" type="checkbox"/> Manufacturer's Specifications Only.		<input type="checkbox"/>	
Employee Evacuation Alarm	<input checked="" type="checkbox"/> Functional test and audibility in all areas in and around the chlorination process area confirmed. <input checked="" type="checkbox"/> Manufacturer's Specifications Only		<input type="checkbox"/>	
Atmospheric Monitoring Equipment for Cl ₂	<input checked="" type="checkbox"/> Meets CI Pamphlet 73, Ed. 7.		<input type="checkbox"/>	



ATTACHMENT F RECEIPT QA INSPECTION CHECKLIST

DEP Contract No.: _____ Ordered by: Prime Contractor Subcontractor

Name of Contractor/Subcontractor: _____

Contractor PO Number: _____

Relevant Specification: _____

Description of Equipment or Materials Received (attach work summary from contract):

- Yes No Verified that all items are clearly marked and identified.
- Yes No Checked shipping and packing documents and the items themselves against POs and relevant specifications and verified that the proper material/equipment was received.
- Yes No Verified that the items are not damaged.
- Yes No Verified that the useful-life of limited-life items are indicated on the product packaging.
- Yes No Confirmed that access to these items is controlled from the point of receipt through storage and installation.
- Yes No Identified the equipment as major chlorination equipment and notified the Resident Engineer to conduct independent quality assurance inspection.
- Yes No Confirmed the receipt of *Certificate of Conformance on Suitability for Chlorine Service* for chlorination and provided a copy to the Resident Engineer.
- Yes No Determined if the item is subject to environmental deterioration in storage and, if yes:
 - Identified the following storage inspection frequency: _____
 - Identified the following storage requirements are met: _____

Special Storage and Handling Requirements.

Inspection Certification:

I certify that I conducted the required receipt inspection of the equipment and relevant documentation and that the information presented on this inspection form is accurate and complete.

Signature: _____ Title: _____

Print Name: _____ Date: _____ Phone #: _____

Follow-Up Corrective Action Required (if applicable) and Completion Documentation:

Completed By: _____

Signature: _____

Date: _____



ATTACHMENT G

SAMPLE DESIGN / RE CONTRACT QA REQUIREMENTS

Quality Assurance (QA) Requirements to be Included in Design Contract RFPs:

- The Design Engineer shall develop and submit a Quality Assurance Plan (QA Plan) to DEP within 60 days of DEP's approval of the 60% design to define the QA requirement for all contractors and consultants from equipment ordering through receipt, installation and startup and to obtain a consolidated implementation record. The Design Engineer shall address DEP's comments and resubmit the plan within 60 days of receiving DEP comments, until approved by DEP. The final QA Plan shall be completed concurrent with the final design specifications. The QA Plan would define:
 - Required inspection and testing to be performed under the construction contracts.
 - The type and frequency of testing.
 - The type and frequency of inspection.
 - The frequency and distribution of testing and inspection reports.
 - The observations to be performed.
 - The frequency and distribution of observation reports.
- Design plans and specifications shall integrate all of the requirements given in Attachment A (of the DEP procedure *Quality Assurance for Design and Construction of New and Modified RMP Regulated Chlorine Processes*) under the "Design QA Requirement" column.
- Design/specifications shall be reviewed against current applicable codes and standards listed in the facility's Process Safety Information documentation and an updated list of codes and standards applicable to the process and equipment provided to DEP along with a summary of changes to the current list.
- The Design Engineer shall participate in design review meetings and address comments to obtain the "owning" DEP Bureau (or Division) engineering and/or operations management review and approval of the preliminary (60%) and final (100%) designs.
- When requested by DEP, the Design Engineer shall participate in Hazard Reviews, and Management of Change (MoC) reviews {and, for major changes, a *Process Hazard Analysis (PHA)*} of new processes or process modifications at the preliminary design stage (60%) and, if necessary, prior to startup. This will include design team participation and, at DEP's discretion, may also include services for Leading/Documenting the PHA.

Contract Quality Assurance (QA) Requirements to be Included in Construction Management RFPs:

- The Construction Manager/Resident Engineer shall confirm that the Contractors are performing receipt inspection Quality Assurance (QA) as required in the construction contract specifications and Quality Assurance Plan and shall directly perform and document independent receipt QA on major chlorination equipment as indicated in **Attachment A** of the DEP procedure *Quality Assurance for Design and Construction of New and Modified RMP Regulated Chlorine Processes*.
- The Construction Manager/Resident Engineer shall confirm that the Contractors are performing required installation QA inspection and testing and shall directly observe and report on critical installation QA activities as indicated in **Attachment A** of the DEP



ATTACHMENT G

SAMPLE DESIGN / RE CONTRACT QA REQUIREMENTS

procedure *Quality Assurance for Design and Construction of New and Modified RMP Regulated Chlorine Processes*.

- The Construction Manager/Resident Engineer shall verify that the Contractors meet all other QA and other RMP obligations and submit requisite documentation (see next section).
- The Construction Manager/Resident Engineer shall involve a representative of the operating Bureau's management in substantial completion inspections and in verifying completion of all required RMP items (MoC and PHA action item completion, turnover of QA information, as-built drawings, etc.) and obtain their approval prior to substantial completion.
- The Construction Manager/Resident Engineer shall manage the QA submittals and records during the project, shall provide requisite copies to the DEP **Contract Supervisor** and DEP operating Bureau RMP staff on request.
- Prior to final acceptance and startup, the Construction Manager/Resident Engineer shall submit a Quality Assurance Report to DEP summarizing the QA work and confirming that all inspected work was completed substantially in compliance with the approved construction documents. The report shall include a complete copy of all fabrication/construction QA certifications and other QA inspection and testing documentation completed by all Contractors, DEP personnel and Consultants performing QA functions during the construction and startup. The Construction Manager/Resident Engineer shall address DEP's comments and resubmit the plan within 60 days of receiving DEP comments, until approved by the DEP the **Contract Supervisor** and facility **RMP Manager**.



ATTACHMENT H

SAMPLE CONSTRUCTION CONTRACT QA REQUIREMENTS

The following should be incorporated into RMP construction contract language.

- Quality Program: Contractor shall establish, implement and maintain their own effective project Contractor Quality Program to manage, control, document and assure that their work complies with the requirements of the QA Plan and other contract documents. Contractor shall submit the project Contractor Quality Program to DEP for approval. The Contractor will address DEP's comments and obtain DEP approval prior to starting construction.
- The Contractor Quality Program shall include procedures, responsibilities and a clearly assigned organization necessary to assure adequate control (inspection) and assure quality for materials, workmanship, fabrication and operations covering both off-site fabrication and on-site construction work. Contractors must assign a person whose function is to manage all quality matters relating to the project and to audit the performance of other individuals who may be doing inspection and testing and to ensure that they are performed in compliance with all applicable standards and the contract documents. The Contractor would be required to have personnel on site performing QA whenever QA activities are required by the QA Plan or specifications during chlorination equipment and piping installation work.
- The Contractor would be required to identify those responsible for the various types of inspections and tests they are required to perform under the QA Plan. The quality assurance personnel of a fabricator are permitted to be inspectors if they are qualified for the tasks they perform (e.g., for code vessel certification by the authority having jurisdiction).
- Receipt Quality Assurance: Contractor shall check all equipment and associated manufacturer information upon receipt and verify that it conforms to the Purchase Order and contract specifications and are suitable for the process application for which they will be used. At minimum, the Contractor shall obtain Certifications of Certificates of Conformance on Suitability for Chlorine Service for all chlorination equipment, shall obtain ASME Code vessel submittals for all pressure vessels and perform all other receipt QA on major chlorination equipment indicated in **Attachment A** of the DEP procedure *Quality Assurance for Design and Construction of New and Modified RMP Regulated Chlorine Processes*. Processes shall be established to ensure the identification, control, and traceability of quality affecting items used in construction and fabrication. The Contractor shall document the Receipt QA (using **Attachment F** of the DEP procedure *Quality Assurance for Design and Construction of New and Modified RMP Regulated Chlorine Processes* or equivalent), produce the Receipt QA records upon request and turn over a complete copy of these records upon substantial completion.
- Fabrication and Preliminary Field Testing: The Contractor shall perform fabrication and installation QA inspection and testing comparing the final product (throughout construction) to the requirements established in the design and construction plans and specifications and shall report on critical installation QA activities as indicated in **Attachment A** of the DEP procedure *Quality Assurance for Design and Construction of New and Modified RMP Regulated Chlorine Processes* and manufacturer's installation instructions. As soon as conditions permit, the Contractor shall inspect the installation and make preliminary field tests of the equipment and appliances furnished. It shall supply all labor, materials and equipment for the inspection and testing. These tests shall determine whether or not the equipment and appliances have been properly installed consistent with design specifications



ATTACHMENT H

SAMPLE CONSTRUCTION CONTRACT QA REQUIREMENTS

and the manufacturer's instructions, meet their operating cycles and are free from defects such as overheating, overloading and undue vibration. The Contractor shall make all necessary changes, adjustments and replacements at his own expense in preparation for placing the equipment into service.

- Final Field Testing: Upon completion of the work and prior to final payment, all equipment and appliances will be subject to final field tests, witnessed by the Engineer, to prove that the fully assembled system and all equipment and appliances are properly installed consistent with design specifications and the manufacturer's instructions and are free from defects.
- Final Fabrication, As-Built and Installation QA Documents: Upon completion of the work and prior to final payment, all fabrication and construction QA, as-built and other records of Risk Management Programs documentation required by the specifications (e.g., as-built drawings, operating procedures, maintenance procedures, etc.) shall be submitted for approval to the Engineer and the facility representative. Drawings of constructed or fabricated items shall reflect conditions during construction and at final completion of the project. QA documentation shall include all required activities and demonstrate that the test results meet any relevant standards (e.g., pressure loss on leak test).



Attachment I Non-Conformance Report NCR - _____ - ____

Contract:	Specification Section & Sub-section:	DEP Assignment Code:	P.O. to Vendor (Issue Date):	Initial Issue Date:
Vendor:		Material / Equipment Inspected:		
Vendor Contact Name:				
Sub-vendor (If Applicable):		Vendor NCR No. (If Applicable):	See Also DJ:	
Sub-vendor Contact Name (If Applicable):		DEP QA PM:	Contact Date:	

Description and Cause of Non-Conformance:

- NOTE: NYCDEP TO BE IMMEDIATELY CONTACTED PRIOR TO ISSUANCE OF NCR -

Inspector's Name (Print)	Inspector's Signature	Date
--------------------------	-----------------------	------

Disposition (Check One Only):

- Disposition determined by QA PM. Re-inspection required after corrective action.
- Disposition to be proposed by Vendor and submitted to their Customer with this non-conformance Notice. Vendor to indicate item, condition and cause of non-conformance, proposed disposition with technical justification, recommended re-inspection items, measure to avoid recurrence, and impact on shipping schedule. Vendor is advised that this material or equipment may be subject to rejection and any work performed prior to resolution of the non-conformance is at the Vendor's own risk.

Disposition Plan (Check One Only):
 USE AS IS
 REPLACEMENT (As Applicable)
 REPAIR
 REWORK
 OTHER (Describe Below):
ATTACHMENT:
 YES
 NO
 _____ PAGES

- NOTE: DISPOSITION PLAN REQUIRES APPROVAL BY NYCDEP -

Prepared By (Vendor)	Date	Approved By (DEP QA PM)	Date
----------------------	------	-------------------------	------

Release for Non-Conformance and Verification:
ATTACHMENT:
 YES
 NO
 _____ PAGES

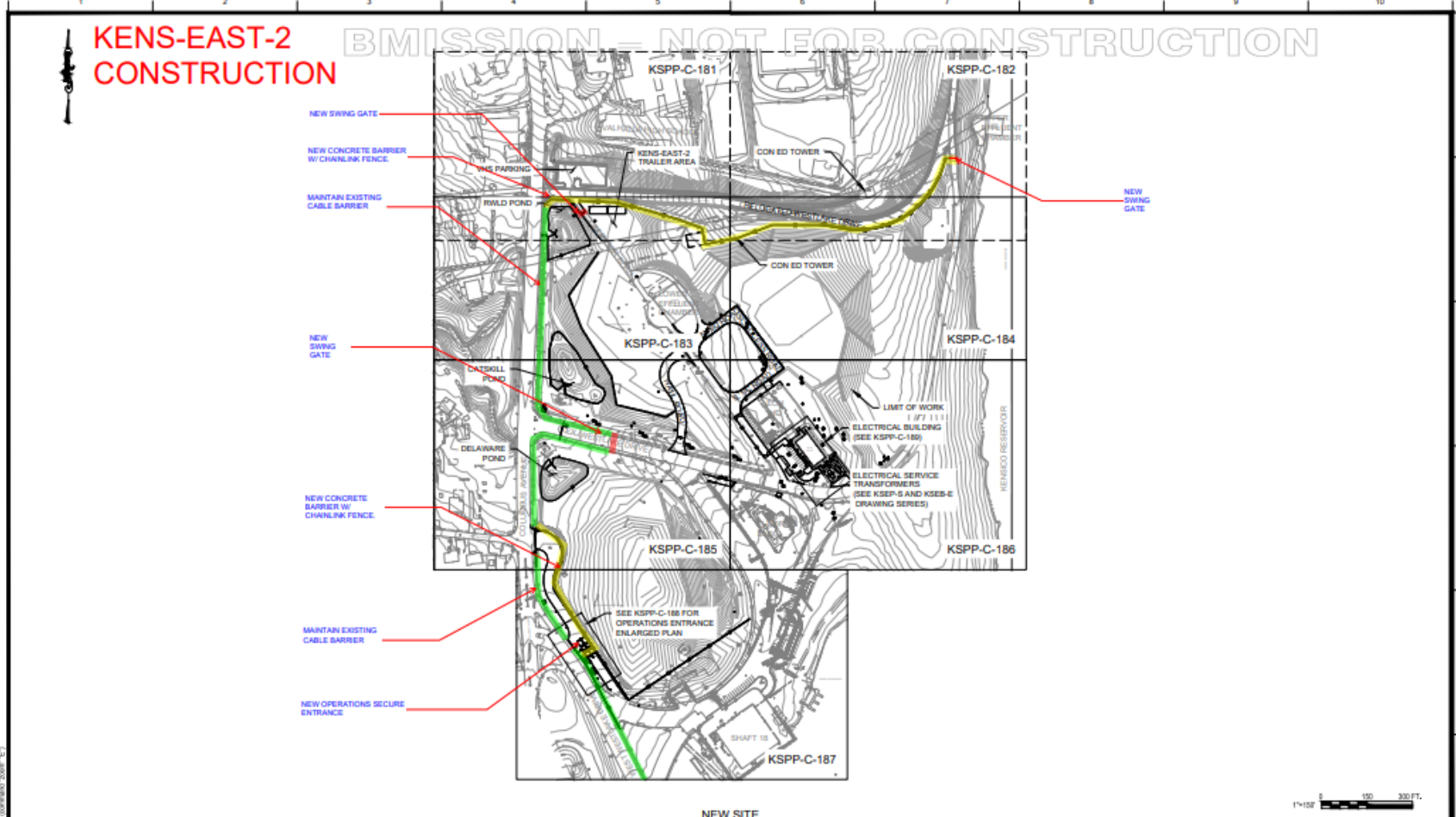
Inspector's Signature	Date	DEP QA PM Signature	Date
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SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2

EXHIBIT C – Kensico Site Bailout Requirements

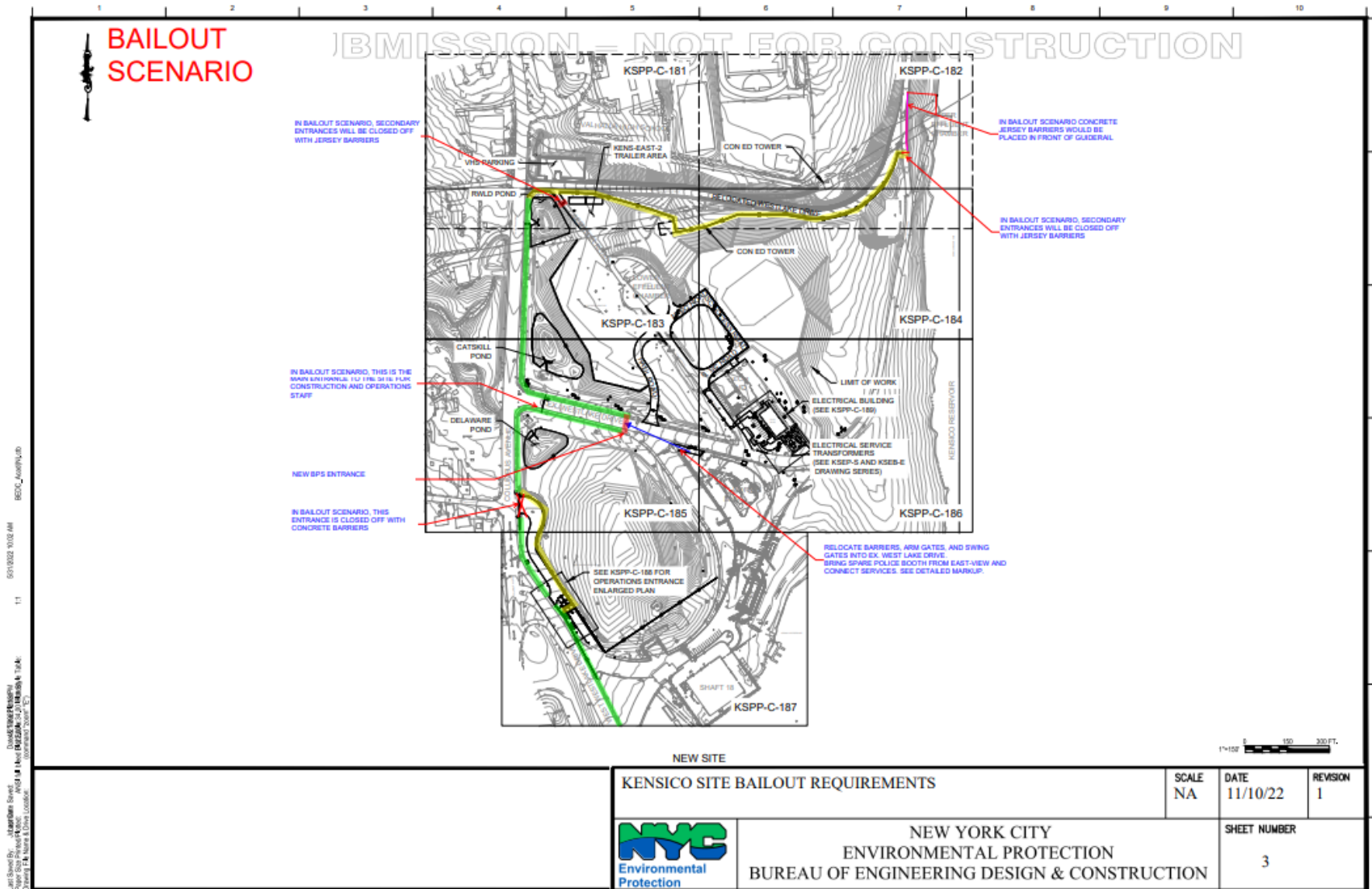
**SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2**



NEW SITE		KENSICO SITE BAILOUT REQUIREMENTS		SCALE NA	DATE 11/10/22	REVISION 1
		NEW YORK CITY ENVIRONMENTAL PROTECTION BUREAU OF ENGINEERING DESIGN & CONSTRUCTION			SHEET NUMBER 1	

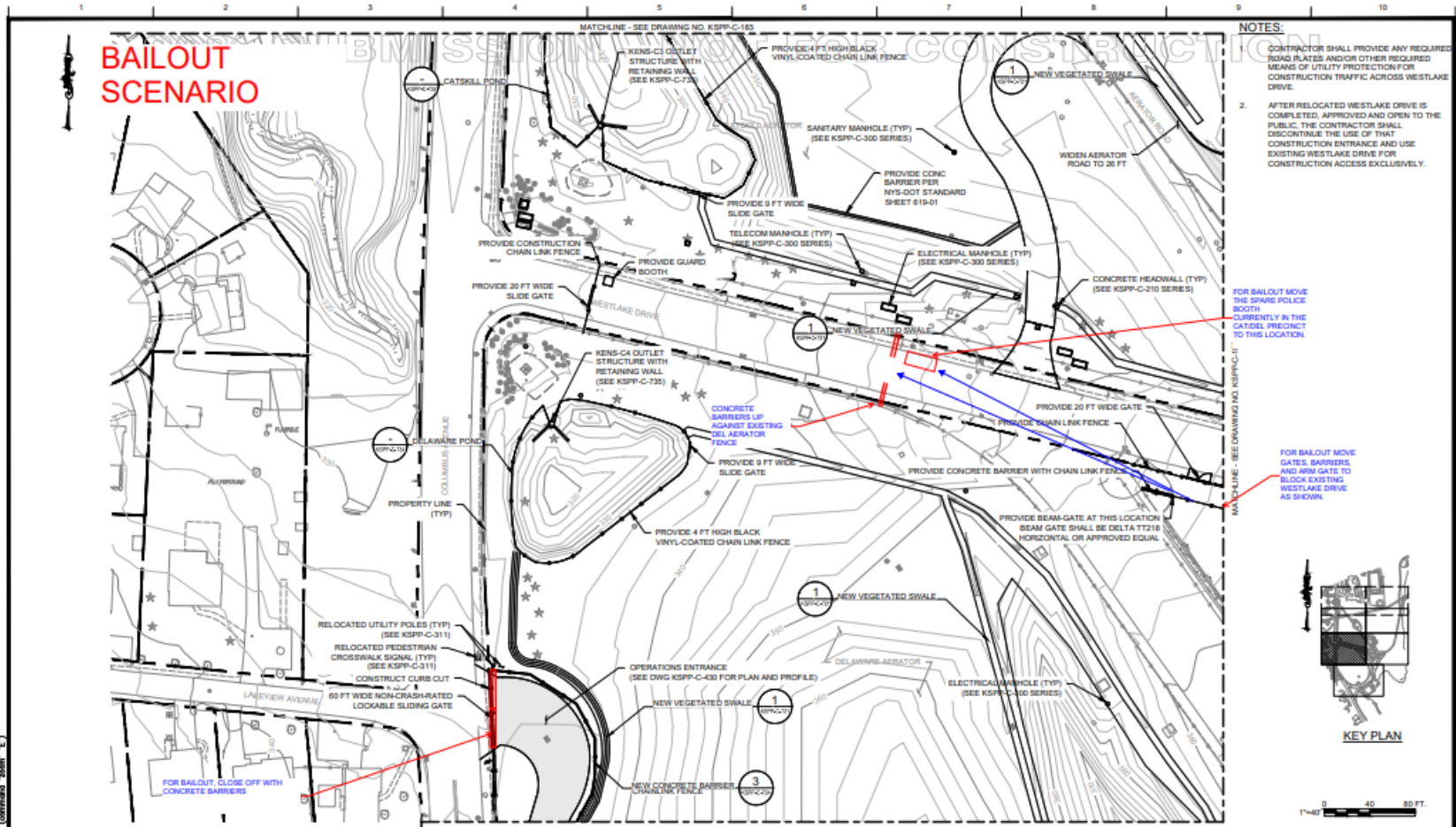
KENS-EAST-2 Kensico-Eastview Connection
Project Kensico Site Preparation

SECTION 01 14 00 – WORK RESTRICTIONS CONTRACT KENS-EAST-2



KENS-EAST-2 Kensico-Eastview Connection
Project Kensico Site Preparation

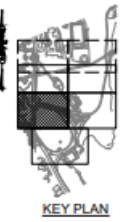
SECTION 01 14 00 – WORK RESTRICTIONS CONTRACT KENS-EAST-2



- NOTES:**
- CONTRACTOR SHALL PROVIDE ANY REQUIRED ROAD PLATES AND/OR OTHER REQUIRED MEANS OF UTILITY PROTECTION FOR CONSTRUCTION TRAFFIC ACROSS WESTLAKE DRIVE.
 - AFTER RELOCATED WESTLAKE DRIVE IS COMPLETED, APPROVED AND OPEN TO THE PUBLIC, THE CONTRACTOR SHALL DISCONTINUE THE USE OF THAT CONSTRUCTION ENTRANCE AND USE EXISTING WESTLAKE DRIVE FOR CONSTRUCTION ACCESS EXCLUSIVELY.

FOR BAILOUT MOVE THE SPARE POLICE BOOTH CURRENTLY IN THE GATEL POND TO THIS LOCATION.

FOR BAILOUT MOVE GATES, BARRIERS, AND ARM GATE TO BLOCK EXISTING WESTLAKE DRIVE AS SHOWN.



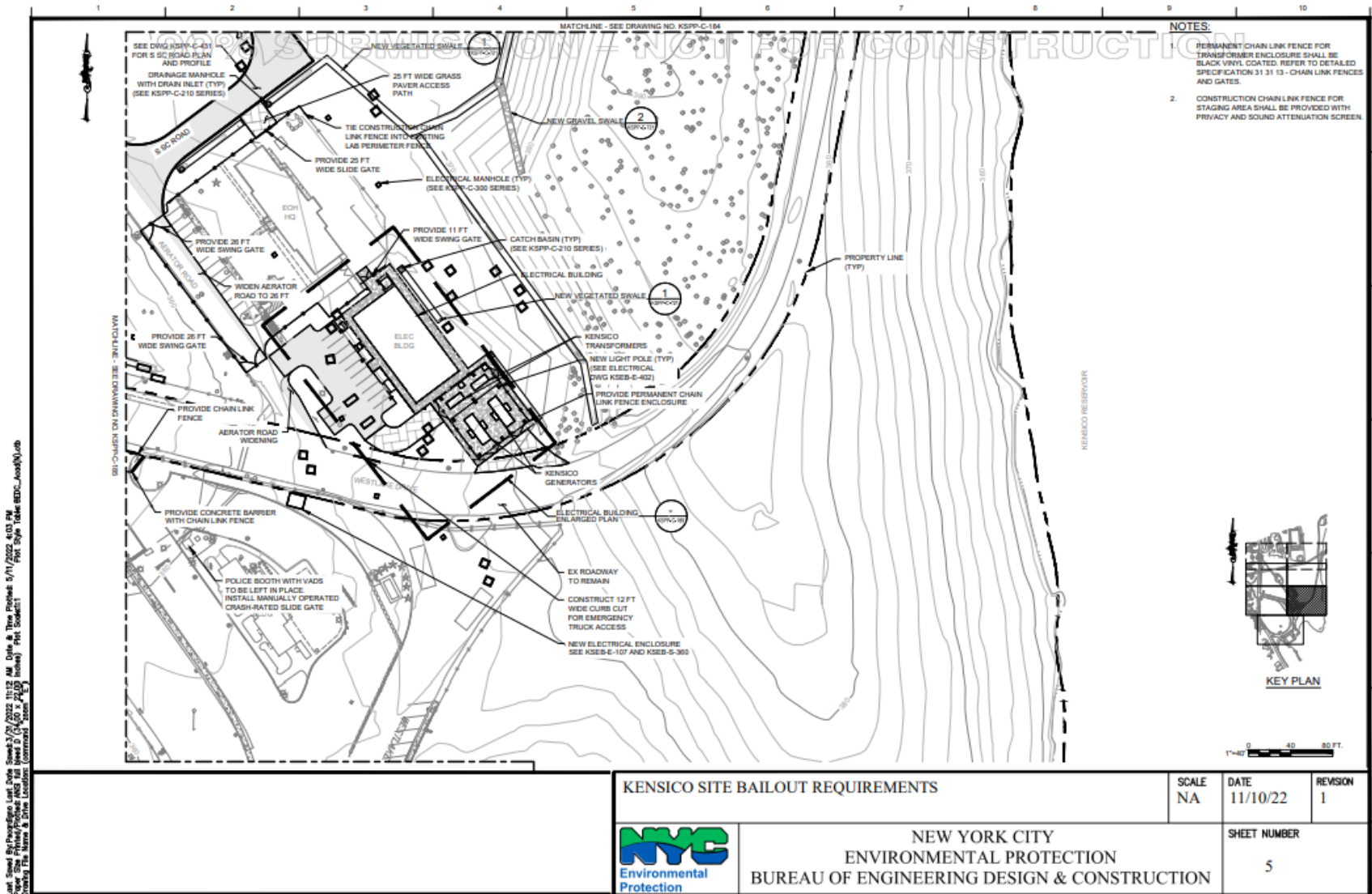
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KENSICO SITE BAILOUT REQUIREMENTS	SCALE NA	DATE 11/10/22	REVISION 1
 NEW YORK CITY ENVIRONMENTAL PROTECTION BUREAU OF ENGINEERING DESIGN & CONSTRUCTION	SHEET NUMBER 4		

Lead: [Name], [Title], [Phone], [Email], [Address]

10/27/2022 10:00 AM 10/27/2022 10:00 AM 10/27/2022 10:00 AM

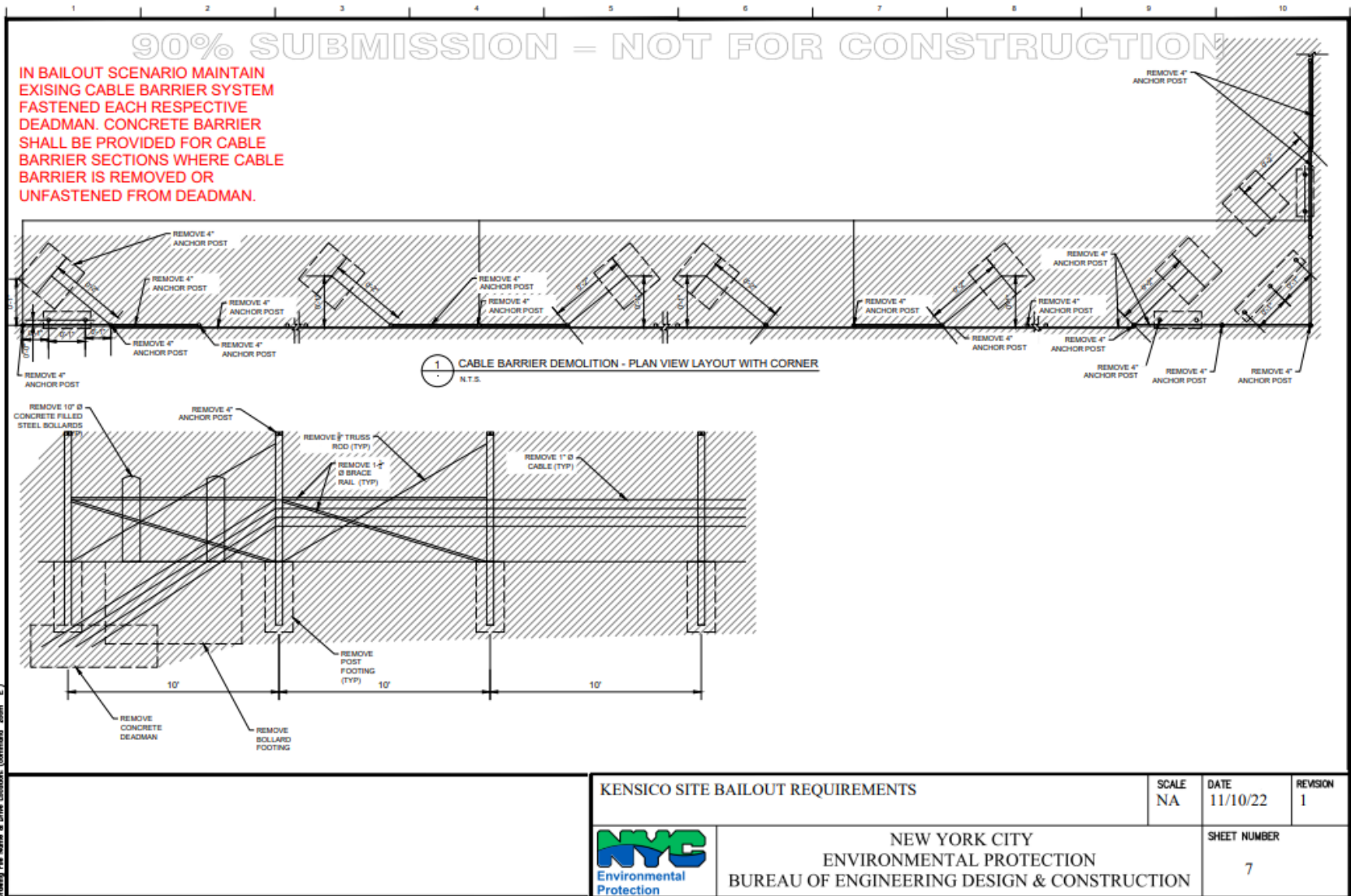
SECTION 01 14 00 – WORK RESTRICTIONS CONTRACT KENS-EAST-2



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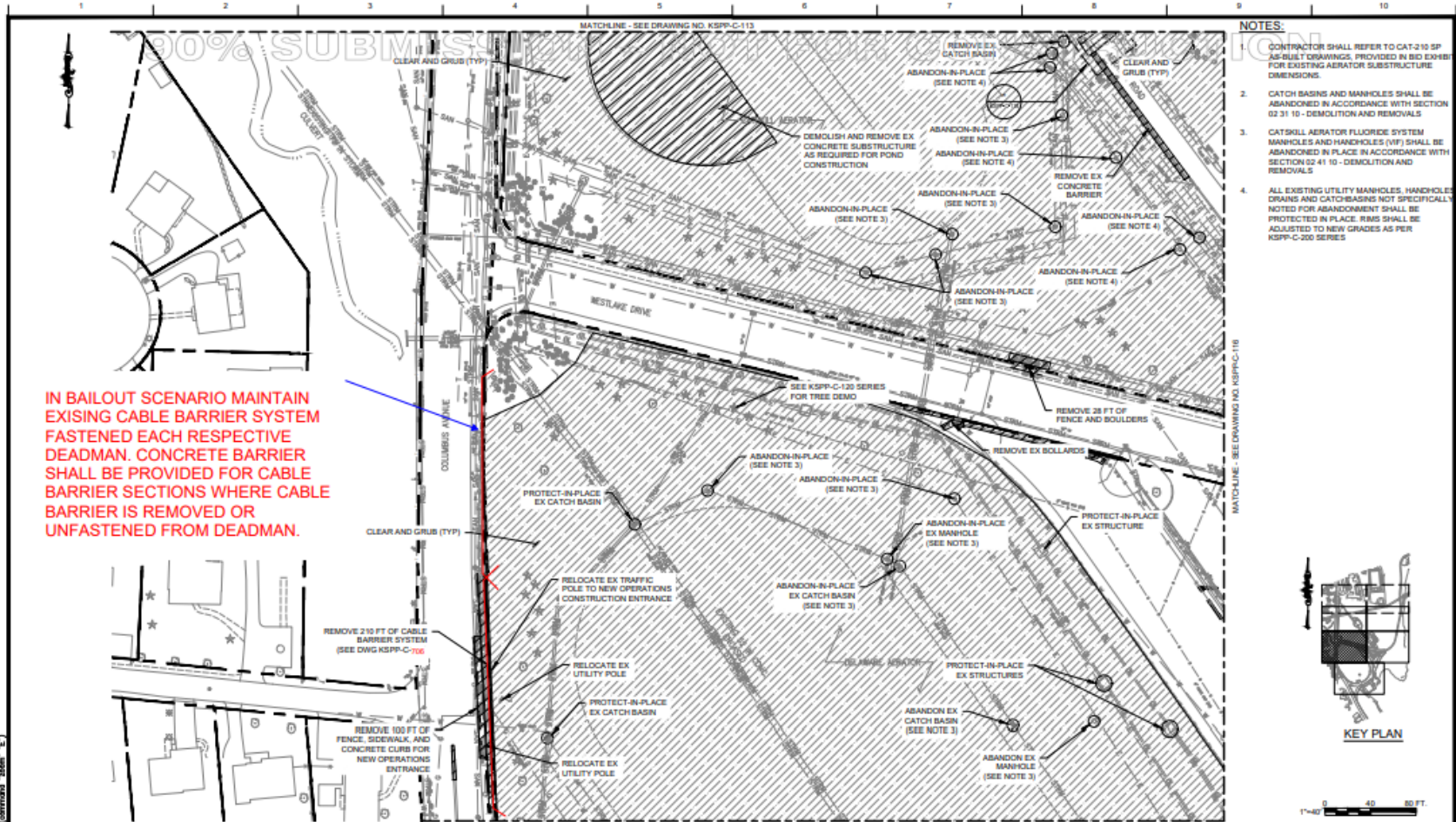
All inquiries regarding this drawing(s) or project should be made to NYC Environmental Protection, Bureau of Engineering Design and Construction.

**SECTION 01 14 00 – WORK RESTRICTIONS
CONTRACT KENS-EAST-2**



KENS-EAST-2 Kensico-Eastview Connection
Project Kensico Site Preparation

SECTION 01 14 00 – WORK RESTRICTIONS CONTRACT KENS-EAST-2



IN BAILOUT SCENARIO MAINTAIN EXISTING CABLE BARRIER SYSTEM FASTENED EACH RESPECTIVE DEADMAN. CONCRETE BARRIER SHALL BE PROVIDED FOR CABLE BARRIER SECTIONS WHERE CABLE BARRIER IS REMOVED OR UNFASTENED FROM DEADMAN.

- NOTES:**
- CONTRACTOR SHALL REFER TO CAT-210 SP AS-BUILT DRAWINGS, PROVIDED IN BID EXHIBIT FOR EXISTING AERATOR SUBSTRUCTURE DIMENSIONS.
 - CATCH BASINS AND MANHOLES SHALL BE ABANDONED IN ACCORDANCE WITH SECTION 02 31 10 - DEMOLITION AND REMOVALS.
 - CATSKILL AERATOR FLUORIDE SYSTEM MANHOLES AND HANDHOLES (VIF) SHALL BE ABANDONED IN PLACE IN ACCORDANCE WITH SECTION 03 41 10 - DEMOLITION AND REMOVALS.
 - ALL EXISTING UTILITY MANHOLES, HANDHOLES, DRAINS AND CATCHBASINS NOT SPECIFICALLY NOTED FOR ABANDONMENT SHALL BE PROTECTED IN PLACE. RMS SHALL BE ADJUSTED TO NEW GRADES AS PER KSPPP-C-200 SERIES.

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 Project: KENSICO Site Preparation
 Drawing: KENSICO Site Preparation - KENSICO Site Preparation - KENSICO Site Preparation
 Author: [Name]
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KENSICO SITE BAILOUT REQUIREMENTS		SCALE NA	DATE 11/10/22	REVISION 1
		NEW YORK CITY ENVIRONMENTAL PROTECTION BUREAU OF ENGINEERING DESIGN & CONSTRUCTION		
			SHEET NUMBER 8	

KENS-EAST-2 Kensico-Eastview Connection
Project Kensico Site Preparation

**SECTION 01 24 10 – VALUE ENGINEERING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor is encouraged and authorized to develop, prepare and submit to the Agency Chief Contracting Officer or his/her designee (the “ACCO”), in writing, Value Engineering Proposals (VEPs) for modifying the plans, Specifications or other requirements of the Contract for the sole purpose of reducing the net cost of construction.
- B. VEPs shall not impair, in any manner, the essential functions or characteristics of the Project, including but not limited to service life, economy of operation, ease of maintenance, desired appearance, design, and safety standards.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

B. VEP Cost Sharing and Payment

1. VEP net cost savings and payment shall be determined as follows:
2. “Net Cost Savings”: means the total reduction in Contractor cost of performance resulting from the acceptance of the VEP minus allowable Contractor development and implementation costs.
3. The City’s cost to review, design and implement the VEP shall be determined by the ACCO and fifty (50%) percent of such cost shall be deducted from the total Contract price as part of a VEP change order.
4. Payment for an accepted VEP shall be reflected in the adjusted total Contract price per the following:
 - a. Original Contract price for the Work;
 - b. Less fifty percent (50%) of Net Cost Savings;
 - c. Less fifty percent (50%) of the City’s Cost.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Abbreviations / Acronyms:

1. VEP - Value Engineering Proposal

1.05 DESCRIPTION

- A. Consideration of VEPs

1. The provisions of this Section shall not be construed to require DEP to consider any VEP, which may be submitted hereunder.
2. Proposed changes in the following will not be accepted as VEPs:
 - a. Water/wastewater treatment process
 - b. Plant or unit process performance characteristics and capacities
3. If a VEP submitted by the Contractor is similar to a change in the Contract Documents under consideration by DEP for the Project at the time said VEP is submitted, or if such a VEP is based upon or similar to Specifications, policy or details adopted by DEP after the advertisement for the Contract and prior to conceptual discussion between the Contractor and DEP, DEP

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will not accept such VEP and reserves the right to make such changes without compensation to the Contractor under the provisions of this Section.

4. A VEP that requires a material change in Contract scope will not be considered as an acceptable VEP.

B. The ACCO Is Sole Judge

1. The ACCO will be the sole judge of the acceptability of a VEP.
2. In determining the net cost savings, DEP reserves the right to disregard the Contract bid prices if in the judgment of the ACCO, such prices do not represent a fair measure of the value of Work to be performed or to be deleted.

C. Continuation of Contract Work

1. The Contractor shall continue to perform the Work in accordance with the requirements of the Contract until an executed change order incorporating an accepted VEP has been issued. If an executed change order has not been issued by the date upon which the Contractor's VEP specifies that a decision thereon should be made, or such other date as the Contractor may subsequently have specified in writing, such VEP shall be deemed rejected.

1.06 QUALITY ASSURANCE

- A. All approved VEPs shall deliver the same quality of product, finish, or workmanship as originally specified under the Contract.

1.07 SUBMITTALS

A. General

1. The Contractor's VEP submittal shall include the following in order to be considered for approval by the ACCO:
 - a. Cover letter proposing the VEP and written description.
 - b. Complete description of the difference between the existing Contract requirements and those proposed, listing of advantages and disadvantages associated with the VEP, and effect, if any, the VEP has on the performance of the Work.
 - c. Preliminary sketches.
 - d. List and analysis of the Contract requirements that must be changed if the VEP is accepted, including proposed Specification requirements.

SECTION 01 24 10 – VALUE ENGINEERING
CONTRACT KENS-EAST-2

- e. A separate, detailed cost estimate showing the affected portions of the existing Contract requirements and the cost savings associated with the VEP. The VEP cost estimate shall include an itemization of the Contractor's development and implementation costs along with all costs attributable to Subcontractors. This cost estimate shall be correlated, where required, with the original detailed estimate breakdown submitted by the Contractor.
 - f. Description and estimate of the costs DEP may incur implementing the VEP.
 - g. Prediction of effect the VEP will have on DEP's Operations and Maintenance costs should the VEP be accepted.
 - h. Statement of time by which a change order must be issued to achieve maximum value and cost reduction, noting any time impact on Contract milestones and the completion date. This statement shall be correlated with, where required, the baseline construction schedule in use for monitoring progress.
 - i. If the ACCO notifies the Contractor that additional information is required to evaluate the VEP, such information must be provided in a timely manner; otherwise, the VEP will be rejected.
- 2. The VEP shall be submitted to the ACCO for review and processing.
 - 3. VEPs may be submitted at any time following the Notice to Proceed and up to 90 days prior to the latest accepted date for Substantial Completion.
- B. Contract Time
- 1. Acceptance of a VEP and performance of the Work thereunder shall not extend the time for completion of the Contract unless specifically provided for in the Contract change order implementing the VEP.
- C. VEP Design Requirements
- 1. Upon acceptance of the VEP, the ACCO will incorporate the VEP into the Contract Documents. The cost to revise and update the Contract Documents shall be included in the DEP's cost.
- D. VEP Review and Acceptance
- 1. Within 15 days after the date of submittal of the VEP, the ACCO shall notify the Contractor of the status of the review of the VEP proposal. If DEP requires additional time to evaluate the Contractor's VEP, the ACCO will notify the Contractor of the additional review time required within such 15-day period.

**SECTION 01 24 10 – VALUE ENGINEERING
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2. The Contractor has the right to withdraw the VEP at any time during the review process.
3. Any VEP may be accepted in whole or part at the ACCO's discretion.
4. DEP expressly reserves the right to adopt a VEP for use on other contracts administered by it.
5. The accepted VEP shall be incorporated into the Contract pursuant to a change order. The change order will include any changes in the quantities of unit bid items and new agreed price items, as appropriate.
6. The ACCO will provide to the Contractor, along with the notification of the acceptance of the VEP, an assessment of DEP's cost in order to finalize VEP cost sharing and payment arrangements as defined in this Section. This will be used in determining the VEP change order amount.

E. Conditions

1. The following conditions shall apply to any VEP accepted by the ACCO:
 - a. Bid prices may not be based on the anticipated approval of a VEP, and if a VEP is rejected, the Contractor will be required to complete the Contract in accordance with the plans and Specifications at the prices bid.
 - b. Where a VEP has been approved and implemented by change order but subsequent modifications to the VEP are necessary in order to adjust for unanticipated field or other conditions, any further change order(s) to implement those subsequent modifications will provide for payment for any additional Work at prices no higher than those in the Contractor's bid, as if such Work was being done in accordance with the original Contract requirements.
 - c. If the Engineer determines that unsatisfactory results are being obtained as a result of Work performed pursuant to an implemented VEP, he/she may reject all or any portion of such Work and direct its removal, and require the Contractor to proceed in accordance with the original Contract requirements. The change order required to "reverse" the VEP shall not entitle the Contractor to compensation for any Work performed under the failed VEP or for its removal. Such rejection or limitation of reimbursement shall not constitute the basis of any claim against DEP.
 - d. All terms and conditions of the Contract, including quality of the Work and inspection, shall apply to a VEP accepted by the ACCO as if the VEP was included originally.

**SECTION 01 24 10 – VALUE ENGINEERING
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- e. The Contractor shall have no claim against DEP due to or arising from the ACCO's rejection of a VEP.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 APPLICATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

SECTION 01 24 10 – VALUE ENGINEERING
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END OF SECTION

SECTION 01 24 10 – VALUE ENGINEERING
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

**SECTION 01 27 00 – MEASUREMENT AND PAYMENT
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Total Bid Price for the Contract shall include the following items in the Bid Schedule of Prices.
 - 1. Lump Sum Prices (Contract Items LS-1 through LS-4)
 - 2. Unit Price Items (Contract Items UP-1 through UP-6)
 - 3. Allowances (Contract Items A-1 through A-11)
- B. Excluding the Allowance and Unit Price items specified in this Section, no separate payment will be made for the Work. All costs thereof shall be included by the Contractor in its lump sum prices bid for the Contract.
- C. Payment of the Total Bid Price shall be in accordance with the requirements of the Contract Documents.
- D. The following index of this Section is presented for convenience:

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SECTION 01 27 00 – MEASUREMENT AND PAYMENT
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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. Lump Sum Price Contract Items

- 1. Contract Item LS-1 - Mobilization

- a. Under Contract Item LS-1 - Mobilization, the Contractor shall offset all costs necessary to commence the Work, including but not limited to, staging and production, supervision and prefinancing as required under this Contract.
- b. The value for Mobilization, as indicated on the Bid Schedule of Prices, shall not exceed four percent (4%) of the Total Bid Price for the Contract, excluding the bid values for all Allowance Items. Should the Contractor's bid for mobilization exceed 4%, the Mobilization Item shall be adjusted to 4% with any overage added to LS-3 Work Result. In no event will the Total Bid Price for the Contract be adjusted because of this re-allocation.
- c. The Contractor shall be paid one-half of Mobilization in the first partial payment.
- d. The Contractor shall be paid the remainder of Mobilization in a subsequent partial payment after all of the following deliverables are completed to the satisfaction of the Resident Engineer:
 - 1) Performance and Payment Bonds per Schedule A.
 - 2) Insurance per Schedule A.
 - 3) Preliminary and Final Schedule of Values per Section 01 29 10 – Schedule of Values.
 - 4) Preliminary CPM Schedule per Section 01 32 10– Progress Scheduling.
 - 5) Final Detailed CPM Schedule per Section 01 32 10– Progress Scheduling.

SECTION 01 27 00 – MEASUREMENT AND PAYMENT
CONTRACT KENS-EAST-2

- 6) Submissions pertaining to Environmental, Health, and Safety Requirements per Section 01 35 27 – Environmental Health and Safety Requirements.
 - 7) Submissions pertaining to Contractor’s Work Quality per Section 01 43 05 - Contractor’s Work Quality, including the Contractor’s Quality Assurance/Quality Control (QA/QC) Management Plan.
 - 8) Installation of the project information panel and its supports per Section 01 58 13 – Temporary Project Signage.
 - 9) Installation and removal of Interim Engineer’s Trailers per Section 01 52 10 – Temporary Field Office Trailers
 - 10) Installation of Engineer’s Field Office Trailers including Furniture and Kitchen Items per Section 01 52 10 – Temporary Field Office Trailers
 - 11) Installation of Contractor’s Field Offices and Other Personnel Facilities per Section 01 52 10 – Temporary Field Office Trailers
 - e. The 5% retainage specified in Schedule A applies to all payments including those for Mobilization.
 - f. The payments for Mobilization do not apply to costs associated with change orders.
 - 12)
2. Contract Item LS-2 – General Contract Activities
- a. The amount paid for General Contract Activities, as indicated on the Bid Schedule of Prices, shall not exceed six percent (6%) of the Total Bid Price for the Contract, excluding the bid values for Mobilization, and all Allowance items. Should the Contractor’s bid for General Contract Activities exceed 6%, the General Contract Activities Item shall be adjusted to 6%, with any overage added to the LS-3 Work Result Contract Item. In no event will the Total Bid Price for the Contract be adjusted because of this re-allocation.
 - b. The Contractor shall be paid 2.8% of the LS-2 amount for General Contract Activities on a monthly basis with each partial payment, not inclusive of change orders, up to the date of Substantial Completion as defined in Schedule A. Any balance remaining after this date will be paid in the Final Payment for the work, after the Resident Engineer has certified that all Work under this item has been satisfactorily completed.
 - c. The following shall be compensated by General Contract Activities:

SECTION 01 27 00 – MEASUREMENT AND PAYMENT
CONTRACT KENS-EAST-2

- 1) Contractor’s Superintendent per Article 5 of the General Conditions.
- 2) Surveys per Article 6 of the General Conditions.
- 3) Contractor’s Daily Reports per Article 7 of the General Conditions.
- 4) Activities pertaining to Summary of Work per Section 01 11 00 – Summary of Work.
- 5) Activities pertaining to Work Restrictions per Section 01 14 00 – Work Restrictions.
- 6) Activities pertaining to Value Engineering per Section 01 24 10 – Value Engineering
- 7) Activities pertaining to Measurement and Payment per Section 01 27 00 – Measurement and Payment
- 8) Activities pertaining to Project Milestones and Scheduling Constraints per Section 01 27 10 – Project Milestones and Scheduling Constraints
- 9) Activities pertaining to Project Partnering per Section 01 31 10 – Project Partnering
- 10) Project Coordination activities per Section 01 31 15 – Project Coordination.
- 11) Use of the Web-based Project Management Information System per Section 01 31 25 – Web Based Project Management Information System.
- 12) Monthly CPM Progress Meetings and Monthly CPM Update Reports per Section 01 32 10 – Project Scheduling.
- 13) All job photographs and videos per Section 01 32 30 – Job Photographs and Videos.
- 14) All submittals per Section 01 33 00 – Submittal Procedures.
- 15) Activities pertaining to Environmental, Health, and Safety requirements per Section 01 35 27 - Environmental, Health, and Safety Requirements, except site safety representative efforts.
- 16) Activities pertaining to Working in Hazardous Locations per Section 01 35 44 - Working in Hazardous Locations
- 17) Activities pertaining to Hazardous Materials Control per Section 01 35 45 – Hazardous Materials Control.

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- 18) Regulatory requirements including obtaining all required Contractor permits per Section 01 41 00 – Regulatory Requirements.
- 19) Activities pertaining to Contractor’s Work Quality per Section 01 43 05 - Contractor’s Work Quality, excluding the Contractor’s Quality Assurance/Quality Control Management Plan.
- 20) Activities pertaining to Quality Assurance Inspection per Section 01 43 10 - Quality Assurance Inspection.
- 21) Activities related to Witness Shop Testing per Section 01 43 15 - Witness Shop Testing.
- 22) Activities pertaining to Approval of Product Manufacturers per Section 01 43 20 - Approval of Product Manufacturers.
- 23) Activities related to Temporary Water and Sanitary Services per Section 01 51 11 - Temporary Water and Sanitary Services, not including removal.
- 24) Activities related to Temporary Heat and Ventilation per Section 01 51 12 – Temporary Heat and Ventilation.
- 25) Activities related to Temporary Electrical Systems per Section 01 51 30 - Temporary Electrical Systems, not including removal.
- 26) Maintenance related to Temporary Field Office Trailers per Section 01 52 10 - Temporary Field Office, not including removal.
- 27) All work requirements related to Field Office Equipment and Supplies per Section 01 52 40 - Field Office Equipment and Supplies.
- 28) Activities pertaining to Temporary Guard Booths per Section 01 52 50 – Temporary Guard Booths, not including removal.
- 29) Activities pertaining to Vehicular Access and Parking per Section 01 55 00 - Vehicular Access and Parking.
- 30) Activities pertaining to Traffic Control per Section 01 55 26 – Traffic Control, not including removal.
- 31) All Work Requirements for Temporary Barriers and Enclosures as per Section 01 56 00 - Temporary Barriers and Enclosures, not including removal.
- 32) All Work Requirements for Temporary Controls per Section 01 57 00 – Temporary Controls.

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- 33) Activities pertaining to Pest Control per Section 01 57 16 - Temporary Pest Control.
 - 34) Activities pertaining to General Product Requirements per Section 01 61 50 - General Product Requirements.
 - 35) Activities pertaining to Product Delivery Requirements per Section 01 65 00 - Product Delivery Requirement.
 - 36) Activities pertaining to Protection of Materials and Equipment per Section 01 66 00 - Protection of Materials and Equipment.
 - 37) Activities pertaining to Protection and Restoration of Structures per Section 01 71 30 - Protection and Restoration of Structures.
 - 38) Activities pertaining to General Construction Requirements per Section 01 71 50 - General Construction Requirements.
 - 39) Activities pertaining to Maintenance of Operations and Construction Staging per Section 01 73 12 - Maintenance of Operations and Construction Staging.
 - 40) Activities pertaining to Installation of Equipment per Section 01 73 17 - Installation of Equipment
 - 41) Activities pertaining to Cleaning and Site Maintenance per Section 01 74 17 - Cleaning and Site Maintenance, except final cleaning.
 - 42) Activities pertaining to Construction Waste Management per Section 01 74 20 - Construction Waste Management.
 - 43) Activities pertaining to Preliminary and Final Field Tests per Section 01 75 10 - Preliminary and Final Field Tests.
 - 44) Activities pertaining to Project Closeout per Section 01 78 10 – Project Closeout.
 - 45) Records in Paper Formats per Section 01 78 40 – Records in Paper Formats.
 - 46) Records in Electronic Formats per Section 01 78 42 – Electronic Formats.
 - 47) Activities pertaining to Equipment Start-up and Training per Section 01 79 05 – Equipment Start Up and Training
- d. The 5% retainage specified in Schedule A applies to all payments including those for this item LS-2 - General Contract Activities.
 - e. The payments for LS-2 - General Contract Activities do not apply to costs associated with change orders.

SECTION 01 27 00 – MEASUREMENT AND PAYMENT
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3. Contract Item LS-3 – Work Result
 - a. Contract Item LS-3 has been provided on the Bid Schedule of Prices as a lump sum price for all Contract Work not inclusive of Mobilization, General Contract Activities, De-Mobilization, Unit Prices and Allowance items.
 - b. Payment under Contract Item LS-3 will constitute full compensation for all labor and materials required to complete all Work under this Contract, with the exception of Mobilization, General Contract Activities, De-Mobilization, the Unit Price Items and Allowances as specified herein and shown on the Bid Schedule of Prices.

4. Contract Item LS-4 – De-Mobilization
 - a. Under Contract Item LS-4 – De-Mobilization, the Contractor shall offset all costs necessary to de-mobilize the Work, including but not limited removal of all temporary facilities, materials and equipment from the Site, as well as removal of all Contractor’s facilities in the staging area, as required under this Contract. The following Work shall be compensated by Contract Item LS-4 – De-Mobilization:
 - 1) Removals pertaining to Temporary Water and Sanitary Services per Section 01 51 11 - Temporary Water and Sanitary Services.
 - 2) Removals pertaining to Temporary Electrical Systems per Section 01 51 30 - Temporary Electrical Systems.
 - 3) Removals pertaining to Temporary Field Office Trailers per Section 01 52 10 - Temporary Field Office Trailers.
 - 4) Removal pertaining to Temporary Guard Booth Removal per Section – 01 52 50 Temporary Guard Booth
 - 5) Removals pertaining to Traffic Control per Section 01 55 26 - Traffic Control.
 - 6) Removals pertaining to Temporary Barriers and Enclosures per Section 01 56 00 - Temporary Barriers and Enclosures.
 - 7) Removals of the project information panel and its supports per Section 01 58 13 - Temporary Project Signage.
 - 8) Final Cleaning per Section 01 74 17 - Cleaning and Site Maintenance.
 - 9) Providing all Operations and Manuals as required under this Contract per Specification 01 78 25.
 - 10) Final Record Documents per Section 01 78 39 - Final Record Documents.

SECTION 01 27 00 – MEASUREMENT AND PAYMENT
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- b. The value for De-Mobilization shall be equal to one-half of the total value of LS-1 Mobilization, in accordance with Section 1.05(A).1.b above. Should the Contractor's bid for De-Mobilization exceed one-half of the total value of LS-1 Mobilization, the De-Mobilization Item will be adjusted to one-half of the total value of LS-1 Mobilization, with any overage added to LS-3 Work Result. In no event will the Total Bid Price for the Contract be adjusted because of this re-allocation. Notwithstanding any other Contract Item, Contract Item LS-4 shall not be considered to pay for Work to be paid under other Contract Items included elsewhere in the Contract, and shall be considered in addition to any such other Contract Items. The Contractor shall be paid the De-Mobilization Price in the Final Payment for the Work, after the Resident Engineer has certified that all Work under this item has been satisfactorily completed.

B. Unit Price Items

1. Contract Items UP-1 through UP-6 have been provided on the Bid Schedule as unit prices for the Contract.
 - a. Payment under Contract Items UP-1 through UP-6 will constitute full compensation without limitation for all services, labor and materials, necessary to complete a respective unit of work.
 - b. The Contractor and the Engineer shall meet and jointly review the Contractor's "pencil copy" of the payment request prior to submission. The payment request shall include the quantity of unit price Work performed during the performance period.
2. Contract Items UP-1 through UP-5 – Tree Removal
 - a. Description: Under Contract Items UP-1 through UP-5, the Contractor shall furnish all labor, tools, equipment and incidentals associated with removal of trees. All Work shall be in accordance with Section 31 10 10 – Site Clearing.
 - b. Measurement for Payment: Payment will be made at the unit price bid per tree of each size, with specified diameter at breast height measured by a calibrated diameter tape. Under Contract Items UP-1 through UP-5, the quantity of tree removal to be measured for payment shall be the number of trees removed the Contract Drawings and as approved by the Engineer for the following Contract Items:
 - 1) UP-1 – Tree Removal, 4 inches to 6 inches (Each)
 - 2) UP-2 – Tree Removal, 6 inches to 12 inches (Each)
 - 3) UP-3 – Tree Removal, 12 inches to 18 inches (Each)

SECTION 01 27 00 – MEASUREMENT AND PAYMENT
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- 4) UP-4 – Tree Removal, 18 inches to 24 inches (Each)
 - 5) UP-5 – Tree Removal, over 24 inches (Each)
 3. Contract Item UP-6 – Site Security at Kensico
Description: Contract Item UP-6 constitutes full compensation for the costs of providing security guard service for protecting the Kensico site as directed and approved by the Engineer, in accordance with the Contract Documents.
Measurement of Payment: Payment will be made at the unit price bid for each day for the duration of the Work at the site.
- C. Allowances
1. Allowance Contract Items A-1 through A-10
 - a. Descriptions of the Work to be performed under the allowances can be found in the related Sections referenced herein. The amounts of the allowances are given in the Bid Schedule of Prices. The Allowances will be included, as listed under this Article, in the Total Bid Price for the Contract.
 - b. All work under the Allowance items set forth above shall be performed on a Time and Material basis. Price to be paid shall be the actual and reasonable cost, calculated in accordance with Articles 26.2.1 through 26.2.13 (excluding Article 26.2.10) and Article 26.3 of the City of New York Standard Construction Contract. The words “Extra Work” in the above referenced Articles shall be substituted with “Allowances” as outlined in this Section.
 2. Contract Item A-1: Unforeseen Hazardous Material Remediation as per Section 01 35 45 Hazardous Material Control and Removal of Unforeseen Regulated Material
 - a. Description: Perform unforeseen hazardous material remediation and disposal. This allowance shall include sampling, laboratory analysis, removal, and disposal, and all necessary reporting in accordance with Section 01 35 45 – Hazardous Material Control.
 - b. Payment for Contract Item A-1 shall be full compensation for all Work listed under this item. Time and Material records shall be submitted daily to the Engineer for approval. Rates used as the basis of Time and Materials payment must be submitted by the Contractor for review and approval prior to any such Work commencing.
 3. Contract Item A-2: Unforeseen Soil Sampling, Testing and Disposal
 - a. This allowance item shall be used to compensate the Contractor for soil sampling, testing, and disposal, as described in 02 24 20 – Soil Sampling and Analysis, should unforeseen contaminant be encountered that is not identified in the Contract Documents. This

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CONTRACT KENS-EAST-2

allowance does not include remediation or disposal of unforeseen hazardous materials contained in Allowance A-1 above. This allowance shall only be used when as directed and approved by the Resident Engineer.

4. Contract Item A-3: Support, Repair, Relocation, or Removal of Undetected and Unmapped Buried Utilities as described in Section 02 43 10 - Relocation of Utilities
 - a. Description: Payment for Contract Item A-3 shall be full compensation for all Work listed under this item. Such payment will include the cost of all labor, equipment, and materials necessary to perform all Work to protect-in-place, support, maintain, replace, install and repair or relocate unforeseen utilities. Time and Materials records will be submitted daily to the Engineer for approval. Rates used as the basis of Time and Materials payment must be submitted by the Contractor for review and approval prior to any such Work commencing.

5. Contract Item A-4: Engineer-Ordered Bailout
 - a. As discussed in further detail in Section 01 14 00, DEP may be required to activate the Catskill Aqueduct during the course of this Contract. If that occurs, this Allowance item may be used to compensate the Contractor for costs incurred to stabilize active construction areas and for construction schedule delays directly resulting from said Work stoppage and demobilization. This Allowance would also include Contractor's cost for establishing a secured perimeter in accordance with NYCDEP requirements as described in Section 01 14 00.

6. Contract Item A-5: Remobilization after an Engineer Ordered Bailout
 - a. As discussed in further detail in Section 01 14 00, DEP may be required to activate the Catskill Aqueduct during the course of this Contract. If that occurs, this Allowance item may be used to compensate the Contractor for costs incurred in remobilizing the construction areas and construction personnel after an Engineer-Ordered Bailout. In addition, reinstating the main and secondary entrances prior to bailout.

7. Contract Item A-6: Consolidated Edison Charges For New Feeders
 - a. This Allowance item shall be used to compensate the Contractor for the costs imposed by Con Edison, if any, for providing two new feeders and relocation of overhead power at Shaft 1C. The amount paid to Contractor under this Allowance will not exceed the direct, exact costs invoiced by Con Ed for this work (i.e. notwithstanding

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CONTRACT KENS-EAST-2

anything to the contrary in paragraph 1.5C.1.b), this Allowance will not include any profit, overhead, or any other indirect cost.

8. Contract Item A-7: Consolidated Edison Charges for Temporary Electric Service at Kensico.
 - b. This Allowance item shall be used to compensate the Contractor for the costs imposed by Con Edison, if any, for providing temporary electric services at Kensico, as described in Section 01 51 30 – Temporary Electrical System. The amount paid to Contractor under this Allowance will not exceed the direct, exact costs invoiced by Con Ed for this work (i.e. notwithstanding anything to the contrary in paragraph 1.5C.1.b, this Allowance will not include any profit, overhead, or any other indirect cost.

9. Contract Item A-8: Traffic Control Agents
 - a. As discussed in Section 01 55 26, Contractor shall pay for the services of all Traffic Control Agents as required by Westchester County or to facilitate or eliminate construction-related traffic problems or conflicts that may arise. The Traffic Control Agents must be authorized representatives of Westchester County.
 - b. Except for the Traffic Control Agents identified in the paragraph above, this Allowance item is not for the Contractor's general maintenance and control of traffic per the Contract Documents. This allowance shall only be used when directed in writing by the Engineer.
 - c. The amount paid to Contractor under this Allowance will not exceed the direct, exact costs of this work (i.e. notwithstanding anything to the contrary in paragraph 1.05.C.1.b, this Allowance will not include any profit, overhead, or any other indirect cost to the Contractor).

10. Contract Item A-9: Unforeseen Demolition and Removals
 - a. Perform unforeseen demolition and removals in addition to the demolition and removals shown on the Contract Documents and described in Section 02 41 10 – Demolition and Removals. This allowance shall only be used when directed in writing by the Resident Engineer.

11. Contract Item A-10: Telecom Charges
 - a. This Allowance item shall be used to compensate the Contractor for cost incurred from telecom entity for relocating or removal of

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CONTRACT KENS-EAST-2

telecom services, as described in Section 02 43 10 – Relocation of Utilities. The amount paid to Contractor under this Allowance will not exceed the direct, exact costs invoiced by the telecom entity for this work. (i.e. notwithstanding anything to the contrary in paragraph 1.05.C.1.b, this Allowance will not include any profit, overhead, or any other indirect cost to the Contractor).

1.06 QUALITY ASSURANCE

A. Not Used

1.07 SUBMITTALS

A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

**SECTION 01 27 00 – MEASUREMENT AND PAYMENT
CONTRACT KENS-EAST-2**

- 3.02 APPLICATION
 - A. Not Used
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

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CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

**SECTION 01 27 10 – PROJECT MILESTONES AND SCHEDULING
CONSTRAINTS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Project Milestones
- B. NOT USED
- C. Liquidated Damages
- D. Determination of Liquidated Damages
- E. Scheduling or Operational Constraints
- F. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

**SECTION 01 27 10 – PROJECT MILESTONES AND SCHEDULING
CONSTRAINTS
CONTRACT KENS-EAST-2**

B. Liquidated Damages

1. Liquidated damages will be assessed against the Contractor if the actual time for completion of any milestones fails to occur within the scheduled time for completion of that milestone, plus any time extensions authorized under Paragraph 1.06(H)(1) of this Section, even if the Contractor has, in the sole determination of the Commissioner, abandoned the Work.
2. For each Project Milestone subject to liquidated damage, the amount of liquidated damages will be determined as follows: the liquidated damages rate, as shown in Schedule A, multiplied by the number of calendar days successful completion occurs after the time for completion, as set forth in Article 1.03, plus any time extensions authorized under Paragraph 1.06(H)(1) of this Section.
3. The Commissioner may, in the exercise of his/her sole discretion, find that the Work specified under the appropriate milestone would have received a determination of completion prior to the actual time of completion and that such determination was precluded solely by actions by the City. The amount of the liquidated damages would be calculated to the date on which the Commissioner finds that the Contractor would have otherwise been entitled to receive a determination of completion.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

A. Project Milestones

1. Milestone # 1: Complete all work for Relocated Westlake Drive, open it to Public Traffic.
 - a. Start of Milestone: Notice to Proceed
 - b. Completion of Milestone: 700 days
 - c. Major Work Activities to be Performed: Construction of a new public roadway

**SECTION 01 27 10 – PROJECT MILESTONES AND SCHEDULING
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CONTRACT KENS-EAST-2**

2. Milestone #2: Complete all Screen Chamber Overburden work.
 - a. Start of Milestone: Notice to Proceed
 - b. Completion of Milestone: 861 days
 - c. Major Work Activities to be Performed: Stabilized Screen Chamber area
3. Milestone #3: Complete all Electrical Building work and complete conduits and manhole in preparation for KENS-EAST-1 connection.
 - a. Start of Milestone: Notice to Proceed
 - b. Completion of Milestone: 867 days
 - c. Major Work Activities to be Performed: Construction and connection of new Electrical Building

1.06 QUALITY ASSURANCE

A. Determination of Liquidated Damages

1. The determination of liquidated damages assessment will be made solely by the Commissioner, and his/her decision with respect thereto shall be accepted as final, binding, and conclusive.
2. For the purpose of calculating the number of calendar days for liquidated damages assessment, such calculation shall include the day on which the Contractor has successfully completed the Work under the appropriate milestone, but shall not include the day of scheduled completion.
3. For the purpose of determining the Time for Completion, unless otherwise specified herein, the start date for each milestone shall be the date given for commencing work in the Notice to Proceed (NTP) for the Contract.
4. There will be no limit to the amount of liquidated damage which may be assessed for failure to achieve a Milestone within the Time for Completion.
5. Determination of the amounts of liquidated damage/bonus will be made at the time of Final Payment for the project as defined in Article 45 of the Standard Construction Contract. Any such amounts determined shall be paid to the Contractor or credited to the City at this time.
 - a. Request for extensions of time for completion for milestones based on delays beyond the Contractor's control shall be submitted at least 90 days in advance in writing to the Commissioner. The Commissioner will have sole authority to approve or deny such a delay request from the Contractor.

1.07 SUBMITTALS

A. Not Used

**SECTION 01 27 10 – PROJECT MILESTONES AND SCHEDULING
CONSTRAINTS
CONTRACT KENS-EAST-2**

1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 01 29 10 – SCHEDULE OF VALUES
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Preliminary Schedule of Values (SOV)
2. Final SOV
3. Cross Reference Listing
4. Changes to the SOV
5. Table 1 – Preliminary SOV (Major Work Results)
6. Table 2 – Final SOV (Minimum Detail Required)

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A.** No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

SECTION 01 29 10 – SCHEDULE OF VALUES
CONTRACT KENS-EAST-2

1.03 RELATED SECTIONS

- A. Section 01 32 10 – Progress Scheduling

1.04 REFERENCES

- A. Schedule of Values: A breakdown of the (Contractor's) lump sum bid price for the Contract or of lump sums bid for items of the Contract, excluding any values associated with mobilization, showing the various operations to be performed under the Contract and the value of each operation, in accordance with Article 41 of the Standard Construction Contract. The Contractor shall also submit such other information relating to the bid breakdown as directed by the Resident Engineer.
- B. Logic and Duration Schedule: See Section 01 32 10 – Progress Scheduling for a definition of the term and details of what it requires.
- C. Work Result: Permanent or temporary aspect of a construction project achieved in the production stage or by subsequent alteration, maintenance or demolition processes, through the application of a particular skill or trade to construction resources.

1.05 DESCRIPTION

- A. The SOV shall be developed in parallel and in coordination with the development of the Logic and Duration Schedule in accordance with the requirements of Section 01 32 10 – Progress Scheduling
- B. Partial payments, in accordance with Article 42 of the Standard Construction Contract, will be determined from the Final SOV.
- C. Preliminary Schedule of Values
 - 1. The preliminary SOV shall include, as a minimum, the proposed values estimated by the Contractor for the Work of the Contract which shall be indicated in Table 1 – Preliminary SOV attached to this Section.
 - 2. The Contractor and Engineer shall meet and jointly review the preliminary SOV and make adjustments in value allocations if, in the opinion of the Engineer, these are necessary to establish fair and reasonable allocation of values to the Work spread over the term of the Contract. Unbalanced allocations weighted towards the commencement of the Contract term or a specific Contract item will not be permitted. Within 14 days of joint review, Contractor shall submit revised SOV for DEP approval. The Engineer shall review and approve (or return for any necessary revisions) within 14 days from the date of the resubmittal.
- D. Final Schedule of Values
 - 1. The minimum required detail of breakdown of the Work of this Contract is indicated in Table 2 – Final Schedule of Values attached to this Section. This list is not intended to be an exhaustive list of work to be performed or

SECTION 01 29 10 – SCHEDULE OF VALUES
CONTRACT KENS-EAST-2

items to be installed. Greater detail shall be provided if requested by the Engineer.

2. Approved change orders reflected in the Logic and Duration Schedule shall each be incorporated by the Contractor into the SOV as a single unit identified by the change order number. Depending on the magnitude and duration of the change order work, the unit may require further breakdown for payment as required by the Engineer. The Contractor shall resubmit within 14 days of Change Order approval. The Engineer shall review and approve submission (or return for any additional revisions) within 14 days of receipt of revised SOV.

E. Cross Reference Listing

1. The Contractor shall furnish a cross reference listing in two (2) parts. The first part shall list each scheduled activity with the breakdown of the respective valued items making up the total cost of the activity. The second part shall list the valued item with the respective scheduled activity or activities that make up the total cost indicated. These listings shall be updated and submitted in conjunction with the Logic and Duration Schedule monthly submittals as specified in Section 01 32 10 – Progress Scheduling.

F. Changes to the Schedule of Values

1. Changes to the Logic and Duration Schedule which add activities not included in the original schedule, but included in the original scope of Work (schedule omissions or errors) shall have values assigned in the SOV as approved by the Engineer. Necessary revisions will incorporate the Cross Reference Listing.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Preliminary Schedule of Values

1. The Contractor shall submit a preliminary SOV for the Engineer's approval within 15 days of the commencement date given in the Notice to Proceed.

- B. Final Schedule of Values

1. The Contractor shall prepare and submit a final SOV to the Engineer within 90 days of the commencement date given in the Notice to Proceed. The final SOV shall be based on the accepted preliminary SOV for major Work and it must be in sufficient detail to determine monthly progress payments related to the Work performed as shown in the monthly progress schedule update. The Engineer shall be the sole judge of acceptable SOV figures, details and description of the values established. If, as directed by the Engineer, a greater number of items is required, the Contractor shall add the additional items to the SOV and resubmit within 14 days of notification.

SECTION 01 29 10 – SCHEDULE OF VALUES
CONTRACT KENS-EAST-2

The Engineer shall review and approve submission (or return for any additional revisions) within 14 days of receipt of revised SOV.

C. Cross Reference Listing

1. A cross reference listing shall be submitted as specified herein, in order to assist in the correlation of the SOV, proposed monthly cash flow (per Article 9 of the New York City Standard Construction Contract), and the Logic and Duration Schedule.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 INSTALLATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

SECTION 01 29 10 – SCHEDULE OF VALUES
CONTRACT KENS-EAST-2

3.04 STARTUP / DEMONSTRATION

 A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

 A. Not Used

End of Section

SECTION 01 29 10 – SCHEDULE OF VALUES
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

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CONTRACT KENS-EAST-2

TABLE 1
PRELIMINARY SCHEDULE OF VALUES
(Major Work Results)

- I. CONTRACT KENS-EAST-2
 - 1. LS-1 Mobilization
 - 2. LS-2 General Contract Activities
 - 3. LS-3 Work Result
 - a. Kensico Site Prep Plan
 - b. Kensico Site Electrical Building
 - 4. LS-4 De-Mobilization

SECTION 01 29 10 – SCHEDULE OF VALUES
CONTRACT KENS-EAST-2

TABLE 2

FINAL SCHEDULE OF VALUES

(Minimum Detail Required for Contract KENS-EAST-2)

- I. Lump Sum 01 - Mobilization
- II. Lump Sum 02 – General Contract Activities
- III. Lump Sum 03 – Area/Process/Location
 - 1. Kensico Site Prep Plan
 - a. Erosion and Sediment Control
 - b. Site Grading
 - c. Dewatering
 - d. Pavings
 - e. Utility Trenching
 - f. Cast in Place Concrete
 - g. Storm Drainage Piping
 - h. Sanitary Sewer
 - i. Water Service
 - j. Fences and Gates
 - k. Landscaping
 - l. Electrical Site Lighting
 - m. Power Circuitry
 - n. Security System
 - o. Metal Fabrication
 - 2. Kensico Site Electrical Building
 - a. Site Civil Work
 - b. Architectural and Structural Work
 - c. Building Mechanical Work
 - d. Electrical Work
 - e. Electronic Safety and Security
 - f. Electric Power Generation
- IV. Lump Sum 04 – De-Mobilization

**SECTION 01 31 10 – PROJECT PARTNERING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall participate in "Project Partnering" along with DEP and its consultants for this Project. The Contractor should also include its major Subcontractors and suppliers in partnering so that these participants may "buy-in" to the concept and work cooperatively with other parties on the Project.
- B. Partnering is considered by DEP to be important to the overall success of this Project. It is also important to this Project that the Contractor be equally concerned with safety, quality, performance, budget, and schedule and that they will endorse and adopt Partnering as an effective tool for achieving these objectives.
- C. Partnering will be effective only if all parties willingly and enthusiastically enter into this cooperative arrangement which is supported by each entity at the highest level in their organizations.
- D. Project partnering and goals;
- E. Initial workshop and follow-up;
- F. Partnering Facilitator and Project charter.
- G. The following index of this Section is presented for convenience:

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SECTION 01 31 10 – PROJECT PARTNERING
CONTRACT KENS-EAST-2

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. "Partnering" refers to the team-building required to create mutual trust among the Contractor, Subcontractors, representatives of DEP and its consulting firms, and other stakeholders in a construction Project, and respect for one another's roles in the Project and recognition of the risks inherent in those roles, so that all members of the team (participants) become partners in executing and completing the Work. As a minimum, the participants shall include the following entities in addition to the Contractor and their Subcontractors:

1. The Bureau of Engineering Design & Construction (BEDC), whom will be the DEP Project representative at all times during the period of the Project unless otherwise specified herein.
2. The DEP Bureau or Bureaus which are responsible for operating and maintaining the existing or new facility where the Project is to take place.
3. The consulting firm or firms, if applicable, which are hired by DEP to design the construction Project, including the preparation of the Drawings and Specifications.
4. The consulting firm or firms, if applicable, which are hired by DEP to manage the construction Project.

- B. The Partnering "Facilitator" is the mutually agreed upon professional selected to initiate the Partnering effort and assist with the Partnering workshops and other activities as specified herein and as required.

1.05 DESCRIPTION

- A. Project Partnering & Goals

1. To be successful, this Project must achieve the following goals:
 - a. Construction meets the Project performance standards as defined in the Drawings and Specifications;
 - b. Completion of the Project on schedule;
 - c. Conformance to budgetary requirements and limitations.
2. Safety, profit, liability limitation, avoidance of litigation, reputation, good will, and other factors are also of significant importance to participants involved in the Project.

SECTION 01 31 10 – PROJECT PARTNERING
CONTRACT KENS-EAST-2

3. Through Partnering, the participants will agree among themselves as to the primary goals for the Project and the methods that will be used to accomplish them. This will require development of a trust relationship, not an adversarial one, among these parties who will be working closely and cooperatively for the duration of the Project.
 4. Commitment, communication and conflict resolution must be of highest importance for this relationship to succeed. The parties mutually will develop a communication framework and a procedure for addressing conflicts that may arise during the performance of the Work.
 - a. Nothing in this Section shall change or modify any other provisions of the Contract.
- B. Initial Workshop & Follow-Up Meetings
1. The Contractor shall hold an initial workshop and conduct follow-up meetings, as required under this Article, to facilitate Project Partnering.
 2. Initial Workshop: Partnering will include an initial workshop in which the basic requirements for the Partnering relationship will be established. The workshop will be held within 30 days of issuance of the Notice to Proceed (NTP) at a time and date agreed upon by all parties at the Site of the Work or a mutually agreed upon location. Attendees at the Partnering workshop shall typically include:
 - a. Contractor/subcontractors' Representatives:
 - 1) Project Director;
 - 2) Project Manager;
 - 3) Superintendent.
 - b. DEP Representatives:
 - 1) Executive Director(s);
 - 2) Director(s);
 - 3) Operating Bureau Chiefs;
 - 4) Portfolio Manager;
 - 5) Design Liaison
 - 6) Accountable Manager;
 - 7) Engineers
 - c. Construction Management (CM) Consulting Firm Representatives:
 - 1) Project Director;
 - 2) Project Manager; and
 - 3) Engineers.

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CONTRACT KENS-EAST-2

- d. Design Engineering Consulting Firm Representatives:
 - 1) Project Director;
 - 2) Project Manager; and
 - 3) Engineers.
 - 3. Follow-up Meetings: Quarterly half-day Partnering sessions shall be held throughout the Project in order to confirm the relationship and assure the Partnering effort continues to be successful. The intent of the on-going sessions is to maintain communication between the key parties and to resolve higher order issues that require decisions at the executive level and areas for improvement. It is not meant to replace the routine Project progress meetings or the normal flow of the Project.
- C. Partnering Facilitator & Project Charter
- 1. The Contractor shall employ a Partnering Facilitator who will help establish and monitor the Partnering relationship. The Contractor shall pay all costs associated with employing the Partnering Facilitator.
 - 2. The Partnering Facilitator shall initiate the Partnering effort and conduct the Partnering workshops. The Contractor shall pay all costs for facilities used to conduct the workshops.
 - 3. Selection of the Facilitator
 - a. As soon as practicable after award of the Contract, the City and the Contractor shall meet to discuss the establishment of the formal Partnering process.
 - b. The Contractor shall propose up to three (3) candidates to select from as Partnering Facilitator.
 - c. The City and the Contractor shall mutually select one (1) of the three (3) candidates to be the Facilitator.
 - 4. The Facilitator shall develop a Project Charter with input from all parties. The Charter shall include, but not be limited to:
 - a. Statement of goals and objectives for the construction Project;
 - b. Identification of all Project participants and descriptions of their roles in the Project;
 - c. The procedures for communicating both normal progress of Work and any barriers to meeting Project goals and objectives;
 - d. A process for resolving conflicts that may arise during the performance of Work. This process is not intended nor shall it be deemed to affect or replace the dispute resolution process set forth in Article 27 of the Standard Construction Contract.

**SECTION 01 31 10 – PROJECT PARTNERING
CONTRACT KENS-EAST-2**

1.06 QUALITY ASSURANCE

- A. The Facilitator shall be trained in the recognized principles of Partnering by an accredited institution such as the International Partnering Institute, Associated General Contractors of New York State, or possess equivalent qualifications as determined by DEP.
- B. The Facilitator shall have the following professional experience and qualifications:
 - 1. At least five (5) years' experience in Partnering facilitation with a demonstrated track record, including public sector construction; and,
 - 2. Skill set that includes some or all of the following; construction management, negotiations, labor management mediation, and/or human relations.

1.07 SUBMITTALS

- A. Within 30 days after the NTP, the Contractor shall provide the resumes of the proposed candidates to select from as Partnering Facilitator containing their full names, contact information, and the following verifiable information:
 - 1. Certification or training;
 - 2. Experience and qualifications;
 - 3. Past facilitation participation.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

**SECTION 01 31 10 – PROJECT PARTNERING
CONTRACT KENS-EAST-2**

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 01 31 15 – PROJECT COORDINATION
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor Cooperation
- B. Coordination Drawings
- C. Final Coordination Drawings
- D. Project Meetings
- E. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 11 00 – Summary of Work

SECTION 01 31 15 – PROJECT COORDINATION
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- B. Section 01 32 10 – Progress Scheduling
- C. Section 01 35 27 – Environmental, Health and Safety Requirements
- D. Section 01 35 45 – Hazardous Materials Control

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

A. Contractor Cooperation

1. The Contractor shall not interfere with DEP or its contractors, consultants, or agents from entering the Work Site for the purpose of constructing, operating, maintaining, removing, repairing, altering or replacing such pipes, sewers, conduits, manholes, wires, poles, or other structures and appliances which may be required to be installed at or in the Work. The Contractor shall cooperate with all the aforesaid parties and shall allow reasonable provisions for the prosecution of any other work by the City, or others, to be done in connection with the Work, or in connection with normal use of the facilities.
2. The Contractor shall cooperate fully with the City, the Engineer, and Other Contractors employed on the Work, to effect proper coordination and progress to complete the project on schedule and in proper sequence. To the extent possible, decisions of all kinds required from the Engineer shall be anticipated by the Contractor to provide ample time for inspection, or the preparation of instructions.

B. Coordination Drawings

1. Coordination Drawings, including point-to-point field wiring diagrams, shall be initiated, completed and submitted for distribution so as not to delay the construction.
2. In addition to any reproducible prints required to be furnished or submitted, the Contractor shall submit electronic AutoCAD (latest version) drawings. This shall also include all pertinent files relating to the drawings such that the drawings can be replicated or edited on any computer that uses AutoCAD (latest version).
3. The Contractor shall initiate coordinating the installations by means of Coordination Drawings, as specified herein. The Coordination Drawings may lack complete data in certain instances pending receipt of shop drawings, but sufficient space shall be allotted for the items affected. When final information is received, such data shall be promptly inserted on the Coordination Drawings.

SECTION 01 31 15 – PROJECT COORDINATION
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4. The Electrical Contractor shall initiate coordinating the electrical installations by means of the Point-to-Point Field Wiring Diagrams. In certain instances these diagrams may lack complete data on all conduits and wiring pending receipt of shop drawings, but sufficient conduits and wiring shall be allocated for the items affected. When final information is received, such data shall be promptly inserted on the Point-to-Point Field Wiring Diagrams.
 5. In preparation of all the Coordination Drawings, composite drawings, large-scale details as well as cross and longitudinal sections shall be made as required, or as directed by the Engineer, to fully delineate all conditions. Particular attention shall be given to the locations, size and clearance dimensions of equipment items, shafts, sleeves, and similar features. In preparing the Coordination Drawings, minor changes in duct, pipe or conduit routings that do not affect the intended function may be made as required to avoid space conflicts, when mutually agreed, but items may not be resized or exposed items relocated without the Engineer's approval. No changes shall be made in any wall or chase locations, ceiling heights, door swings or locations, windows or other openings, or other features affecting the function or aesthetic effect of the building. If conflicts or interferences cannot be satisfactorily resolved, the City shall be notified and its decision obtained.
 6. If Contractors are unable to reach agreement on a matter of interference, the matter shall be submitted to the City for its binding decision. Should any problems of coordination require architectural or structural change of design, the change shall be submitted to the City for resolution.
 7. No unauthorized deviations will be permitted. If made without the knowledge or agreement of the Engineer or other affected contractors, Contractor shall remove and correct such deviations at no additional cost to the City if so ordered.
- C. Project Meetings
1. The Contractor shall attend Project meetings, including but not limited to the following:
 - a. Pre-construction Meeting
 - 1) Upon receipt of a copy of the Notice to Proceed, or at an earlier time if agreeable to the Contractor, the Engineer will arrange a pre-construction meeting. Attendees shall include: the Contractor's project representative authorized to act on behalf of the Contractor and to direct the performance of Work by the Contractor's employees and agents; the Contractor's superintendent; major subcontractors; the Engineer; DEP representatives; and others involved in the execution of the Work.

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- 2) The purpose of this meeting will be to establish a working relationship and understanding between the parties and to discuss project organization, job communications, construction schedule, submittals and processing, Schedule of Values, payment procedures, Extra Work procedures, safety requirements, permits and inspections, and such other subjects as may be pertinent for the execution of the Work.
- b. Monthly Status Meetings
 - 1) Upon commencement of Work at the Site or earlier as directed by the Engineer, the Contractor shall attend the project status meetings on a monthly basis (or as required by the Engineer). The Engineer will arrange and conduct these meetings and will prepare and circulate an agenda for each meeting. A representative of the Contractor approved by the Engineer shall attend these meetings.
 - 2) The status of outstanding submittals will be reviewed to determine anticipated dates of any submittals yet to be provided, and the status of those submittals under review by DEP. The status and progress on resolving any outstanding requests for change orders will be reviewed. The status of any other items that could have a significant impact upon the course of the Work will also be reviewed and discussed.
 - c. Monthly and CPM Progress Meetings: These meetings shall be carried out in accordance with Section 01 32 10 – Progress Scheduling.
 - d. EHS Coordination Meetings: These meetings shall be carried out in accordance with Section 01 35 27 – Environmental, Health and Safety Requirements.
 - e. Special Coordination Meetings
 - 1) During the course of performing the Work, attend special coordination meetings in advance of commencing certain work activities as specified or directed by the Engineer, including but not limited to the following:
 - a) Specific requirements for coordination meetings are included in Section 01 35 45 – Hazardous Materials Control.
 - b) Programmatic Coordination meetings, if deemed necessary, with other contracts anticipated to be in progress as specified in Section 01 11 00 - Summary of Work.

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- 2) DEP will determine the need for additional special coordination meetings and convene such meetings with written notice to the Contractor.
- 3) The Contractor shall attend and participate in these special coordination meetings at no additional cost to the City.

1.06 QUALITY ASSURANCE

A. Work on Coordination Drawings

1. All Work on the Coordination Drawings shall be performed in a clear, legible manner. The Engineer shall be the sole judge of the acceptability of the Coordination Drawings.
- B. All changes in the Work on any Contract, whether a change in price is given or not, shall be shown on the Coordination Drawings.

1.07 SUBMITTALS

A. Final Coordination Drawings

1. After the final Coordination Drawings have been agreed upon, the Contractor shall provide and distribute fifteen (15) copies to the Engineer, for reference and record purposes.
2. The record copies of final Coordination Drawings shall be retained by the Contractor as a working reference. All Shop Drawings, prior to their submittal to the Engineer, shall be compared with the Coordination Drawings and developed accordingly by the Contractor. Any revisions to the Coordination Drawings which may become necessary during the progress of the Work shall be noted by the Contractor and shall be neatly and accurately recorded on the record copies. The Contractor shall be responsible for the up-to-date maintenance of record copies of the Coordination Drawings and to keep one copy available at the Site.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

**SECTION 01 31 15 – PROJECT COORDINATION
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2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 01 31 25 – WEB BASED PROJECT MANAGEMENT INFORMATION
SYSTEM
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the requirements for the Contractor’s use of DEP’s web-based Enterprise Project Management Information System (“EPMIS” or “the System”) to manage all Project communications, workflows and document submittals.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 32 10 – Progress Scheduling
- B. Section 01 33 00 – Submittal Procedures

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C. Section 01 78 42 – Records in Electronic Formats.

1.04 REFERENCES

A. Not Used

1.05 DESCRIPTION

A. Use and Operation of the System:

1. The Contractor shall utilize EPMIS for electronic submittal of all data and documents throughout the duration of the Contract.
2. The System is required for use by all participants in the Project including DEP, the Construction Manager, Engineer, Contractor, and all other users authorized by DEP.
3. The System will operate primarily on an e-Builder, Inc. (www.e-builder.net) platform that will be administered by DEP and the Construction Manager. Joint use of the System will facilitate electronic exchange of information, automation of key processes, and overall management of the Contract.
4. The System shall be the primary means of Project information submission and management. When required by DEP or its representatives, paper documents shall also be provided.

B. User Access Limitations and Data Ownership

1. DEP, the Construction Manager and the Engineer will control access to the System by allowing access and assigning user profiles to authorized Contractor and Project personnel. User roles will define levels of access to the System, and determine assigned role-based authorizations and user privileges. Subcontractors and suppliers will be given access to the System through the Contractor. Entry of information exchanged and transferred between the Contractor and its Sub-contractors and suppliers through the System shall be the responsibility of the Contractor.
2. Secure username and password will be required for controlled access to the System for all authorized participants via a web URL address. The Contractor shall designate its staff to be granted access to the System.
3. Data entered in a collaborative mode (entered with the intent to share as determined by permissions and workflows within the System) by DEP and its representatives and the Contractor will be owned by DEP.

C. Automated System Notification and Audit Log Tracking

1. Any review comments made (or the failure to make review comments) by DEP and its representatives on Contractor-submitted documentation shall not relieve the Contractor of responsibility for compliance with the requirements of the Contract Documents. The Contractor is responsible for

**SECTION 01 31 25 – WEB BASED PROJECT MANAGEMENT INFORMATION
SYSTEM
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managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. The City's acceptance through automated System notifications or audit logs extends only to the fact that the documentation was submitted and does not constitute substantive approval of the Contractor's submitted information.

D. Computer Requirements

1. The System will have a minimum bandwidth of 4MB/s download and 1MB/s upload. A faster connection is recommended (1.5MB per concurrent user should be used as a planning factor) and may be used, but uploading time considerations by the Contractor when uploading pictures and files to the System shall be based on the bandwidth defined herein.
2. Once implemented on the project, if the System does not meet its minimum performance standards, as listed below, the Contractor shall make the corrections necessary to its computers or network until the standards are met.
3. The required minimum EPMIS performance standards, and the higher, recommended levels of performance, are as follows:
 - a. File download speed
 - 1) One (1) second per MB of data recommended (e.g., one (1) 20MB file should download in less than 20 seconds)
 - 2) Five (5) seconds per MB of data minimum (e.g., one (1) 20MB file must download in less than 100 seconds)
 - b. File upload speed
 - 1) One (1) second per MB of data recommended (e.g., one (1) 20MB file should upload in less than 20 seconds)
 - 2) Five (5) seconds per MB of data minimum (e.g., one (1) 20MB file must upload in less than 100 seconds)
4. The Contractor shall use computer hardware and software that meets the requirements of the System. Computers shall be less than three (3) years old. As recommendations are modified by the System provider, the System will be upgraded to meet those recommendations or better. Any need for upgrading of the Contractor's computer systems will not be justification for a cost or time modification to the Contract.
5. The Contractor shall ensure that its authorized System users have access to the public internet from a computer system running a currently supported Microsoft Windows operating system and Microsoft Internet Explorer web browser (or other functionally equivalent software). The connection to the internet should be high speed (broadband) as described under "Computer Requirements," above. The Contractor shall ensure that anti-virus and anti-

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malware software is installed and maintained on all computers given access to EPMIS.

E. Contractor Responsibilities

1. The Contractor shall be responsible for the validity of its information placed in the System and for the abilities of its personnel to use the System. Accepted users shall be knowledgeable in the use of computers, including internet browsers, email programs, CAD drawing applications, and Adobe portable document format (PDF) document conversion programs. The Contractor shall utilize the existing forms and processes in the System to the maximum extent possible. If an additional form is required that does not exist in the System, the Contractor shall request approval to develop such form or for one to be provided by DEP. Adobe PDF documents will be created through electronic conversion rather than optically scanned. The Contractor, in coordination with the Construction Manager, is responsible for the training of its personnel in the use of the System (beyond what is provided by DEP) and of the other programs indicated above, as needed.
2. DEP owns EPMIS, and will provide initial training and rollout services after Contract award. DEP will provide overall System administration during the Contract period. The Construction Manager will have a System administrator for the project with limited System administration support responsibilities, including ongoing training of the Contractor team.
3. The Contractor shall provide a list of its key personnel designated for access to the System for the City's approval. The Contractor is responsible for timely notifying the City and the Engineer of any changes in personnel that require adding or removing authorized users from the System. DEP reserves the right to perform a security check on all potential users. The Contractor may be given the rights to provide System access to additional personnel or Subcontractors.
4. The System user license fees will be paid by DEP.

F. Connectivity

1. EPMIS is a web-based environment and therefore subject to the inherent speed and connectivity problems of the internet. The Contractor is responsible for its own connectivity to the Internet. The System's response time is dependent on the equipment used to access it, including processor speed, internet access speed, etc. and current traffic on the internet. The City will not be liable for damages resulting from any delays associated with the use of the System including, but not limited to: slow response time, downtime periods, connectivity problems, or loss of information. Moreover, such delay shall not be deemed a sufficient basis for a time extension of or cost adjustment to the Contract.

G. Training

**SECTION 01 31 25 – WEB BASED PROJECT MANAGEMENT INFORMATION
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1. DEP, through the System vendor or the System vendor's qualified representative, will provide training in the use and functionality of the System. Training sessions will be provided for employees of the Construction Manager, Engineer, the City, and the Contractor. Each training session will be for a duration of eight (8) hours. The Contractor shall have two (2) qualified persons attend the training. One (1) refresher training session will be provided upon request.

1.06 QUALITY ASSURANCE

- A. All Contractor representatives participating in workflows and EPMIS processes (e.g. RFIs, submittals, Non Conformance Reports, etc.) shall have a minimum of three (3) years of experience in the use of Microsoft Word, Excel, and Internet Explorer. The Contractor's Document Control Specialist shall be experienced and trained in the use of entering and monitoring documentation into a web-based document management system, e.g., e-Builder, Meridian Prolog, Oracle-Primavera Contract Manager, or an equivalent system. The Document Control Specialist shall be knowledgeable of the status of all Contract documentation aspects of the work throughout the term of the Contract.

1.07 SUBMITTALS

- A. Within thirty (30) calendar days of issuance of the Notice to Proceed, the Contractor shall submit for approval by the Engineer a list of the Contractor's and its Subcontractors' key personnel who have been designated to have access to the System. The list shall include descriptions of the designated individual's roles and responsibilities for this Project. The Contractor should also identify its organization's System administrator on the list.
- B. The Contractor shall submit the name and qualifications of its designated Document Control Specialist. Any change in the individual serving as Document Control Specialist shall be submitted to and coordinated with the Construction Manager.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

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2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 IMPLEMENTATION

- A. System Utilization

1. The System shall be utilized in connection with all submittal preparation and information management required under this Contract. Requirements contained in this Article are in addition to the applicable submittal and documentation requirements of other Sections of the Specifications, including without limitation, Section 01 33 00 – Submittal Procedures and Section 01 78 42 – Records in Electronic Formats.
2. All submittals detailed in design drawings and related specifications shall be submitted by the Contractor as CAD files (in .dwg format), PDF files, and LIDAR record through the System submittal workflow process.
3. Shop Drawing and design data documents shall be submitted as CAD files (in .dwg format), PDF files, and LIDAR record through the System submittal work flow process. Examples of Shop Drawings include, but are not limited to:
 - a. Standard manufacturers’ installation drawings;
 - b. Drawings prepared to illustrate portions of the Work designed or developed by the Contractor;
 - c. Steel fabrication, piece, and erection drawings.
4. Product catalog data and manufacturers’ instructions shall be submitted as PDF files through the System submittal workflow process. The PDF files should be the original, searchable PDF files from the manufacturer and not scanned files which are not searchable. Examples of product data include, but are not limited to:
 - a. Manufacturers’ printed literature;

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- b. Preprinted product specification data and installation instructions.
5. All correspondence and pre-construction administrative submittals shall be submitted using the System. Examples of administrative submittals include, but are not limited to the following:
 - a. Digging permits and notices for excavation;
 - b. Requests for Deviation (RFDs) for product substitutions;
 - c. List of contact personnel;
 - d. Notices for roadway interruption, Work outside of Normal Project Working Hours, and utility cut overs;
 - e. Requests for Information (RFIs);
 - f. Network Analysis Schedules and associated reports and updates;
 - g. Each schedule submittal specified in Section 01 32 10 – Progress Scheduling shall be submitted as a native backed-up file (.PRX or XER) of the scheduling program being used. The schedule will also be posted as a PDF file in the format specified in Section 01 32 10 – Progress Scheduling.
 - h. Plans for safety, demolition, environmental protection, and similar activities;
 - i. Quality control plan(s), testing plan and log, quality control reports, production reports, quality control specialist reports, preparatory phase checklist, initial phase checklist, field test reports, summary reports, rework items list, etc.;
 - j. Meeting minutes for quality control meetings, progress meetings, pre-installation meetings, etc.;
 - k. Any general correspondence submitted.
6. Compliance submittals such as test reports, certificates, and manufacturer’s field report submittals shall be submitted through the System as PDF attachments. Examples of compliance submittals include, but are not limited to:
 - a. Field test reports;
 - b. Quality control certifications;
 - c. Manufacturers’ documentation and certifications for quality of products and materials provided.
7. Record submittals such as operation and maintenance data and closeout submittals shall be submitted through the System as PDF documents during the approval and review stage as specified, with a hard copy (paper) set of

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documents submitted for final. Examples of record submittals include, but are not limited to:

- a. Operation and maintenance manuals: final documents shall be submitted as specified;
 - b. As-Built Drawings: final documents shall be submitted as specified;
 - c. Extra materials, spare stock, etc.: submittal forms shall indicate when actual materials are to be submitted.
8. Financial submittals, such as Schedule of Values, pay estimates and change order request proposals, shall be submitted through the System. Supporting material for pay estimates and change order requests shall be submitted through the System as PDF attachments. Upon acceptance of corrected “pencil copies” of payment estimates, hard copies shall be submitted for processing. Examples of financial submittals include, but are not limited to, the following:
- a. Contractor’s Schedule of Values;
 - b. Contractor’s monthly progress payment requests;
 - c. Contract change order proposals requested by the City.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

**SECTION 01 32 10 – PROGRESS SCHEDULING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. CPM and Project Schedule Software
2. Work Breakdown Structure (WBS)
3. Activities and Activity Code Structure
4. Sequence and Interdependence of Work Activities
5. Project Calendars
6. Activity Labor and Resource Data
7. CPM Progress Meeting and Reports
8. Remedial Measures and Recovery Schedule
9. Exhibit 1 - Work Breakdown Structure
10. Exhibit 2 - Activity ID Format
11. Exhibit 3 – Schedule Milestones
12. Exhibit 4 – Proposed Activity Codes
13. Exhibit 5 – Project Calendars

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Activity - A representation of a discrete portion of the overall scope of Work or an event through Duration and description.
- B. Baseline Construction Schedule - The planned, detailed Critical Path Method (CPM) schedule of activities, including all Logic, Durations, Resource and Cost Loading, and showing the entire scope of Work, which has been accepted by DEP.
- C. Critical Path Method (CPM) - A management technique used to plan and control a project which combines all relevant information into a single plan defining the sequence and duration of operations and depicting the interrelationship of the Work elements required to complete the project. The critical path is defined as the longest sequence of activities in a network which establishes the minimum length of time for accomplishment of the end event of the project.
- D. Current Construction Schedule - The most recently updated schedule that captures progress to date and forecasts the Early Start/Early Finish for each Activity and the remaining cash flow, depicted with the open bar chart activity line with corresponding schedule dates shown.
- E. Data Date - The date used as a starting point for scheduling calculations. The Data Date is changed to the current end of period date when a schedule is updated for progress.
- F. Duration - The amount of time, in workdays, an Activity will take to perform once begun and continuously performed until complete.
- G. Early Finish - The earliest estimated date an Activity is calculated to be complete, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
- H. Early Start - The earliest estimated date an Activity is calculated to begin, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.

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- I. Float - The calculated amount of time that the estimated start or finish of an Activity can be delayed without impacting the start or finish of other downstream Activities logically connected in a progressive relationship.
 - J. Fragnet - Fragmentary network: a portion of the project schedule detailing impacts of an event on specific Activities in the broader schedule.
 - K. Late Finish - An estimate of the latest plausible date an Activity's completion can be postponed until without rendering as unachievable the required completion of any downstream milestones to which the Activity is Logically connected to in a progressive relationship.
 - L. Late Start - An estimate of the latest plausible date an Activity's start can be postponed until without rendering as unachievable the required completion of any downstream milestones to which the Activity is Logically connected to in a progressive relationship.
 - M. Logic - A direct progressive relationship between Activities where one Activity's performance restricts the performance of another Activity
 - N. Original Duration - The estimated amount of time, in workdays, an Activity is expected to take to complete at the beginning of a project as anticipated by the Contractor based on its planned means and methods at time of bid and documented in the Baseline Construction Schedule.
 - O. Percent Complete - The percentage of the scope of Work represented by an Activity completed as of the Data Date calculated by dividing the progress earned by the budgeted value.
 - P. Remaining Duration - The amount of time, in workdays, the remaining scope of Work represented by an Activity is expected to take to complete at the current Data Date
 - Q. Resource and Cost Loading - Values assigned for estimated manpower, equipment and/or materials necessary to complete the scope of Work represented by a specific Activity.
 - R. Total Float - The amount of time the start or finish of an Activity can be delayed without affecting the project completion date.
 - S. Work Breakdown Structure (WBS) - A deliverable-oriented decomposition of a project into smaller components. A WBS also provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.
- 1.05 DESCRIPTION
- A. CPM & Project Schedule Software
 - 1. Critical Path Method – The CPM type construction schedule will be used to monitor Contract progress. The Contractor shall be responsible for providing all information concerning the sequencing, Logic and Duration

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of all Activities as well as providing the electronic schedule file produced in the Primavera Project Management (.xer) format. Once the initial Baseline Construction Schedule is accepted by the Engineer, the Contractor shall be responsible for preparing and submitting monthly update information regarding schedule Logic, physical Percent Complete, actual start and finish dates, Duration changes, added and deleted Activities, change orders and related reports and schedules, including the updated Primavera Project Management (.xer) format electronic file.

B. Work Breakdown Structure (WBS)

1. WBS is a deliverable-oriented decomposition of a project into smaller components. A WBS also provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control. The WBS depicted in **Exhibit 1**, attached to this Section, reflects the minimum structure needed for reporting and the Contractor is expected to define and add additional lower levels as needed.

C. Activities

1. Activities included in the CPM schedule shall be of sufficient detail to assure adequate planning and execution of the Work, such that, in the judgment of the Engineer, it provides an appropriate basis for forecasting, monitoring and evaluating the progress of the Work.
 - a. Activities shall conform to the following requirements:
 - 1) Subdivide the total scope of Contract Work into Activities of Duration no longer than twenty working days each, except as to non-construction activities (such as purchase of materials, delivery of materials, delivery of equipment and concrete curing) and any other Activities for which the Engineer may approve longer Duration. The Duration of the Activities representing the Engineer's approval of items such as shop drawing submittals, drawing submittals, requests for manufacturer approval, requests for Subcontractor approval, etc. shall not be less than twenty calendar days but may be longer if the detail and complexity of the submittal warrant.
 - 2) The construction time as determined by the CPM schedule from Early Start to Late Finish for any sub phase, phase or the entire Project shall not exceed the Contract time specified or shown in the Contract Documents.
 - 3) One day shall be the smallest time unit shown unless otherwise directed by the Engineer.

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- 4) Activity descriptions shall contain consistent terminology such that the scope of Work represented is readily identifiable for assessment of completion.
- 5) Activities labeled "start," "continue," or "complete," will not be allowed. Lead and lags will be acceptable only if the description accurately identifies such a restraint and if they are realistic with respect to the scheduling and sequencing of the Work and overall control of the project.
- 6) Show the following on each Activity, as directed by the Engineer:
 - a) Activity number consistent with Engineer's provided template and in accordance with **Exhibit B**, attached to this Section;
 - b) Complete (self-explanatory) description of the Work represented by the Activity stated in a verb, noun, and location format.
 - c) Duration in days and number of shifts;
 - d) Labor hours required to accomplish scope represented by the Activities. Labor hours are to include all direct labor, by trade, required for Activities representing construction.
 - e) Physical quantity of material to be installed (cubic yard of concrete, linear feet of pipe, etc.) for items directed by the Engineer and in accordance with this Section.
 - f) Other Activity coding as directed by the Engineer to define the Activity's scope, constraints, responsibility or other requirements.
 - g) Completed coding and organization of data and schedule information in accordance with the Activity Code Structure requirements provided in this Section and approved by the Engineer.
2. All Activities, with the exception of the Notice to Proceed (NTP) and Substantial Completion, shall have a predecessor and successor. No open-ended Activities will be permitted.
3. The construction schedule shall contain Activities representing contractual and non-contractual milestones as designated by the Engineer and detailed in **Exhibit 3**, attached to this Section.

D. Activity Code Structure

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1. Activity codes proposed for scheduling Work progress under the Contract are shown on **Exhibit 4**, attached to this Section.
 2. Activity codes should be defined as Project Activity codes, not global Activity codes.
 3. The Contractor shall break the Work into Activities in accordance with the specified coding structure and in accordance with the Contract Drawings and Specifications. The selection of Activities and the coding structure shall be subject to the review and acceptance by the Engineer.
 4. The coding shall follow the designation conventions outlined above and shall include identification of Subcontractors, suppliers/vendors and fabricators, and other parties reporting to the Contractor.
 - a. The Contractor is required to develop other Activity codes and values needed to comply with the reporting requirements listed in this Section, subject to acceptance by the Engineer.
 5. The Engineer will provide the Contractor with a system of identification numbers that shall be used for CPM schedule numbering system and project coding. Additional coding required by the Contractor may be added to the network to supplement that supplied by the Engineer.
 6. Activity IDs will conform to the format detailed in **Exhibit 2**, attached to this Section, or as directed by the Engineer.
- E. Sequence and Interdependence of Work Activities
1. The CPM schedule shall indicate the Logic of Activities. It shall include, but not be limited to, the following items as appropriate to the Contract:
 - a. Contractor working drawing preparation and review by the Engineer;
 - b. Materials, Equipment, and Systems:
 - 1) Vendor submittal/approval;
 - 2) Shop drawing submittal/approval;
 - 3) Release for fabrication;
 - 4) Fabrication period;
 - 5) Witness shop test;
 - 6) Delivery;
 - 7) Installation;
 - 8) Preliminary test;
 - 9) Final test;

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- 10) Operation and Maintenance (O&M) manuals submittal/approval;
 - 11) Equipment training plans and procedures submittal/approval;
 - 12) Equipment training;
 - 13) Systems training plans and procedures submittal/approval;
 - 14) Systems training.
- c. Shop and field performance tests and supervisory service Activities;
- d. Mobilization and move-in;
- e. Preparing and coordinating drawings;
- f. Obtaining all required permits;
- g. Inspections;
- h. Specific Work activities, such as, but not limited to:
- 1) Sitework;
 - 2) Underground piping;
 - 3) Electrical ductbanks;
 - 4) Paving;
 - 5) Structural excavation;
 - 6) Soil testing;
 - 7) Backfill;
 - 8) Placement of sheeting;
 - 9) Pile driving;
 - 10) Formwork erection;
 - 11) Rebar placement;
 - 12) Placing of concrete;
 - 13) Stripping forms;
 - 14) Concrete curing;
 - 15) Installation of process piping and valves;
 - 16) Electrical conduits and wiring;
 - 17) Instrumentation and controls conduits and wiring;
 - 18) Terminations;
 - 19) Maintenance and exercising activities;
 - 20) Other materials and plant equipment;

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21) Cleanup.

- i. Construction of all facilities outlined in the Contract Documents;
- j. Subcontractors' items of Work;
- k. Time allowance for inclement weather per National Oceanographic and Atmospheric Administration (NOAA) information for local area;
- l. Delivery, installation, and check out/testing of City-supplied equipment;
- m. Punch lists;
- n. Final cleanup;
- o. Time allowance for checkout and startup;
- p. Contract coordination with Other Contractors, Substantial Completion and final completion dates and maintenance of existing operations;
- q. Indicate all coordination activities from related construction contracts;
- r. Interruption and shut down requests of plant utilities to allow for new connections;
- s. Connection to all existing plant systems and equipment;
- t. Preparation of final copies of Contractor working drawings;
- u. Specific information required by or from the Engineer;
- v. All temporary utilities and construction;
- w. Required inspections by the Contractor or Engineer;
- x. Submittal of Contract record drawings at Project completion, or as directed by the Engineer.

F. Project Calendars

- 1. All Activities should have a project calendar assigned, not a global calendar. This allows the calendars to easily travel with the Project when exported and more importantly, when imported.
- 2. Each calendar should also identify all other days considered non-work days, including but not limited to observed holidays.
- 3. Each calendar should be adjusted for months beginning in the year of NTP and lasting three years beyond the Contract completion date.
- 4. Each calendar should be named @-###_X, where @-###_ represents the project and X summarizes the nature of the calendar. Typically, the number

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of days per week and number of shifts per day are included as the balance of the description. See examples in **Exhibit 5**, attached to this Section.

G. Activity Labor and Resource Data

1. The Contractor shall accurately labor load by craft or trade all Activities requiring direct field labor. All labor loading shall be in hours. At the direction of the Engineer, and at no additional cost to the City, the Contractor may be required to include additional resource loading, such as, but not limited to, major pieces of construction equipment, in order to track major critical Activities and measure progress.
2. When required by the Engineer, and at no additional cost to the City, the Contractor shall accurately quantity load specific Activities or groups of Activities. The quantity amount shall equal the total quantity to be installed for each specific Activity. Quantity loading may be required for major Activities with Durations dependent on daily production, such as mass excavation – cubic yards, piling – linear feet of piles, concrete formwork – square feet of forms, concrete pours – cubic yards of concrete, piping installation – linear feet of pipe, electrical duct banks – linear feet, electrical conduit and wire – linear feet, terminations – number of terminations, etc.
3. All resource loading shall be coded to the Contract identifier under a “root.” Since resource loading cannot be project-specific, this root heading is needed to keep the database segregated.

1.06 QUALITY ASSURANCE

- A. The Contractor shall retain a CPM scheduling consultant or utilize its own qualified CPM scheduler in lieu of a CPM consultant, to develop and maintain the update of the CPM schedule plan for the Work for the duration of the Contract. This consultant, along with the Contractor, is expected to work closely with the Engineer to deliver acceptable work products as outlined in this Section. The purpose of this Section is to expand and further clarify the requirements for the CPM schedule under Article 9 of the Standard Construction Contract.
- B. Within seven days after the NTP, the Contractor shall submit the qualifications of the proposed CPM scheduler for review and approval.
 1. The Contractor may submit to the Engineer for approval a written request to provide its own qualified CPM scheduler or a CPM consultant. In the case of a Contractor’s scheduler, the Contractor is responsible for performing all activities described in this Section as being performed by the CPM consultant.
 2. If, after approval, the Engineer determines that the Contractor’s scheduler or scheduling consultant is unable to adequately perform the CPM requirements of this Specification, the Engineer will require the Contractor to provide a new qualified CPM consultant at no additional cost to the City.

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- C. Upon NTP, the Contractor shall meet with its CPM scheduling consultant at least weekly for the purpose of developing the information required by this Section. These meetings will continue until a minimum status of “Accepted” has been achieved on the Baseline Construction Schedule.
- D. The Contractor will be required to coordinate its scheduling of Activities with the CPM scheduling consultant. If, in the judgment of the Engineer, the Contractor is deemed uncooperative in providing the required information to the CPM scheduling consultant necessary to develop the preliminary CPM, Baseline Schedule, or monthly schedule updates, then the Engineer may withhold partial payments or a portion thereof.
- E. The monthly CPM schedule update payment item for any specific month will not be earned until the Contractor submits the required monthly CPM progress schedule. In the event the Contractor fails to submit such schedule, liquidated damages will be assessed against the Contractor in the amount fixed in Schedule A of the General Conditions, unless the Engineer determines that the Contractor is not the cause for the delay in submitting monthly updates or update information per Monthly Progress Meeting and Reports described herein. The Contractor shall be notified within one week of said delinquency that the liquidated damages are being assessed against its Contract.
- F. Monthly Progress Meeting and Reports, including the use of Contractor Daily Quality Control Reports, shall be used as the basis for updating progress schedules.

1.07 SUBMITTALS

- A. Within 7 days after the NTP, the Contractor shall submit the qualifications of the CPM consultant to the Engineer for approval. The Engineer will respond to the submittal within seven (7) calendar days of receipt.
- B. CPM Schedule
 - 1. The preliminary CPM Schedule shall be submitted **fifteen (15) calendar days** after NTP. The preliminary CPM Schedule shall include:
 - a. All critical mobilization, Project set-up, procurement, and construction activities in each of the major Work areas required during the first 180 calendar days of Contract time after the NTP, including submittals and permitting;
 - b. The balance of the Work depicted in summary activities by MLS (milestone), AREA (area), SYS (system) and RESP (responsibility). (See Activity Code Structures for MLS, AREA, SYS and RESP in **Exhibit A** of this Section);
 - c. All submittal and procurement activities for long lead items necessary to meet all Project milestones;
 - d. The Project’s overall critical path and each milestone’s critical path.

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- e. An electronic copy of the schedule in Primavera Project Planner (.xer) format.
- 2. Within fourteen (14) calendar days after submittal of the preliminary CPM Schedule, the Engineer will notify the Contractor of the acceptance, rejection, or acceptance with comments of the preliminary CPM Schedule. If the preliminary CPM Schedule has been rejected, or accepted with comments, the Contractor shall address all comments and re-submit within 14 calendar days for review. The submittal process shall continue until the Engineer accepts the preliminary CPM schedule with no comments.
- 3. The final, complete and detailed CPM Schedule required for submittal under this Section shall be composed of two parts, with each part due as follows:
 - a. Part 1 - Logic and Duration Schedule is due within **sixty (60)** calendar days **after** NTP.
 - 1) Submit an electronic copy of the schedule in Primavera Project Planner (.xer) format, schedule reports, and the narrative report as specified within this Section.
 - 2) This schedule is at the final level of detail for each Activity, containing the required relationships completely identified and the Duration of each Activity correctly depicted and coded in accordance with this Section.
 - 3) This Baseline Construction Schedule shall identify all Contract milestones.
 - a) If the schedule reflects completion of a milestone or completion of Contract Work earlier than specified in the General Conditions, this in no way revises or voids the dates set forth in the Contract. The dates specified in the Contract govern.
 - b) Where the schedule reflects such an early completion date, the schedule may be accepted by the Engineer with the Contractor's understanding that no claim for additional Contract time or an increase in the Contract price shall be made by the Contractor as the result of failure to complete the Work by the earlier date shown on the schedule.
 - 4) This schedule shall show the overall schedule requirements as set forth in Schedule "A" of the General Conditions being met.
 - a) This detailed CPM Schedule shall not reflect any Contract changes or delays that may have occurred during the interim schedule development period.

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- b) Any such changes and all progress through the time of Baseline Schedule acceptance will be entered at the first update after the schedule has been accepted.
- b. Part 2 - Resource and Cost Loaded Schedule
 - 1) At the direction of the Engineer and at no additional cost to the City, a Resource and Cost Loaded Schedule is due within **30 calendar days** after acceptance of the Logic and Duration Schedule.
 - a) Submit an electronic copy of the schedule in Primavera Project Planner (.xer) format, schedule reports and other reports as specified in this Section.
 - b) Each Activity shall be resource and cost loaded to permit initial and monthly generation of a resource and cost curve and to assess the progress of the Work.
 - c) Cost loading of the schedule is required on a summary level and is not required to the Activity level. The intent of the cost loading is to facilitate forecasting, tracking, and reporting of overall cash flow by major work areas or systems, and Specifications. The summary level cost loading requirements will be determined and agreed to by the Engineer during the development of the project-specific schedule coding developed for the Baseline Logic and Duration Schedule and used to track the construction progress.
- 4. Once the Logic and Duration Schedule is accepted by the Engineer, it shall become the basis for future updates until acceptance of the Resource and Cost Loaded Schedule. The Resource and Cost Loaded Schedule, once accepted, may only contain changes to the Logic and Duration Baseline that are necessitated by resource issues identified during the preparation of the Resource and Cost Loaded Schedule.
- 5. Once the Resource and Cost Loaded Schedule is accepted, it shall become the Baseline Schedule of record and the basis for future updates. All subsequent monthly updates shall be compared to the Baseline Schedule. In addition, each current monthly update shall be compared to the last accepted update. Each update shall be labeled by period with the Data Date and report date identified on the hard copy and electronic file label.
- 6. After the acceptance of the Baseline Schedule required by this Section, no changes shall be made to Logic, Duration, or description of Activities therein without acceptance by the Engineer.

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7. The Contractor shall have no claim for damages by reason of the failure of the Engineer to give timely acceptance or comments on any progress schedule under this Section.
 8. The monthly update schedule submittal to the Engineer shall include the following:
 - a. An electronic copy of the schedule in Primavera Project Planner (.xer) format, with Data Date and monthly period clearly marked.
 - b. Electronic (.pdf) format copy of the CPM computer printouts in bar chart form, including:
 - 1) A comparison of the Baseline Schedule Activities against current update Activities organized and summarized by milestone, AREA, and DIV according to the requirements for Activity codes in this Section, or as otherwise directed by the Engineer. Each Activity shall have two bars with different colors (one showing the current schedule and one showing the Baseline Schedule).
 - 2) A comparison of current activities against the prior month's activities organized and summarized by milestone, AREA, and DIV according to the requirements for Activity codes in this Section, or as otherwise directed by the Engineer. Each Activity summary shall have two bars with different colors (one showing the current schedule and one showing the prior month's update schedule).
 - 3) A clear presentation of the specific detailed Activities making up the critical path(s) for the Project and for each milestone.
 - c. Electronic (.pdf) format copy of the Narrative Report as outlined in this Section.
 9. Comments made by the Engineer on the initial and monthly updated Current Construction Schedule will not relieve the Contractor from compliance with the requirements of the Contract Documents. This review is only for general conformance with the schedule concept of the project and general compliance with the information given in the Contract Documents.
- C. Narrative Reports
1. Schedule Basis Narrative shall be submitted to the Engineer with each Baseline Schedule submittal to memorialize assumptions made in development of the schedule and shall include the following:
 - a. A description of scope of the Project and how the Work is represented in the schedule activities;

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- b. A description of the overall sequence of major components of Work;
 - c. Planned work week;
 - d. Description of the critical path in the proposed Work plan;
 - e. Basis of Activity Durations;
 - f. How weather will be accommodated in the schedule;
 - g. How, regulatory, operational or third party constraints are accommodated in the schedule;
 - h. Description of key Project coordination points or events;
 - i. Discussion of long lead items and basis of time frames for submittals;
 - j. Description of anticipated means and methods for large quantity production Activities;
 - k. Potential opportunities and risks and quantify the schedule reduction or expansion;
 - l. Assumptions/exclusions made in the schedule.
2. Update Narrative Report shall be submitted to the Engineer each month with the monthly update submission, and include the following:
- a. The Contractor's transmittal letter;
 - b. Contract complete date status by milestone:
 - 1) Ahead of schedule and number of calendar days;
 - 2) Behind schedule and number of calendar days;
 - 3) Calendar days lost/gained compared with the previous update.
 - c. Schedule change report organized by milestone and area listing each Activity in the CPM schedule that has been/ will be:
 - 1) Completed during this reporting period;
 - 2) In progress during this reporting period;
 - 3) Scheduled to be performed during the next reporting period.
 - d. Analysis, organized by milestone and area, of the critical and near critical path/s describing:
 - 1) The nature of the critical/near critical path;
 - 2) Impact on other Activities, milestones and completion dates;
 - 3) Risks and opportunities impacting the critical/near critical paths.

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- e. List of current and anticipated delays by milestone:
 - 1) Cause of the delay;
 - 2) Corrective actions and schedule adjustments to correct the delay;
 - 3) Impact of the delay on other Activities, milestones and completion dates;
 - 4) Weather delays – when applicable, the Contractor shall describe how the impacts of weather conditions and constraints were absorbed and accounted for in the schedule and documentation showing they were beyond normal for the area or those provided for in the baseline.
 - f. Changes in Activity description, Logic, or Duration shall be grouped and organized in the report in a manner that communicates in detail the rationale associated with each change and the impact upon construction sequence, relationships and the critical path.
 - g. Added/deleted Activities and the rationale associated with each action;
 - h. Pending issues and status of other items:
 - 1) Permits;
 - 2) Contract modifications;
 - 3) Change orders;
 - 4) Long lead procurement items;
 - 5) Other.
 - i. Out of Sequence Report describing the necessity of each Activity relationship shown therein, as described within this Section;
 - j. Illogical Progress/Restraint Reports (if any);
 - k. Other project or scheduling concerns;
 - l. Electronic copy of the latest CPM schedule update file in Primavera (.xer) format;
 - m. Primavera scheduling error report.
- D. CPM Progress Meeting and Reports
- 1. Monthly, on a date established by the Engineer, a CPM Progress Meeting will be held, at which time the schedule will be reviewed. The meeting shall be attended by the Engineer, and representative(s) of the Contractor to include the scheduling consultant. The Contractor representative(s) at the meetings shall have the competence and authority to make any necessary

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decisions and their statement shall commit the Contractor to the agreed procedures, sequencing of Work, coordination and time schedules.

2. Prior to the meeting, the CPM scheduling consultant shall obtain, through any required means including Site meetings, the necessary information to update the CPM schedule to reflect progress to date and to update/revise the schedule (plan) of the Work for the balance of the project. The updated schedule and draft narrative report shall be furnished to the Engineer at least 48 hours prior to the meeting and be distributed by the Contractor in hard copy at the meeting for review.
3. To update the CPM schedule, the Contractor shall:
 - a. Enter actual start and completion dates for those Activities started and/or completed during the previous reporting period;
 - b. For Activities in progress, indicate the Remaining Duration correlating to an accurate forecasted completion date and physical percentage complete to date (Percent Complete is to reflect the actual quantity of Work completed, and is separate from any actual or Remaining Duration calculation). Review, and revise as necessary, the network Logic for the Remaining Duration of the Work from the update to the estimated completion date;
 - c. For Activities not yet started, review, and revise as required, the necessary Logic, the Durations of Work and the estimated start and completion dates;
 - d. Enter, for each applicable Activity, actual installed quantities information;
 - e. For identified construction change requests, Extra Work or change orders, add the appropriate detailed schedule Activities upon submittal of Form 1 for changes in the Work. The change order review and registration Fragnet will be provided by the Engineer and shall include the following Activities in sequence:
 - 1) Submittal of Form 1 on the actual date submitted;
 - 2) Contractor pricing of the identified change subsequent to submittal of Form 1;
 - 3) Pricing negotiations;
 - 4) Comptroller review and registration; followed by;
 - 5) Detailed submittal and construction Activities with correct Activity coding as specified within this Section.
4. The total Duration to be initially added to any schedule update reflecting the Activities from submittal of Form 1 to the registration of any specific change order, shall be in accordance with the Fragnet provided by the

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Engineer and shall be incorporated into the monthly schedule update following the submittal of Form 1 for the change in Work. The forecasted construction Activities shall be logically tied to the appropriate predecessor and successor base Contract Activities and contain all of the required Logic, Duration, and Resource Loading specified for the detailed CPM schedule Activities.

5. In the event the Contractor begins performance in the field of identified Extra Work during the update period, the monthly progress schedule update shall reflect the actual start date of the Work, and any predecessor Logic ties or restraints shall be broken in order to accurately forecast completion of the identified Extra Work Activity. This will allow for accurate forecasting of the successor Work Activities and completion milestones.
 - a. Annotate updated status information on the CPM schedule update in a manner that will graphically depict the current status of the Work;
 - b. Should discrepancies regarding data/information accuracy be noted during the review meeting or other discussions, the Engineer may direct the Contractor to adjust the percentage completion, Remaining Duration and actual dates to selected activities and re-issue the updated schedule and reports.
6. Default progress data provided from the scheduling system shall not be allowed. Actual start and finish dates and Remaining Durations of Activities shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual start and finish dates on the CPM schedule shall match those dates provided from the Contractor's Daily Quality Control Reports. Failure of the Contractor to document the actual start and finish dates on the Contractor Daily Quality Control Report for every in-progress or completed Activity, and to ensure that the data contained on the Contractor Daily Quality Control Reports is the sole basis for schedule updating, shall result in the disapproval of the Contractor's submittal.
7. Activities that have reported progress without predecessor Activities being completed (out-of-sequence progress) will not be allowed except on a case-by-case basis with the approval of the Engineer. A written explanation for each instance shall be included in the monthly submittal.
8. The Contractor shall not constrain the schedule with artificial Logic ties and or constraint dates and or any other scheduling techniques that may distort the Activity Float and Total Float associated with the critical path Activities and the schedule in general.
9. In addition to the requirements of the General Conditions, the Contractor shall submit monthly the proposed correlated sequence and estimated dates for submission, approval and final submission activities for the following:
 - a. Working drawings submittals;

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- b. Equipment operation and maintenance manuals submittals;
 - c. Witness shop tests;
 - d. Delivery of materials and equipment to Site;
 - e. Final field tests;
 - f. Special tools and lubricant deliveries;
 - g. Spare part deliveries;
 - h. Instructional services;
 - i. Permits;
 - j. Final record documents;
 - k. Startup and commissioning/testing;
 - l. Piping and equipment identification.
10. The above information shall be presented in an organized tabular format, showing for each submittal item, organized by item:
- a. Submission date (actual or forecast);
 - b. Approval date (actual or forecast);
 - c. Final submissions (actual or forecast);
 - d. Comments (actual or forecast).
11. Equipment/material procurement information shall be presented in an organized tabular format, showing for each item, organized by item:
- a. Drawing submittal date (actual or forecast);
 - b. Drawing approval date (actual or forecast);
 - c. Release for fabrication date (actual or forecast);
 - d. Witness shop test date (actual or forecast);
 - e. Delivery date (actual or forecast).
- E. Remedial Measures and Recovery Schedule
1. Delays to the Critical Path – Whenever it becomes apparent from the monthly CPM schedule update that delays to the critical path have occurred due to action or inaction of the Contractor, and as a result the Contract completion date will not be met, the Contractor shall take some or all of the following actions at no additional cost to the City, in addition to and apart from the other requirements of this Section, as directed by the Engineer:
- a. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of Work.

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- b. Increase the number of working hours per shift, shifts per day, or working days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.
 - c. Reschedule Activities to achieve maximum practical concurrence of accomplishment of Activities, and comply with the revised schedule.
 - d. Submit to the Engineer for review a written statement of the steps the Contractor intends to take to remove or arrest the delay to the schedule. The Contractor shall promptly provide the necessary level of effort to bring the Work back on schedule.
2. The Engineer may require the Contractor to add to its equipment and materials or construction forces, as well as increase the working hours, if operations for critical, less critical or non-critical activities fall behind the Contractor's Baseline Schedule at any time during the construction period.
 3. The Engineer may require the Contractor, at any time during the Project and at no additional cost to the City, to develop a more detailed schedule/Fragnet than depicted in the detailed Baseline Schedule to provide a clearer understanding of the effort needed to complete a specific area of Work or task.
 4. Should the Contractor fall behind schedule, the Engineer may require the Contractor to prepare a recovery schedule for Engineer review and acceptance. The recovery schedule shall propose alternative methods, overtime, and other means available to the Contractor to recover the schedule slippage incurred to date.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

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- 2.02 MATERIALS / EQUIPMENT
 - A. Not Used
- 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

PART 3 EXECUTION

- 3.01 EXAMINATION / PREPARATION
 - A. Not Used
- 3.02 IMPLEMENTATION
 - A. Not Used
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

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EXHIBIT 1 -- WORK BREAKDOWN STRUCTURE

WBS Code	WBS Name
@-###	@-### – STIC Facility Rehabilitation
@-###.CO	STIC Rehab - Contract
@-###.CO.CO	STIC Rehab - Construction
@-###.CO.CO.STE	STIC Site
@-###.CO.CO.STE.WTS	Water Treatment System
@-###.CO.CO.STE.DRV	Facility Driveway
@-###.CO.CO.STE.ENT	Security Gate Entrance
@-###.CO.CO.STE.BOA	Boat Ramp
@-###.CO.CO.STE.PRO	Propane Tank
@-###.CO.CO.STE.STR	Storage Shed
@-###.CO.CO.STE.SEW	Sewage System
@-###.CO.CO.STE.DRP	Stream Remediation Drop Box
@-###.CO.CO.STE.LNS	Landscaping and Erosion control
@-###.CO.CO.STC	STIC Building
@-###.CO.CO.STC.CHB	Central Chamber
@-###.CO.CO.STC.SSC	Substructure Central Chamber
@-###.CO.CO.STC.WNC	Temporary Central Chamber Winch System
@-###.CO.CO.STC.CRA	Existing Crane System
@-###.CO.CO.STC.CWS	City Water System
@-###.CO.CO.STC.ATT	Attic Walkway Platform and Access
@-###.CO.CO.STC.OFF	Office Space – South Wing
@-###.CO.CO.STC.WSP	Work Space – North Wing
@-###.CO.CO.STC.VEN	Venturi Plug System
@-###.CO.CO.STC.BFS	Bypass Flow System
@-###.CO.CO.STC.FBY	Chamber Forebay
@-###.CO.CO.STC.DOW	Chamber Downtake
@-###.CO.CO.STC.FGA	Slide Gates
@-###.CO.CO.STC.IBS	Intake Bar Screen
@-###.CO.CO.STC.RSW	Railways and Stairways
@-###.CO.CO.STC.ROO	Roof and Access Hatches
@-###.CO.CO.STC.INF	Chamber Influent Area and Channel
@-###.CO.CO.STC.HVC	HVAC System
@-###.CO.CO.STC.BLG	Building Shell
@-###.CO.CO.STC.HLW	High Level Withdrawal System
@-###.CO.CO.STO	Storage Shed

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@-###.CO.CO.STO.FON	Foundation
@-###.CO.CO.STO.BLG	Building Shell
@-###.CO.CO.STO.HVC	HVAC System
@-###.CO.CO.STO.ELE	Electrical System
@-###.CO.CO.CON	Contractor Staging Area
@-###.CO.CO.CON.TP	Temporary Power

EXHIBIT 2 – ACTIVITY ID FORMAT

1. Activity ID format: Activity ID’s shall be preceded by the Contract identifier: @-### - ...
2. Do not use the letters X or Z within the activity ID as these are reserved for DEP use
3. For Activities added to the schedule during the Project representing Contract change order execution and Extra Work, the Contractor shall insert “CO” after the Contract identifier and use the succeeding numbers to identify the change order number.

EXHIBIT 3 – SCHEDULE MILESTONES

1. NTP- @-###;
2. Mobilization- @-###;
3. Construction Start (start of installation of permanent Work in the field - @-###);
4. Project Specific milestones- @-###;
5. Substantial Completion- @-###;
6. Or other Milestones as directed by the Engineer.

**SECTION 01 32 10 – PROGRESS SCHEDULING
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EXHIBIT 4 -- PROPOSED ACTIVITY CODES

1. **@-### _RESP** - Responsibility Code – The party contractually responsible for the scheduled Activity. This Activity Code field should be defined as being four digits in length.

VALUE	SEQUENCE	TITLE
DEP	1	Department of Environmental Protection
ENG	2	DEP's Design Engineer
CCM	3	DEP's Construction Manager
CON	4	Contractor
ELE	5	Electrical
HVC	6	HVAC
PLB	7	Plumbing

2. **@-### _MLS** - Milestone Code – Milestones specified in the Contract. This Activity Code field should be defined as being four digits in length.

VALUE	SEQUENCE	TITLE
M1	1	Notice To Proceed
M2	2	Phase 1 Complete
M3	3	Phase 2 Complete
M4	4	Phase 3 Complete
M5	5	Substantial Completion

3. **@-### _LOC** - Location Code – Project location specified in the Contract. This Activity Code field should be defined as being four digits in length.

VALUE	SEQUENCE	TITLE
KENS	1	Kensico Site - @-###
SHUC	2	UEC Shaft

4. **@-### _AREA** - Area Code - The specific area within the project Site where the Work is taking place. This Activity Code field should be defined as being four digits in length.

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VALUE	SEQUENCE	TITLE
STSS	1	STIC - Substructure
STFB	2	STIC - Facility Building
STFS	3	STIC - Facility Site
GGWT	4	Grand Gorge Wastewater Treatment Plant office

5. @-### _OPER - Operation Code - The operation or type of Work
Note: The operation codes listed are for example only. The specific operation codes will be determined during the development of the Baseline Logic and Duration schedule and will reflect the Contractor’s anticipated means and methods. This Activity Code field should be defined as being four digits in length.

VALUE	SEQUENCE	TITLE
01	1	General Requirements
02	2	Site Clearing
03	3	Site Earthwork
04	4	Utilities
05	5	Access Roads
06	6	Temp Facilities
07	7	Erosion Control
08	8	Concrete
09	9	Landscape
10	10	Drainage
11	11	Temp Power
12	12	Lighting
13	13	Dewatering
14	14	Masonry
15	15	Metals
16	16	Wood and Plastics
17	17	Thermal and Moisture Protection
18	18	Doors and Windows
19	19	Finishes

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VALUE	SEQUENCE	TITLE
20	20	Specialties
21	21	Equipment
22	22	Furnishings
23	23	Special Construction
24	24	Conveying Systems
25	25	Mechanical
26	26	Electrical
27	27	Instrumentation and Control
28	28	Site Restoration
29	29	Piping modifications
30	30	Electrical modifications
31	31	Maintenance Activities

6. **@-###_ADD -** Activities Added – Code for Activities added during the current schedule update period. This Activity Code field should be defined as being four digits in length.

VALUE	SEQUENCE	TITLE
001	1	Activity Added in Update #01
002	2	Activity Added in Update #02
003	3	Activity Added in Update #03
Continued – to be updated by Contractor in each Progress Schedule		

7. **@-###_CO# -** Change Order Number – Code for Activities added for Change Order work. This Activity Code field should be defined as being four digits in length.

VALUE	SEQUENCE	TITLE
G001	1	G001 – General Change Order No.1 Description
E001	2	E001 – Electrical Change Order No.1 Description
H001	3	H001 – HVAC Change Order No.1 Description
G002	4	G002 – General Change Order No.2 Description
E002	5	E002 – Electrical Change Order No.2 Description
H002	6	H002 – HVAC Change Order No.2 Description

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VALUE	SEQUENCE	TITLE
Continued – to be updated by Contractor in each Progress Schedule		

8. **@-###_Contractor** General Contractor. This Activity Code field should be defined as being seven digits in length.

VALUE	SEQUENCE	TITLE
G1	1	Contractor
E1	2	Electrical sub-Contractor
H1	3	HVAC sub -Contractor
Continued – to be updated by Contractor in each Progress Schedule		

9. **@-###_Point of Contact** DEP Accountable Manager. This Activity Code field should be defined as being seven digits in length.

VALUE	SEQUENCE	TITLE
RB	1	Robert Bye
Continued – to be updated by Contractor in each Progress Schedule		

10. **@-###_Key Milestones** Optional Field for DEP use. This Activity Code field should be defined as being seven digits in length.
11. **@-###_Standard Milestones** Optional Field for DEP use. This Activity Code field should be defined as being seven digits in length.
12. **@-###_Temporary** Optional Field for DEP use. This Activity Code field should be defined as being seven digits in length.
13. **@-###_Hide** Optional Field for DEP use. This Activity Code field should be defined as being seven digits in length.
14. In addition to the required Activity coding outlined above, the Engineer may direct the Contractor to provide additional Activity coding, at no additional cost to the City, in order to facilitate the management of the project and schedule. Additional Activity coding may include:
- a. SUBC – Code designating major Subcontractors or vendors;
 - b. SYST – Code designating process or functional system;
 - c. TYPE – Code designating general type of Work;

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- d. PHAS – Phase of Work in accordance with construction phasing requirements.

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EXHIBIT 5 – PROJECT CALENDARS

1. @-###_5D1S - 5 days per week and one shift per day
2. @-###_5D2S - 5 days per week and two shifts per day
3. @-###_5D3S - 5 days per week and three shifts per day
4. @-###_7D3S - 7 days per week and one shift per day
5. @-###_Planting - Contains months warm enough for planting vegetation
6. @-###_X-Xxx - Limited months in calendar year (Xxx – Xxx) work can occur.

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NO TEXT ON THIS PAGE

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PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Pre-Construction Photographs and Videos
2. Construction Photographs and Videos
3. Post-Construction Photographs and Videos
4. Aerial Photographs
5. Videos
6. Informational Video

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.**

SECTION 01 32 30 – JOB PHOTOGRAPHS AND VIDEOS
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B.

1.03 RELATED SECTIONS

A. Section 01 31 25 - Web-based Project Management Information System

1.04 REFERENCES

A. Definitions

1. For the purposes of this Section, “Photograph” shall be defined as one digital camera image, which is approved by the Engineer for development into the products specified herein.
2. For the purposes of this Section, an “Aerial Photograph” shall be defined as one aerial view, approved by the Engineer, for development into the products specified herein.

B. Reference Standards

1. International Organization for Standardization
 - a. ISO 18902: 2013 - Imaging materials -- Imaging Materials – Albums, Framing and Storage Materials.
 - b. ISO-IEC 14496-14 Information technology -- Generic coding of moving pictures and associated audio information: MPEG-4 Part 14 (MP4 file format).
 - c. IPTC/XMP (International Press Telecommunications Council's/Adobe Extensible Metadata Platform) Standard

1.05 DESCRIPTION

A. Unless specifically noted otherwise, all Work of this Section shall be performed by the Contractor.

B. The Contractor shall engage the services of experienced professional photographers and/or video recording firms, approved by the Engineer, to document the progress of Work by taking color job Photographs, Aerial Photographs and videos. The photographer shall take Photographs, Aerial Photographs and videos of the Project before start of construction work, during ongoing construction, and after completion of construction as directed by the Engineer.

C. A designee of the Engineer will accompany the photographer for the taking of all photographs and videos.

D. Pre-Construction Photographs and Videos

1. The photographer, when directed by the Engineer, shall visit the Site prior to start of construction to take a total of 24 Photographs and make a 10 minute video showing existing conditions of the entire project site and any adjacent areas which could possibly be disturbed during construction.

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2. 4 Aerial Photographs shall be taken which showcase the project site in relation to the surrounding neighborhood.

E. Construction Photographs and Videos

1. The photographer, when directed by the Engineer, shall visit the Site during construction on a monthly basis unless the Engineer requests different frequencies of the visits, to take a total of 96 Photographs for the project and to visit the site when directed by the Engineer to tape a total of 1 hour of videos. Photographs taken and video minutes taped shall be distributed evenly among the visits and visits shall be distributed evenly over the course of the Project, all subject to the direction of the Engineer.
2. A total of 36 Aerial Photographs shall be taken with 3 views, at 6 phases of construction, as determined by the Engineer.

F. Post-Construction Photographs and Videos

1. The photographer, when directed by the Engineer, shall visit the Site at the completion of construction to take a total of 24 Photographs and make a 10 minute video showing the completed Work, the entire Project Site and any adjacent areas which were disturbed during construction.
2. 4 Aerial Photographs shall be taken showing the completed Work, the entire project site and any adjacent areas which were disturbed during construction.

G. Informational Video

1. The Contractor shall engage a professional video recording firm to develop a finished 60-minute informational video as directed by the Engineer.
2. The video shall be developed by editing the videos made during the pre-construction, construction and post-construction stages of the project, as well as any additional taping needed to complete the documentation of Work at the Project Site.

1.06 QUALITY ASSURANCE

- A. Photographs shall be clear with proper exposure. New Photographs are to be taken immediately if Photographs of an adequate quality cannot be achieved. Photographs shall be of a quality to permit enlargements.
- B. The professional photographer and professional video recording firm shall have a minimum of three (3) years of experience with duties similar to those specified herein. The qualifications of the professional photographer and professional video recording firm shall be subject to review by the Engineer.
- C. All videos shall be made using professional-type video cameras and with adequate lighting.

1.07 SUBMITTALS

- A. Submittals shall include, but not be limited to, the following:

SECTION 01 32 30 – JOB PHOTOGRAPHS AND VIDEOS
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1. Resume of the professional photographer proposed for this Work;
2. Resume and experience of the professional video recording firm proposed for preparing the informational video;
3. Plot plans indicating the location and unique sequential identifier of all Photographs.
4. Photo log of all Photographs and associated metadata in an Excel spreadsheet
5. One (1) set of all Photographs / Aerial Photographs taken for the Engineer’s review and approval for processing further.
6. The Contractor shall provide the Engineer with updated images, key plans and Photograph logs on a monthly basis.

- B. Submittals shall be made in accordance with Section 01 31 25 - Web-based Project Management Information System.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. All Photographs, Aerial Photographs, and videos resulting from the Work under this Contract shall become the exclusive property of the City upon their creation.
- B. Neither the Contractor nor the photographer nor the video recording firm shall retain any rights pertaining to the Photographs, Aerial Photographs, and videos nor shall they reproduce or otherwise publish or disseminate any of the Photographs, Aerial Photographs, prints or videos taken under this Contract without the prior written approval of DEP.
- C. The Photographs, Aerial Photographs, and videos shall be considered “work made for hire” under applicable provisions of the Copyright Act, and the City shall be the copyright owner thereof and of all aspects, elements and components thereof in which copyright protection might subsist. To the extent that such materials do not qualify as “work made for hire”, the Contractor hereby irrevocably transfers, assigns and conveys exclusive copyright ownership in and to such materials to the City, free and clear of any liens, claims or other encumbrances. The agreements between the Contractor and the photographer and video recording firm shall contain a provision containing these requirements.

SECTION 01 32 30 – JOB PHOTOGRAPHS AND VIDEOS
CONTRACT KENS-EAST-2

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Photographs

1. Digital cameras shall produce records with true optical resolution. Images shall not be resized or interpolated to a higher resolution from a lower resolution.
2. One set of digital images shall be submitted to DEP's web-based Project Management Information System.
3. Photographs should be embedded with metadata using the IPTC/XMP (International Press Telecommunications Council's/Adobe Extensible Metadata Platform) Standard. This includes:
 - a. Project number
 - b. Project name
 - c. Contract number and description
 - d. Unique sequential identifier
 - e. Description of Vantage point, indication location, direction and other pertinent information
 - f. General description of what the Photograph represents
 - g. Global Positioning System (GPS) location data
 - h. Phase of Construction (i.e. pre-construction, construction or post-construction)
 - i. Date and time Photograph was taken if not date stamped by camera
 - j. Name of photographer
 - k. Name of Department of Environmental Protection witness
4. The Contractor shall transmit one (1) electronic copy of each Photograph to the Engineer for use in preparing descriptions. The Photographs with descriptions will be returned to the Contractor for record management.

B. Aerial Photographs

1. One set of digital images shall be submitted to DEP's web-based Project Management Information System. Aerial Photographs shall meet the digital Photograph requirements of this Section, except that they shall be a minimum 50 megapixel file size.

C. Videos

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1. Video recordings shall be ASTC format, 1080P (1920 x 1080) using MPEG-4 Program Stream encoding (ISO-IEC 14496-14 “Coding of audio-visual objects -- Part 14: MP4 File Format”), using professional video cameras with clear and succinct narrative. The narrative material shall be developed in conjunction with the Construction Manager, Contractor, and Engineer.
 - a. All video recordings shall begin with a chapter index listing the contents in detail and providing direct access to each chapter.
 - b. All video recordings must include on parallel tracks metadata (catalogue information) to include the date and time of recording, the name of the area being documented, the project name, direction of travel, the viewing side, project number, Contract number and description, name of photographer and Department of Environmental Protection witness. The date and time shall be on a track separate from the rest of the metadata and, when displayed, shall appear in the upper left hand corner of the picture. Time and date shall use the following format:

Time: HH;MM;SS (using 24-hour clock time) Date: MM/DD/YYYY

- c. The project number, project name, Contract number and description, name of photographer and Department of Environmental Protection witness, when displayed, shall appear on the lower half.
2. Video output from camera used must be capable of producing full HD resolution (1920 x 1080). Geometric distortion should not exceed two (2) percent of picture height at any point in picture area.
3. All recording shall be done with adequate lighting. Written authorization by the Engineer to proceed with video documentation at any areas must be done with consideration of existing environmental conditions. The designee of the Engineer will accompany the photographer during all taping sessions.
4. During the recording period, all records shall be turned over to the Engineer for review of the content and quality. Any portion of the recording deemed unacceptable by the Engineer shall be re- recorded by the Contractor at no additional cost to the City.
5. One copy of all acceptable recordings shall be furnished and shall be properly identified by container number, equipment, location and project name. A record of the contents of each recording shall be provided on a run sheet, identifying each chapter segment of the recording.

D. Informational Video

1. The informational video shall have titles and audio defining all aspects of Work activities. In consultation with the Engineer and the City, the video shall develop the basic design criteria, explain each phase of excavation or

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construction, extras or credits, safety highlights, concrete, steel and other suppliers, disposal of materials, dewatering, control of groundwater, and other such items.

2. Two copies of the acceptable informational video (flash drive or hard drive) shall be furnished and shall be properly identified and labeled. Identifying information furnished on the informational video shall be the same as specified for other videos in this Section.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Fabrication

1. Photographs

- a. The file format for Photographs shall be color, uncompressed Tagged Image File Format (TIFF) produced by a digital camera with a minimum sensor size of 12 megapixel files or greater, and at an image resolution of not less than 5,000 pixels by 3,500 pixels at 300 dpi or greater
- b. Photographic images shall be provided as 8 bit per channel RGB color images.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

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NO TEXT ON THIS PAGE

**SECTION 01 33 00 – SUBMITTAL PROCEDURES
CONTRACT KENS-EAST-2**

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Submittal Categories
2. Schedule of Submittals
3. Letter of Transmittal
4. Contractor Responsibilities
5. Shop Drawings Submittal
6. Approval of Shop Drawings not a Waiver
7. Final Copy – Shop Drawings

B. The following index of this Section is presented for convenience:

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C. The following Schedule, attached after the “End of Section” designation, is a part of this Section:

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1. Attachment 01 33 00-1 - Sample Schedule of Submittals

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 31 25 – Web-Based Project Management Information System
- B. Section 01 32 10 – Progress Scheduling
- C. Section 01 78 39 – Final Record Documents

1.04 REFERENCES

- A. New York State Building Code (NYSBC)
American Society for Testing and Materials (ASTM)
American Institute of Steel Construction (AISC)

1.05 DESCRIPTION

- A. Submittals includes all types of drawings and other documents required to be prepared or assembled and submitted to the Engineer by the Contractor before, during, or after construction, such as, but not limited to, the following "submittal categories":
 - 1. As-Built Drawings
 - 2. Bid Submittals
 - 3. Certifications
 - 4. Construction Progress Photos and Videos
 - 5. Baseline and Monthly CPM Progress Schedules
 - 6. Final Record Documents
 - 7. Material Safety Data Sheets
 - 8. Mock Ups
 - 9. Operation and Maintenance Manuals
 - 10. Permits
 - 11. Plans (or Procedures)
 - 12. Preliminary and Final Test Procedures
 - 13. Product Data
 - 14. Reports
 - 15. Samples

SECTION 01 33 00 – SUBMITTAL PROCEDURES
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- 16. Schedule of Submittals
 - 17. Shop Drawings
 - a. Shop Drawings includes all drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for the Contractor and submitted by the Contractor to illustrate some portion of the Work.
 - 18. Shop Test Procedures
 - 19. Spare Parts
 - 20. Test Reports
 - 21. Warranties
- 1.06 QUALITY ASSURANCE
- A. Shop Drawings shall be submitted so that they can be approved within the first three (3) submissions. Starting with the fourth submission, liquidated damages will be assessed against the Contractor in accordance with Schedule A of the General Conditions.
- 1.07 SUBMITTALS
- A. The Contractor shall submit a schedule of submittals in accordance with the requirements of this Section, for review and approval.
 - 1. The Contractor shall resubmit an updated schedule of submittals to the Engineer for review and approval on the first day of each month until Substantial Completion, unless otherwise directed to submit less frequently by the Engineer.
 - 2. The Schedule of Submittals shall demonstrate coordination with the CPM Schedule submitted under Section 01 32 10 - Progress Scheduling. Changes and updates to the CPM Schedule shall be reflected in the specified resubmissions of the Schedule of Submittals.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Not Used
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used

SECTION 01 33 00 – SUBMITTAL PROCEDURES
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PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. All Submittals shall have identifying titles and bear the signature of the Contractor as evidence that they have been reviewed and approved by the Contractor and that they conform to the requirements of the Contract Documents. Submittals without this stamp of approval will not be reviewed by the Engineer and will be returned to the Contractor.

1. The stamp shall contain the following minimum information:

Project Name: _____
Contract No.: _____
Contractor's Name: _____
Date: _____
Item: _____
Section No(s): _____ Section Title(s): _____
Article No(s). _____ Paragraph No(s): _____
Contract Drawing No(s): _____
Location: _____
Submittal No.: _____ Review Cycle No.: _____
Shop Drawing Reference No.: _____
Source Company Name: _____
This submittal was reviewed for conformance with the Contract Document requirements and approved by: _____

SECTION 01 33 00 – SUBMITTAL PROCEDURES
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2. All applicable Specification sections, subsections, articles, paragraphs and drawings shall be noted in the stamp.
- B. Submittal Identification and Tracking: In order to identify and track each submittal as a separate and unique item, the Contractor shall utilize a submittal numbering system as follows:
1. Submittal Number:
 - a. The Submittal Number shall be a separate and unique number correlating to each individual Submittal that needs to be tracked as a separate and unique item.
 - b. The Submittal Number shall be a two-part number assigned by the Contractor in the following manner:
 - 1) The first part of the Submittal Number shall consist of 6 to 10 digits that pertain to the applicable Specification section.
 - a) Include all spaces (and decimal, if applicable) as per the Specification section title.
 - 2) The second part of the Submittal Number shall consist of three digits (the numbers 001 to 999) to number each separate and unique submitted under each Section.
 - 3) A dash shall separate the two parts of the Submittal Number.
 - 4) For example:
 - a) The submittal number for the third submittal under Section 09 91 00 – Painting, would be 09 91 00-003.
 - b) The submittal number for the first submittal under Section 40 05 59.16 01 – Stop Logs (Aluminum), would be: 40 05 59.16 01-001.
 2. Review Cycle:
 - a. The review cycle shall be identified by a three-digit number indicating whether a Submittal is the initial submission (i.e., "000") or a resubmission of an earlier Submittal (i.e., "001" or higher).
 - 1) The first resubmission, for example, would be assigned "001"; the second resubmission will be assigned "002"; etc.
 - b. Liquidated damages will be assessed upon rejection of any Submittal identified as "003" in the review cycle.
- C. Submittals shall include appropriate references to all related and pertinent Contract Drawing(s) and Specification Section(s).

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- D. In submitting Shop Drawings for approval, all associated drawings relating to a complete assembly of various parts necessary for a unit shall be included. Shop Drawings shall not be submitted until the full set of associated drawings is complete, so that they may be checked in relation to the assembly proposed.
- E. All items of electrical equipment constituting an operating system and any mechanical units involved therein or necessary for the functioning of such system shall be submitted at the same time and shall include clear diagrams showing circuit functioning and necessary details for field construction.
- F. Partial, incomplete, or illegible submissions will be marked "Rejected" and returned to the Contractor without review, for resubmission.
- G. Final Copy Shop Drawings: The Contractor shall furnish all "Final Copy Shop Drawings" to the DEP as a condition precedent to the Commissioner issuing a written determination of Final Acceptance. Final Copy Shop Drawings shall be submitted in accordance with Section 01 78 39 – Final Record Documents.

3.02 IMPLEMENTATION

- A. General:
 - 1. All Submittals including, but not limited to, Shop Drawings and inquiries pertaining to engineering features or Specification and Contract Drawing interpretations, shall conform to the General Conditions and the requirements of this Section and Section 01 31 25 – Web-Based Project Management Information System.
 - 2. Within 30 calendar days from the Work commencement date specified in the Notice to Proceed (NTP), the Contractor shall prepare and submit for the Engineer's approval a Schedule of Submittals which it proposes to follow, listing Section references, names of Submittals required, and the dates on which the Contractor proposes to make the Submittals. The proposed dates of submittals must be chronologically complementing the CPM schedule.
 - a. No other Submittals shall be accepted for review until the Schedule of Submittals is received and approved by the Engineer. Submittals that are submitted prior to approval of the schedule of submittals shall be returned "Rejected".
 - b. The Schedule of Submittals shall be in the form of a table.
 - 1) Each row in the schedule of submittals shall include, but not be limited to, the following data divided into columns:
 - a) The first part of the submittal number.
 - b) The second part of the submittal number.
 - c) The title of the submittal.
 - d) The review cycle.

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- (1) As the project progresses, data for resubmittals shall be added as separate rows under each submittal number.
 - e) The date of submission, anticipated (for future submittals) or actual (for past submittals).
 - f) The date the submittal is returned.
 - (1) For future or anticipated submittals, use "N/A".
 - (2) For past submittals, use the actual date the submittal is returned.
 - g) The disposition of the submittal:
 - (1) For future or anticipated submittals, use "N/A".
 - (2) For past submittals, use the actual disposition (e.g., FAS, FAC, R&R, etc.).
 - c. Refer to Attachment 01 33 00-1, Sample Schedule of Submittals, for an example schedule of submittals table.
 - d. The Schedule of Submittals is intended to be exhaustive, including all anticipated future submittals with reasonable estimates for submittal dates.
 - e. The Schedule of Submittals shall demonstrate coordination with the CPM Schedule submitted under Section 01 32 00 - Progress Scheduling.
3. Submittals shall be made as directed by the Engineer. All submittals shall be in the English language with U.S. customary units of measurement being used in all drawings and data.
4. The Contractor shall use the Project Web-Based Project Management Information System to submit all documents as directed by the Engineer and as described in Section 01 31 25 – Web-Based Project Management Information System.
5. Samples shall be shipped directly to the Engineer. A copy of the transmittal with photographs (JPEG format) of the samples (minimum three (3) angles per sample) shall be entered into the web-based Project Management Information System.
- B. Letter of Transmittal or Inquiry
- 1. A letter of transmittal shall accompany each submission. If data for more than one Section of the Specifications is being submitted, a separate transmittal letter shall accompany the material being submitted under each Section. To the extent possible, letters of inquiry concerning certain phases of the Contract shall also deal with only one Section of the Specifications.

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2. At the beginning of each letter of transmittal and each letter of inquiry, provide a reference heading indicating the following:

Owner's Name: NYC Department of Environmental Protection

Project Name: _____

Contract Number: _____

Transmittal Number: _____

Section and Item Number: _____

3. If submittals show variation from the requirements of the Contract, the Contractor shall make specific mention of such variation in the Submittal package.

C. Contractor Responsibilities

1. The Contractor shall review all submittals before transmitting them to the Engineer for review and approval.

a. Prior to transmitting each submittal to the Engineer:

- 1) The Contractor shall ensure proper coordination of the Work submitted.
- 2) The Contractor shall ensure that each submittal is in accordance with the requirements of this Section.
- 3) The Contractor shall ensure that each submittal is in accordance with each and all applicable submittal requirements of the corresponding Specification section(s) and/or drawings.
- 4) The Contractor shall ensure that each submittal contains sufficient documentation and information, presented plainly and clearly, to verify each and all requirements that are contained within the Specification Section(s) or shown on the Contract Drawing(s) prior to transmission to the Engineer.

- b. Regardless of what a manufacturer, fabricator, Subcontractor, etc. transmits to the Contractor, it is the Contractor's exclusive responsibility to ensure completeness of the submittal package prior to transmitting the package to the Engineer for review.

- 1) Packages that are incomplete, whether by failing to include all materials required to be submitted by the pertinent Specification section(s) and/or Contract Drawings, or whether failing to transmit any and all information needed to verify every feature, detail, etc. that is specified and/or

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shown, may be returned "Rejected" for the Contractor to resubmit.

- c. A note shall appear on the first page of each submittal indicating that the Contractor has made this check.
 - 1) Shop Drawings not so checked and noted shall be returned to the Contractor with a disposition of 'Rejected' for noncompliance with the requirements of the Contract Documents.
 - 2. Approval of Submittals shall not relieve the Contractor of the responsibility of furnishing materials and equipment of proper dimension, size, quality, quantity, and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Approval shall not relieve the Contractor of responsibility for errors of any sort on the Submittals. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the Work of all trades.
 - 3. Approval of any Submittal by the Engineer only determines its overall agreement with the information given in the Contract Documents. Approval of any Submittal by the Engineer does not constitute a representation that the Submittal was found to conform to all requirements of the Contract.
- D. Shop Drawing Submittals
- 1. The Contractor shall promptly prepare and submit Shop Drawings of all parts of the Work as specified herein. Shop Drawings which are full size shall be on "D" size, 22" x 34" ANSI standard drawing sheets. All Shop Drawings shall be drawn to scale.
 - 2. Shop Drawings shall be numbered consecutively and shall accurately and distinctly present the following:
 - a. All shop and erection dimensions;
 - b. Arrangement and sectional views;
 - c. Necessary details, including complete information for making connections between Work under this Contract and work under other contracts;
 - d. Kinds of materials and finishes;
 - e. Parts list and description thereof.
 - 3. Each Shop Drawing shall be dated and contain:
 - a. The name of the project and the Contract number;

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- b. The descriptive names of equipment or materials covered by the drawing and the Contract item number or numbers under which it is or they are required;
 - c. The locations or points at which the materials or equipment are to be installed in the Work.
- 4. Shop Drawings for equipment requiring electrical and/or mechanical connections shall show the units of equipment in the proposed position for installation and the details of attachments and connections required, with locations referred to each other and to the structure.
- 5. Whenever mechanical equipment, electrical equipment, tanks, pipe sections, structural and architectural details and other related items are to be permanently installed in the structures or are of sufficient weight and bulk to cause excessive stresses on the structural members and frame while being hauled, rigged, hoisted, blocked and placed in final positions, the Contractor shall submit, in advance of this Work, to the Engineer for approval, Shop Drawings showing the methods and sequence of the positioning operations, the size and material of all skids, blocks, falsework, runways, etc., the capacities of hand-operated and electric hoists and chain blocks, the positions of the hoists on the completed structural frame, temporary shores and supports, the capacities of winches and their position of attachment and similar and related rigging equipment required to effect the successful positioning of the permanently installed mechanical and electrical equipment.
- 6. Mechanical and electrical equipment shall not be moved across the floor of the structure without first covering the floor with timber of sufficient size so that the applied loads will be transferred to floor beams and girders of steel or concrete. If it is required to reduce bending stresses or deflection, the beams and girders shall be provided with temporary supports.
- 7. The Shop Drawings shall also show the loads at points of concentration, the stresses in the structures due to these temporary loads, the size and class of material of the temporary members and bracing installed or placed to minimize excessive stresses in the completed structures and computations to demonstrate that the temporary rigging equipment and accessories will not damage or injure any portion of the completed structure.
- 8. The approval by the Engineer of Shop Drawings for rigging and hoisting electrical and mechanical equipment and related items in final position will not relieve the Contractor of its responsibility to ensure the safety of the rigging operations, the equipment to be installed and its personnel nor will it relieve the Contractor from its responsibility not to damage completed structures, parts or members thereof or other installed equipment. The Contractor shall make good, repair or replace any damaged or injured items, structural, mechanical, electrical, architectural or landscaping, promptly

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and effectively to the satisfaction of the Engineer and at no extra cost to the City.

9. Supporting structures designed by Contractor: Supporting structures, which the Contractor is required to design, shall be of sufficient strength to safely withstand all stresses to which they may be subjected, within permissible deflections, and shall meet the applicable requirements under NYS Building Code, ASTM A36 and AISC Specifications for structural steel.
 10. Engineer's assumed design data: All structural steel, concrete and reinforcement indicated or specified to fully or partially support equipment or appurtenances and the areas immediately adjacent thereto, have been designed from data based on assumed average anticipated clearances and loadings. The final structural design in these locations will be based on definite data available only after the Engineer approves the equipment and appurtenances to be installed. Therefore, no Shop Drawings pertaining to such supporting steel or concrete structures shall be submitted until the Contractor is furnished with full data relative to the approved equipment and appurtenances.
 11. Necessary major changes in framing will be covered by supplementary or revised drawings which will be furnished to the Contractor. All changes indicated or necessary to accommodate the equipment and appurtenances shall be incorporated into the Shop Drawings submitted for approval.
 12. Shop Drawings for the Work in paragraphs 9, 10, and 11 above shall be prepared by or under the direction of a qualified licensed Professional Engineer, currently registered in the State of New York, and shall bear the imprint of their seal and signature.
- E. Shop Drawings Approval
1. Shop Drawings submitted to the Engineer shall contain complete data on the Work and full information on related matters.
 2. In submitting Shop Drawings for approval, all associated drawings relating to a complete assembly of various parts necessary for a unit shall not be submitted until the assembly of drawings is complete so that they may be checked in relation to the assembly proposed. Where errors, deviations and/or omissions are discovered later, they shall be made good by the Contractor irrespective of any approval by the Engineer.
 3. With Submittals, the Contractor shall notify the Engineer by written notification of all departures from the Contract Drawings and Specifications; otherwise, approval of such Submittals will not constitute approval of the departure. Approval of a Submittal will constitute approval of the subject matter thereof only and not of any other structure, material or apparatus shown or indicated.

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4. If the Contract Documents specify that a submittal (or a portion thereof) shall bear the signature and seal by a registered Professional Engineer, then in order for said submittal to be considered complete, the requisite documents must bear the signature and seal of a registered Professional Engineer at the time of submittal.
 - a. The submittal of draft documents for review without signature and seal is unacceptable. Such documents shall be considered incomplete and shall be returned with a disposition of "Rejected" without review.
5. Materials or equipment shall not be ordered nor shall any Work be done by the Contractor before the materials, the equipment and the Shop Drawings as herein required have been approved by the Engineer.
6. After the Engineer completes the review, the Submittals will be marked with one of the following notations of dispositions:
 - Furnish as Submitted (FAS)
 - Furnish as Noted (FAN)
 - Furnish as Corrected (FAC)
 - Revise and Resubmit (R&R)
 - Rejected (R)
 - For Information Purposes Only (FIO)
 - a. If a Submittal is acceptable, it will be marked "Furnish as Submitted", "Furnish as Noted", or "Furnish as Corrected". If a Submittal is unacceptable, it will be marked "Revise and Resubmit" or "Rejected."
 - b. Upon return of a Submittal marked "Furnish as Submitted", "Furnish as Noted", or "Furnish as Corrected", the Contractor may order, ship or fabricate the materials included on the Submittal, provided they are in accordance with any corrections indicated.
 - 1) Upon return of a Submittal marked "Furnish as Corrected", the Contractor shall make the corrections indicated, and resubmit the Shop Drawings to the Engineer.
 - 2) Upon return of a Submittal marked "Furnish as Noted", the Contractor shall make the corrections indicated, but does not need to resubmit the Shop Drawing to the Engineer unless the Contractor disagrees with the corrections noted.
 - c. Upon return of a Submittal marked "Revise and Resubmit", the Contractor shall make the corrections indicated, clearly noting any revisions and repeat the initial approval procedure.

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- d. The "Rejected" notation is used to indicate material or equipment that is not acceptable. Upon return of a Submittal so marked, the Contractor shall repeat the initial approval procedure utilizing acceptable material or equipment.
 - e. The "Rejected" notation is also used for submittals where the Contractor did not review the submittal for completeness prior to transmission to the Engineer as specified in this Section.
 - f. Shop Drawings or other Submittals not bearing the Engineer's "Furnish as Submitted", "Furnish as Noted", or "Furnish as Corrected" notation shall not be issued to Subcontractors nor utilized for construction purposes. No Work shall be performed or equipment installed without a "Furnish as Submitted", "Furnish as Noted", or "Furnish as Corrected" drawing or Submittal.
- 7. In the event the Contractor obtains the Engineer's approval for the use of equipment other than that which is shown or specified in the Contract Documents, the Contractor shall, at its own expense and using methods approved by the Engineer, make all changes to the Work, including structures, piping, and electrical equipment and controls that may be necessary to accommodate this equipment.
 - 8. Shop Drawings shall be submitted well in advance of the need for the material or equipment for construction and with ample allowance for time required to make delivery of material or equipment after the Submittal covering such is approved. The Contractor shall assume the risk for all materials or equipment which are fabricated or delivered prior to the approval of Shop Drawings. No materials or equipment will be permitted to be incorporated into the Work nor will such be included in monthly payment estimates until approval thereof has been obtained in the specified manner.
 - 9. The Engineer will review and process all Submittals promptly. A reasonable time should be allowed for the Engineer's review and processing of Submittals, the Contractor's revisions and resubmissions of Submittals, and the Engineer's review and returning the approved Submittals to the Contractor.
 - 10. It is the Contractor's responsibility to review and confirm compliance with the Contract Documents prior to submitting each submittal. Any delays, due to the quality of submittals requiring multiple cycles for review and approval, will be the responsibilities of the Contractor.
- F. Approval of Submittals not a Waiver
- 1. The approval of a Submittal shall not constitute a waiver of any of the requirements of the Contract nor shall the City be compelled to accept any Work unless it passes all the tests and requirements specified in the Contract Documents.

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2. All deviations made during construction from final Shop Drawings previously annotated by the Engineer "Furnish as Submitted", shall be corrected on the Shop Drawings, and resubmitted to the Engineer showing conditions as constructed.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

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ATTACHMENT 01 33 00-1
SAMPLE SCHEDULE OF SUBMITTALS

Submittal Number:		Name:	Review Cycle:	Date Submitted:	Date Returned:	Disposition:

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NO TEXT ON THIS PAGE

**SECTION 01 35 27 – ENVIRONMENTAL, HEALTH AND SAFETY
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PART 1 GENERAL

1.01 SUMMARY

A. Requirements for the Contractor to provide its employees and its Subcontractors a safe and healthful work environment and for performing all Work in compliance with all applicable environmental health and safety (EHS) laws, rules, and regulations.

1. The EHS performance of the Contractor and its Subcontractors is the responsibility of the Contractor. Since effective on-site management is essential for EHS performance, the Contractor shall evaluate the performance of its on-site EHS team on a continuous basis. Where deficiencies are found, the Contractor shall take appropriate action including removal of its personnel or its Subcontractors' personnel.

B. Attachments

1. Exhibit A – Standard Environmental, Health and Safety Requirements Specifications
2. Exhibit B – Bidder's EHS Safety Record and Program Review Questionnaire

C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 57 16 - Temporary Pest Control
- B. Section 02 24 20 – Soil Sampling and Analysis
- C. Section 31 23 16 - Excavation

1.04 REFERENCES

A. Definitions

1. “Competent Person” means one who is capable of identifying existing and 35 27predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees or the environment, and who has authority to take prompt corrective measures to eliminate them. A Competent Person has stop work authority.
2. “EHS Resources” shall mean the Contractor’s EHS Professional(s) and its EHS Site Representative (EHS Rep), as approved by the BEDC EHS unit. This definition shall also apply to the Subcontractors’ EHS Resources, where required. This definition also includes any consultant or other EHS personnel associated with the Project. Such EHS personnel are subject to evaluation and approval by BEDC EHS as set forth in this Section.
3. “Environmental Health & Safety Plan (EHASP)” shall mean the plan developed in accordance with all applicable EHS rules and regulations and these Specifications to identify and set forth policies and procedures to control the health and safety concerns and environmental impacts known and unknown at the Site. This plan is not to be confused with the Health and Safety Plan that may be required under 29 CFR 1910.120 for Hazardous Waste Operations and Emergency Response (HAZWOPER).
4. “Job Hazard Analysis” (JHA) shall mean a tool used to document a process by which the steps required to accomplish a work activity are outlined, the actual or potential hazards for each step are identified, and measures for the elimination or control of those hazards are developed.

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5. “Hazard Identification” shall mean an existing condition that has the potential to harm people, cause damage to property or the environment, or some combination of these.
6. “Incident” shall mean an undesired occurrence that resulted in injury, illness, environmental release, fire, explosion, motor vehicle event, property damage, equipment failure, non-compliance, and/or adverse impact to operations/work.
7. “Near Miss” shall mean an undesired event in which no property or environment was damaged and no personal injury (i.e., work related harm, damage or loss to a person, including first aid cases as well as recordable injuries) was sustained, but where, given a slight shift in time or position, damage or injury easily could have occurred.
8. “Observation” shall mean an opportunity to improve that does not entail an event included as a hazardous identification, near miss, or incident.
9. “Qualified Individual” shall mean one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve or resolve problems relating to the subject matter, Work or Project.

B. Reference Standards

1. 29 CFR 1926 - Safety and Health Regulations for Construction (Subpart Z – Toxic and Hazardous Substances), Standard No. 1926.1153 - Respirable Crystalline Silica

1.05 DESCRIPTION

A. General

1. In performing the Work of this Contract, the Contractor shall at all times be in compliance with all federal, state, City and local environmental, health and safety laws, rules, regulations, DEP Policies and BEDC EHS Standards.
2. The Contractor shall ensure that its employees and those of its Subcontractors working on a DEP project site under the Contract are clearly identifiable as Project Contractor employees. This may include the use of labeled safety vests or hard hats or other acceptable means in addition to complying with the identification badge requirements of Article 37 of the Standard Construction Contract.
3. The Contractor shall be responsible for the health and safety of its employees, Subcontractors, the public and all other persons at or around the Work Site. The Contractor shall be solely responsible for the adequacy of all construction methods, materials, equipment and the safe and environmentally compliant prosecution of the Work. Where possible, the

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Contractor shall implement Best Management Practices to reduce injuries, accidents and environmental impacts.

4. The overall site management for EHS is performed by the Engineer in coordination with the DEP Construction Manager. The Construction Manager's EHS staff/consultant and Contractor's EHS staff shall work closely with the Engineer's designated EHS staff (i.e., coordinate to perform joint EHS activities, including inspections, incident investigations, etc.). The Contractor shall coordinate with the Engineer's EHS designee with regard to any Site rules or Site-specific requirements such as working hours, delivery times and operations coordination and sequencing.
5. The Contractor shall perform and document its due diligence in determining whether the Subcontractors it hires to perform Work under the Contract are capable of performing to the EHS standards set forth in this Section. At a minimum, the Contractor is required to perform an EHS evaluation of proposed Subcontractors prior to submitting them for DEP approval. The Contractor must have a Subcontractor EHS evaluation program that is at least as stringent as the DEP Contractor Selection and Management Policy available in the BEDC web-based PMIS. Poorly performing Subcontractors will affect the Contractor's performance evaluations and ability to obtain future contracts with DEP.
6. DEP requires a drug and alcohol free, healthful, safe and secure work environment. Contractor employees will report to work in an appropriate mental and physical condition for work. DEP reserves the right to require any Contractor or Subcontractor employee to submit to drug testing when cause for reasonable suspicion of a violation of this policy exists. Drug testing may occur when: a) there is reasonable suspicion that an employee is under the influence of alcohol or illegal drugs, or b) an employee has been involved in an Incident, or involved in an unsafe practice, or c) as required by BEDC EHS Standards. The Contractor must prohibit any employee from being under the influence of any illegal drug or alcohol while at work, on duty, or operating a vehicle or construction equipment.
7. The Contractor shall implement an EHS Management Program which includes qualified Safety Professionals (SPs) and Environmental Professionals (EPs), collectively referred to as EHS Professionals, along with project management staff, with appropriate competencies to provide EHS direction, guidance, and oversight of all aspects of the performance of the Contract's detailed scope of Work.
8. The Contractor shall ensure that its EHS Resources have appropriate authority to execute their duties and responsibilities as set forth in this Section and under the Contractor's EHS Management Program.

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9. The Contractor shall arrange for additional approved EHS Resources to be available during EHS staff absences. The Contractor must inform the Engineer, in writing, of anticipated absences.
10. Contractor EHS Resources:
 - a. At a minimum, the Contractor shall provide the EHS Resources described below. The Contractor is required as part of its EHS Management Program to identify any EHS Resources necessary beyond the listed minimums.
 - b. For all contracts that employ 100 or less employees on site at any time, the Contractor shall have at least one full-time site EHS Rep. The Contractor may submit a request in writing to the Engineer to waive the requirement of a separate EHS Rep at each site and permit other Contractor employees who are Qualified Individuals to monitor the EHS activities of the employees and to assume all of the responsibilities of the full-time site EHS Rep, if it can show that one EHS Rep can effectively manage multiple sites. The EHS Rep(s) shall have no other duties except those related to EHS on the Contract, and shall not be the project manager, engineer, superintendent or have any other title or project role other than EHS Rep.
 - c. For all contracts that employ over 100 employees on site at any time, the Contractor shall have at least two full time EHS Reps. These EHS Reps shall have no other duties except those related to EHS on the Contract, and shall not be project managers, engineers, superintendents or have any other title or project role other than EHS Rep.
 - d. The Contractor may submit a request in writing to the Engineer to waive the requirements of this Section and permit other Contractor employees who are Qualified Individuals to monitor the EHS activities of the employees on site and to assume all of the responsibilities of the full-time EHS Rep.
 - e. The Contractor shall ensure that Subcontractors who consistently employ over 100 employees for more than two weeks at a time under the Contract shall have one full-time site EHS Rep. This EHS Rep shall have no other duties except those related to EHS on the Contract and shall not be the Project Manager, Engineer, superintendent or have any other title or project role other than as the Subcontractor's EHS Rep.
 - f. If the Contract has more than one location, each location shall be treated as a separate contract for purposes of determining the

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number(s) of necessary EHS Reps in accordance with paragraphs b through d above.

- g. The Contractor's EHS staff shall be provided an appropriate office on the Project Site to maintain and keep available EHS records, up-to-date copies of all pertinent EHS laws, rules, regulations and governing legislation, material safety data sheets, and the EHASP.
11. All site workers have the right to refuse unsafe work which is reasonably believed to present imminent danger to their own safety or the safety of others, the public or the environment, or to City property, without adverse consequences.
 12. The Contractor and its Subcontractors shall stop Work and initiate immediate corrective action whenever a Work procedure or a condition at the work site is deemed unsafe by the EHS staff, DEP, Competent Persons, or the Engineer. All Contractor and Subcontractor employees working on site shall report any unsafe or noncompliant work condition(s) immediately to the EHS staff, Competent Persons, or the Engineer. If a stop Work order is issued to the Contractor by the Engineer for unsatisfactory EHS performance, the Contractor shall not make any claim against the City for any losses associated with the stop work order.
 13. The Contractor and all Subcontractors are responsible for daily cleanup of their immediate Work areas in accordance with BEDC's Housekeeping Standard. Construction scrap and debris shall be removed daily during the course of construction, alterations and repairs. Contractor refuse shall not be allowed to accumulate so as to create trip hazards or block access routes and pathways. The Contractor shall implement procedures to ensure a high standard of housekeeping. All waste shall be disposed of in accordance with the appropriate regulations and applicable Specifications.
 14. The Contractor shall ensure that any sand, soil, plaster, cement, mortar or the like is not deposited or washed into any drain or sewer unless specifically authorized under required permits.
 15. When working with (i.e. the cutting, grinding, drilling, chipping, demolition/removal) masonry materials containing respirable crystalline silica (i.e. brick and concrete), the Contractor shall perform work utilizing specified engineering and work practice control methods in accordance with 29 CFR 1926.1153.
- B. Environmental Health and Safety Plan (EHASP)
1. The Contractor shall have a written EHASP prepared and signed by the EHS Professional in accordance with the BEDC EHASP Standard. The EHASP must be signed by a principal or senior manager of the company and project management staff. The EHASP shall be submitted to BEDC for review and

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approval prior to the start of any work. JHAs will be developed as the Work progresses, in accordance with the BEDC JHA Standard, and will supplement the Contractor's EHASP.

C. Emergency Action Plan

1. The Contractor shall work with the Construction Manager and Other Contractors to develop a single cohesive construction EAP in accordance with BEDC's EAP Standard.
 - a. The Contractor is responsible for providing or supplementing the facility's existing, emergency alarm/siren/annunciation system to ensure that all Contractor personnel will be adequately notified of an alarm condition or required/test evacuation.
 - b. The Contractor is responsible for evaluating and ensuring that all identified emergency resources are adequate and appropriate for the potential rescues/emergencies needed.

D. Spill Prevention Program (SPP)

1. The Contractor shall establish a Spill Prevention Program (SPP) for the prevention of releases of petroleum, hazardous substances or other pollutants. The SPP shall be included in the EHASP, and include awareness training for all personnel on measures designed to reduce, minimize and eliminate the potential for releases.
2. The Contractor shall establish sound work practices and implement appropriate measures to achieve release prevention and control of releases when they do occur.
3. At a minimum, the Contractor shall include within the SPP the following:
 - a. Proper materials handling, labeling and container storage inspection practices for all products including hazardous and universal waste.
 - b. All petroleum products, hazardous substances, or chemicals must be stored in designated areas and include secondary containment (with capacity to contain 110% of largest container) for all closed containers with a capacity greater than 5 gallons. Open containers of petroleum products, hazardous substances, or chemicals must be stored on secondary containment at all times.
 - c. Follow manufacturer recommended preventive Maintenance Procedures (MPs) and where none exist, develop in-house equipment specific MPs.
 - d. Inspection for and purging of residual materials in piping, tanks and other equipment prior to disassembly, demolition and disposal.

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- e. Supervision of fuel and chemical deliveries. These deliveries shall only be permitted during normal Project work hours or as otherwise approved by the Engineer.
 - f. The SPP shall include a detailed summary of anticipated petroleum and chemical storage. The information shall include capacity, contents, description and secondary containment provided.
4. The Contractor shall bear sole responsibility for all costs and delays resulting from any releases on the Project which occur as a result of the work activities.

1.06 QUALITY ASSURANCE

A. Qualifications

- 1. The Contractor shall ensure that, at all times, its employees and those of its Subcontractors have received OSHA 10-Hour Construction training or OSHA 30-Hour training within the last five (5) years.
- 2. The EHS Professional(s) shall possess a combination of safety and environmental skills as needed to manage the EHS hazards and issues presented by this Project. The EHS Professional may be one or more persons meeting the individual qualifications for Safety and Environmental Professionals as detailed below.
- 3. Safety Professional (SP): Persons recognized as a Safety Professional shall, at a minimum, possess the following education and experience:
 - a. Certification as a Certified Safety Professional granted by the Board of Certified Safety Professionals and five (5) years of documented professional construction EHS management experience; or
 - b. Certification as a Certified Industrial Hygienist granted by the American Board of Industrial Hygiene and five (5) years of documented professional construction EHS management experience; or
 - c. A Bachelor of Science degree in safety, industrial hygiene, occupational safety and health, environmental health and science, or related field and ten (10) years of documented professional construction EHS management experience.
 - d. All documented professional EHS management experience must be in the types of construction and conditions expected to be encountered on the site.
 - e. For projects that require hazardous waste remediation or response, the SP is also required to have successfully completed a forty-hour

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Hazardous Waste Operations and Emergency Response
(HAZWOPER) training course.

4. Environmental Professional (EP): Persons recognized as an Environmental Professional shall, at a minimum, possess the following education and experience:
 - a. A Bachelor's degree in environmental science, environmental engineering or other related engineering or science field and ten (10) years of documented professional environmental field, management and/or engineering experience. All documented professional environmental experience must be in the types of construction and conditions expected to be encountered under this Contract.
 - b. The EP's knowledge and experience should include, but not be limited to, management and disposal of solid and hazardous waste, universal waste, hazardous materials management, chemical and petroleum bulk storage, used oil, chemical and petroleum spill control plans, lead/mercury/PCB and asbestos remediation and management, storm water and soil management, and environmental permit management.
 - c. Where required for soil sampling plans and determining soil classifications the EP shall meet the NYSDEC definition for a Qualified Environmental Professional (QEP). In addition, when soils are excavated for onsite or offsite reuse in NYS, the QEP shall be present onsite to monitor contractor compliance with soil management plans, such as the Field Sampling Plan and Soil Excavation, Reuse, Transport and Disposal Plan (SERTD Plan) specified in 02 24 20 – Soil Sampling and Analysis and 31 23 16 – Excavation, respectively.

5. Electrical Safety Professional (ESP): Persons recognized as an Electrical Safety Professional shall, at a minimum, possess one of the following qualifications:
 - a. Certification as a National Fire Protection Association (NFPA) Certified Electrical Safety Compliance Professional (CESCP)
 - b. Licensed electrician with 8,000 hours (4 years) of verifiable work experience with electrical power systems (field work) or in lieu of licensure, must show proof of electrician job role and 8,000 hours (4 years) of verifiable work experience with electrical power systems (field work), and completed a minimum of 40 hours of electrical safety training from one or more of the following sources within the last 3 years:

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- 1) NFPA 70E Electrical Safety in the Workplace training seminars
 - 2) International Brotherhood of Electrical Workers (IBEW) electrical safety training
 - 3) Independent Electrical Contractors (IEC) electrical safety training
 - 4) Other approved electrical safety training
- c. Licensed Registered Professional Electrical Engineer, or an Electrical Engineer with a Bachelor's degree (or higher) in electrical engineering from an accredited college or university with 4,000 hours (2 years) of verifiable work experience with electrical power systems (field work), or an Associate degree in electrical engineering from an accredited college or university with 8,000 hours (4 years) of verifiable work experience with electrical power systems (field work), and completed a minimum of 40 hours of electrical safety training from one or more of the following sources within the last 3 years:
- 1) NFPA 70E Electrical Safety in the Workplace training seminars
 - 2) International Brotherhood of Electrical Workers (IBEW) electrical safety training
 - 3) Independent Electrical Contractors (IEC) electrical safety training
 - 4) Other approved electrical safety training
- d. Certified Safety Professional (CSP) with 6,000 hours (3 years) of verifiable work experience with electrical power systems and completed a minimum of 40 hours of electrical safety training from one or more of the following sources within the last 3 years:
- 1) NFPA 70E Electrical Safety in the Workplace training seminars
 - 2) International Brotherhood of Electrical Workers (IBEW) electrical safety training
 - 3) Independent Electrical Contractors (IEC) electrical safety training
 - 4) Other approved electrical safety training
- e. Licensed Electrician certified as an InterNational Electrical Testing Association (NETA) Level 3 - Certified Technician with 8,000 hours

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- (4 years) of verifiable work experience with electrical power systems (field work), or Level 4 - Certified Senior Technician with 4,000 hours (2 years) of verifiable work experience with electrical power systems (field work)
6. EHS Rep: Qualifications of the EHS Rep(s) shall include a minimum of: ten years of relevant construction experience, five years of which were exclusively in construction EHS management and successful completion of the following training courses:
- a. BEDC EHS Standards;
 - b. Thirty-hour OSHA construction safety and health training;
 - c. For projects that require hazardous waste remediation or response, forty-hour HAZWOPER training;
 - d. Resource Conservation Recovery Act/DOT hazardous waste/manifesting training
 - e. Permit- required confined space;
 - f. BEDC spill prevention and control;
 - g. Control of hazardous energy sources (lockout/tagout);
7. Electrical Safety Worker (ESW): Persons recognized as an Electrical Safety Worker shall, at a minimum, possess one of the following qualifications:
- a. Certification as a National Fire Protection Association (NFPA) Certified Electrical Safety Worker (CESW)
 - b. Licensed Electrician with a minimum of 40 hours of verifiable electrical safety training within the last 36 months (3 years), and completed an apprenticeship program that provides both a minimum of 576 hours of verifiable related instruction and 8,000 hours (4 years) of verifiable work experience with electrical power systems, or a minimum of 250 hours of verifiable related instruction and a minimum of 12,000 hours (6 years) of verifiable work experience with electrical power systems.
 - c. Licensed Electrician certified as an InterNational Electrical Testing Association (NETA) Level 3 - Certified Technician with 8,000 hours (4 years) of verifiable work experience with electrical power systems (field work), or Level 4 - Certified Senior Technician with 4,000 hours (2 years) of verifiable work experience with electrical power systems (field work)
8. The EHS Professional and EHS Rep shall have extensive experience with hazard identification, evaluation and controls, and be knowledgeable of all

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applicable EHS requirements set forth by governing laws, rules and regulations as well as Best Management Practices. Where gaps in the training or experience are identified, DEP may require additional experience or training for approval.

B. Performance Evaluations

1. The Contractor, in conjunction with its Subcontractors, shall be evaluated semi-annually on their performance in implementing the Work of this Contract in accordance with this Section and all related EHS specifications, rules, regulations, laws, policies and procedures. The evaluations are based on the criteria established in DEP's Contractor Selection and Management Policy.
2. In conjunction with the Contractor evaluation form, the EHS Professional and EHS Rep will be evaluated by BEDC EHS and these shall be included in the evaluations.
3. Any EHS Professional or EHS Rep who knowingly falsifies any data, result, audit, document, etc. will be removed from the Project and precluded from further DEP Work.

1.07 SUBMITTALS

A. Environmental Health and Safety Plan (EHASP)

- a. The Contractor shall submit the draft EHASP to the Engineer for review and approval within thirty business days from issuance of the Notice to Proceed. In no case shall Work be allowed to commence without an approved EHASP.
 - b. Initial submission of the EHASP shall be provided as one hard copy and one electronic copy (either Word or Acrobat format) to the Engineer.
 - c. The EHASP submittal shall be reviewed and comments shall be provided to the Contractor upon completion of the review.
 - 1) The Contractor shall work with the Engineer to address all comments in order to obtain EHASP approval.
 - d. Upon receipt of final approval, the Contractor shall provide one hard copy and one electronic copy (either Word or Acrobat format) of the EHASP to the Engineer.
2. The EHASP shall be available to all of the Contractor's employees working on the Contract.
 3. Review, acceptance and/or approval of the EHASP will not impose responsibility for the EHASP on any other party, nor will it relieve the Contractor from any of its EHS responsibilities.

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4. The Contractor shall submit to BEDC EHS for approval, the names of the EHS Professional and EHS Rep(s) to be employed. BEDC EHS may request and conduct an interview of the candidates prior to approval. The Contractor shall submit the resumes, copies of certifications, a signed certification of employee training, along with other qualifications of the EHS Professional and EHS Rep. The resumes shall include items such as: experience, education, EHS courses completed, safety and environmental conferences attended, and certifications achieved. Documentation and/or personal references confirming the qualifications may also be required. The DEP may reject persons proposed as EHS Professionals or EHS Reps for failure to have adequate qualifications or for other cause at any point prior to and during the Contract period, as determined by the Engineer.
 5. The Contractor shall adhere to the requirements of BEDC Incident and Near Miss Reporting and Investigation Standard and shall immediately notify the Engineer of all Incidents involving employee injury and illness, and any other work-related Incidents or Near Misses, damage to equipment and structures, releases or adverse impacts to the environment, or other conditions as defined in the Standard.
 6. The Contractor must notify the Engineer and BEDC EHS immediately of any regulatory inspections, notices of citations and penalties, Notices of Violation (NOVs), or any other outside agency violations. In addition, the Contractor shall furnish to the Engineer a copy of all correspondence from OSHA, NYSDEC, the Department of Buildings (DOB) or any other government regulatory agency, within one day of receipt, which may include, but are not limited to, employee complaints, notices of citations and penalties, environmental and NOVs. The Contractor must close out all NOVs and provide documentation to the Engineer that the NOV is closed/corrected as a condition precedent to obtaining final payment.
- B. Risk Control Reports
1. The Contractor will forward to the Engineer any risk control reports generated by its insurance carrier or broker within one day of receipt.
- C. Monthly Contractor EHS Report
1. The Contractor shall submit, on or before the 10th day of each month, a summary report of EHS activity for the prior month, including, but not limited to:
 - a. EHS metrics reported on the metrics reporting form provided as part of the pre-construction package and as may be updated throughout the life of the Project.
 - b. Chemical Inventory with HTSL (Hazardous and Toxic Substance List) and Subpart Z List.

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- c. Local Law 77 and DEP Bureau of Environmental Compliance air permits.
 - d. Summary of audit data including trending and analysis along with root cause and corrective actions/training identified.
 - e. Summary of the regulatory inspections, notices of citations and penalties, NOVs, or any other outside agency violations (which occurred and were provided to BEDC in accordance with this Section).
 - f. Statement by the EHS Professional discussing their review of the monthly report and recommendations for improvement, as necessary.
 - g. Detailed information regarding each pesticide application during the prior month, as specified in Section 01 57 16 - Temporary Pest Control.
2. The Engineer shall review the report to verify that the Contractor is effectively managing the EHS requirements under the Contract. If the Contractor has no, or limited Work in a given month, it shall inform the Engineer that no Work was performed or submit the required documentation for those days that Work was performed.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. EHS Equipment

- 1. The Contractor shall provide the proper EHS and rescue equipment for all employees, adequately maintained and readily available, for any foreseeable contingency or situation under the Contract during the performance of the Work.

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2. All equipment shall be stored in protected areas and maintained and calibrated in accordance with the manufacturer’s recommendations and as specified in the EHASP. Where equipment is required to be inspected and or calibrated, documentation shall be maintained and available for review.

B. Personal Protective Equipment

1. All personnel employed by the Contractor and any visitors entering the job site shall be required to wear appropriate personal protective equipment (PPE) required as specified in the EHASP and the BEDC EHS PPE Standard. The Contractor shall continuously provide and maintain adequate PPE.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. EHS Staff Duties

1. The Contractor’s EHS staff is responsible for overseeing and managing the Contractor’s safe and environmentally compliant performance of all Work.
2. EHS Professionals shall be required to initiate, review and implement measures to ensure the health and safety of all Contractor employees, and to protect property and the environment. Each EHS Professional is required to visit the Site and audit the Site conditions in accordance with the Contractor’s EHS Plan or as directed by the Engineer.
3. The EHS Professional will be held accountable to adjust his/her workload to enable proper performance of all of their EHS responsibilities in accordance with all requirements of this Section and all applicable regulations. DEP may request that the Contractor remove the EHS Professional for not meeting the Contract requirements.
4. The EHS Professional shall visit the Site prior to developing the Contractor’s EHASP . The EHS Professional will arrange a visit with the Engineer and perform an inspection of the Site to understand the full scope of Work to be performed under the Contract. Contract Documents relevant to writing the EHASP can be reviewed and obtained at this time. Facility/Site specific information must be provided, reviewed, and documented in accordance with the BEDC EHS Site Orientation Standard.

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5. The EHS Professional shall visit all Work areas as frequently as necessary, but no less frequently than monthly, to verify that EHS compliance is being achieved. The EHS Professional shall review hazards, JHAs, and the foremen's and superintendent's preparation and communication of JHAs to workers. The EHS Professional shall review the Project team's compliance with and adherence to EHS requirements, as well as their proactive approach and planning for EHS.
6. The EHS Professional shall be available for consultation whenever necessary. Prior to and after each visit, the EHS Professional shall sign the visitors' log maintained at the Engineer's office.
7. The EHS Professional is expected to perform their inspections in concert with the EHS Rep, during which time the EHS Professional will not only inspect the Site, but shall also mentor and direct the EHS Rep. During the inspection, the EHS Professional will evaluate the Contractor and each subcontractor working under the Contract and clearly identify findings and who they are assigned to, using the EHS Professional checklist provided in the EHASP. Any findings that cannot be resolved immediately will be assigned to the EHS Rep for follow-up. The EHS Professional is expected to communicate with the EHS Rep to ensure all identified findings are closed out. The EHS Professional's inspection shall include programmatic issues such as adhering to the Contractor's EHS program, including, but not limited to, preparing and communicating JHAs and proactively minimizing EHS risks.
8. The EHS Rep will coordinate with the EHS Professional when questions arise requiring the EHS Professional's expertise. After each visit, the EHS Professional shall prepare a report, including photographs (where necessary), acceptable to the Engineer and BEDC EHS, detailing the findings. The report shall include those hazards and violations discovered during the site visit and when and how they were or will be closed out. Any EHS items not covered or documented by the inspection checklist will be noted in the comments section of the checklist. The report shall be submitted to the Engineer within one business day of the Site visit.
9. The Electrical Safety Professional (ESP) shall be at the Site full time during all shifts whenever electrical work is in progress. The ESP is responsible for electrical safety planning and enforcing Contractor compliance with electrical safe work practices.
10. An EHS Rep shall be at the job Site full time whenever work is in progress during all shifts.
11. The EHS Professional's and EHS Rep's responsibilities are as follows:

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- a. The EHS Professional is responsible for directing the Contractor’s EHS program, ensuring implementation by the Contractor and all Subcontractors, and for directing and monitoring all activities of the EHS Rep. If the EHS Rep is not enforcing the EHASP, JHAs, or other elements of the EHS program, the EHS Professional shall either recommend retraining or removal of the EHS Rep from the Project by submitting a letter to the Engineer and the Contractor.
- b. The EHS Rep must review JHAs to verify that the Work activity’s EHS issues and hazards are accurately identified, addressed, and communicated. JHAs shall be regularly communicated to affected employees and must be made available in the areas where the affected employees are working. The EHS Professional is responsible for reviewing JHAs at least monthly to verify that they adequately reflect the recognized hazards and controls of the tasks being performed. JHAs shall be provided to the Engineer or BEDC EHS when requested.
- c. Both the EHS Professional and the EHS Rep shall schedule and conduct EHS meetings and training programs as required. A specific schedule of these meetings and an outline of topics to be covered shall be provided with the EHASP. The Engineer shall be advised in advance of the time and place of such meetings, and DEP personnel shall be invited to attend the meetings.
- d. All Contractor employees shall be instructed by the EHS Professional and the EHS Rep on the recognition of hazards, safe Work practices and environmental precautions, the contents of the EHASP, and the use of environmental, personal protective and emergency equipment. Such training shall be documented, recorded, and provided as part of the EHS monthly report(s). EHS Reps and EHS Professionals will attend regularly scheduled meetings held by the Engineer and BEDC EHS including, but not limited to, the EHS Pre-Construction Meeting.
- e. Determine that operators of specific equipment are qualified by training, certification and/or experience before they are allowed to operate such equipment. Ensure documentation of licenses, certifications and training by the appropriate agencies (for example OSHA, NYC DOB, NYC Fire Department, etc.) are on site and current, prior to start of Work.
- f. Verify implementation of the BEDC Emergency Action Plan (EAP) Standard.

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- g. Develop an effective Site communication plan that includes, signage, and verbal and written communication of EHS issues and notices.
- h. Post all appropriate notices regarding EHS regulations at Site location(s) which afford maximum exposure to all personnel at the job Site.
- i. Post appropriate instructions and warning signs regarding all hazardous areas or conditions which cannot be eliminated. Identification of these areas shall be based on experience, site surveillance, and severity of hazard. Such signs shall not be used in place of appropriate workplace controls.
- j. The EHS Rep is to conduct EHS inspections a minimum of twice per shift to ensure that all machines, tools and equipment are in a safe operating condition, and that all Work areas are free of safety and environmental hazards. The EHS Rep shall take necessary and immediate corrective actions, where feasible, to eliminate all unsafe acts and/or conditions, and submit to the Engineer each day a copy of the findings on the inspection check list report forms established in the EHASP. Detailed checklists will be tailored to the EHS hazards and conditions on the Site, and will include a comments section to include findings not specifically listed on the checklist.
- k. Whenever DEP and its agents perform both announced and unannounced inspections of the Contractor's EHS performance, a member of the Contractor's on-site EHS team shall be available during the inspections. The EHS Professional will coordinate inspections with the Engineer and DEP inspectors upon request. The Contractor shall take immediate corrective action, where feasible, to eliminate hazards identified by the Engineer, DEP inspectors, or any other entity. The Contractor, if requested, shall develop and implement a plan detailing corrective actions necessary to mitigate the presence of noncompliant conditions and actions following Incidents, citations, NOVs, or identification of patterns of noncompliant conditions and acts.
- l. Notify the Engineer and BEDC EHS immediately of all inspections by regulatory agencies, and submit to the Engineer and BEDC EHS copies of all EHS reports, citations, and NOVs from regulatory agencies and insurance companies within one workday of receipt.
- m. Implement an effective fire protection and prevention program at the Site throughout all phases of the construction Work in accordance with BEDC's Fire Prevention Standard. The Contractor will ensure the availability of fire protection and suppression equipment

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adequate to control the degree of fire hazard encountered during construction.

n. Provide and document appropriate Site-specific orientation to Contractor employees, visitors, and Subcontractors communicating recognized hazards present at and surrounding the Site(s) and facility in accordance with BEDC’s Site Orientation Standard and DEP’s Contractor Selection and Management Policy.

o. Perform all tasks and responsibilities as identified in the EHASP.

3.02 APPLICATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. EPCRA and Related Hazardous Material Regulations

1. The Contractor shall maintain a monthly inventory of hazardous substances or extremely hazardous substances used or stored on Site in accordance with the BEDC-provided chemical inventory form. Documentation shall be maintained on Site and available for review.

2. The Contractor shall prepare and provide to the Engineer a Right to Know (RTK)/Emergency Planning and Community Right to Know Act (EPCRA) Annual Chemical Inventory Form for all hazardous and extremely hazardous substances that the Contractor used or stored during the previous calendar year. This shall be provided by January 15th of each year.

3. In addition to any requirements of the New York City Standard Construction Contract, in order to obtain Final Acceptance, the Contractor must satisfy all EPCRA reporting requirements for the final year of the Contract.

B. Temporary Protective Grounding Equipment

1. Temporary Protective Grounding Equipment (TPGE) shall be used at locations required by 29 CFR 1910.269. TPGE may be used at other locations, when specified in the EHASP.

2. TPGE shall not be used as a substitute for following lockout procedures.

C. Hot Work

1. The performance of Hot Work is prohibited unless performed under the issuance of a Hot Work permit from the Permit Authorizing Individual (PAI). The PAI shall be provided by the DEP.

a. Where the DEP and Engineer are not routinely present, the Contractor may be allowed to obtain PAI certification for Contract employees.

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2. The Contractor shall provide the Engineer with a JHA at least 48 hours prior to the performance of Hot Work. The JHA shall identify the following:
 - a. The locations where the Work is to performed;
 - b. Equipment to be used;
 - c. Gases or vapors within or adjacent to the location that have the potential to create a combustible atmosphere;
 - d. Controls required to mitigate or prevent the accumulation of gases or vapors in quantities that have the potential to create a combustible atmosphere; and
 - e. Controls or methods to promptly discontinue the use of and de-energize equipment when a combustible atmosphere is detected.
3. For Hot Work in hazardous (classified) locations, refer to the requirements of Section 01 35 44 – Working in Hazardous (Classified) Locations.

D. Electrical Equipment Lockout

1. Contractor is required to lock out all electrical equipment utilizing lockable disconnecting means that provide mechanical isolation followed by verification of no voltage, as according to OSHA 1910/1926 and NFPA 70E; equipment tag out is not sufficient. If a lockable disconnecting means is not available at the identified equipment due to equipment design or operational condition, the Lockout process will continue elevating to the next level of the system, electrical or otherwise, until a lockable disconnecting means is available providing mechanical isolation. Complex electrical systems and network power distribution systems require lockable disconnecting means at all isolation points from the main power source through the downstream equipment loads (e.g. systems with A and B bus sources or other multiple power sources). The lock out requirement will be performed to the greatest extent possible in consideration of plant operational impacts. When the plant operational impacts are too significant to environmental compliance, an alternative method may be utilized known as an Energized Electrical Work Permit (EEWP). An EEWP is a document, defined by NFPA 70E, that clearly describes the following: the circuit, equipment, and location of the job/task at hand; the work that is to be done; justification of why the circuit or equipment cannot be de-energized or the work deferred until the next scheduled outage; performed by an Electrical Safety Worker (ESW); signatory authorization by the Plant Chief or Facility Manager.

E. Operability Assessment Program

1. An Operability Assessment Program as defined in Section 02 22 24 will be performed to verify the proper mechanical operation and lockout

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disconnecting means of the power distribution system equipment within the contract work scope. This program would start at the construction NTP and will be completed as the first contractor work activity. This program would need to be completed for each work area prior to any electrical work being performed. The program checklist for each unit of equipment will require sign-off by the Contractor ESP, CM, and Plant Chief.

3.04 **STARTUP / DEMONSTRATION**

A. **Visitors**

1. Allowing visitors and members of the public to tour an active construction site is discouraged due to the potential exposures to hazardous conditions and materials associated with construction Work. However, where necessary, approved and authorized visitors of the Contractor, Subcontractors, or any other authorized agency, department, or other entity associated with the Contractor shall sign in at both the DEP/Contractor Security Booth and the Visitors' Log maintained at the Contractor's Site office. Visitors are required to receive Site orientation training, comply with all provisions of the EHASP, wear proper and appropriate PPE and be escorted at all times. All efforts should be made not to schedule site tours/visits at the time of the scheduled evacuation drills. Visitors must not be exposed to construction hazards without prior training with respect to those construction hazards.

3.05 **ADJUSTING / PROTECTION / CLEANUP**

A. **Not Used**

END OF SECTION

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EXHIBIT A

**STANDARD ENVIRONMENTAL, HEALTH AND SAFETY
SPECIFICATIONS
REV 4, 6/23/2022**

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STANDARD ENVIRONMENTAL, HEALTH AND SAFETY SPECIFICATIONS

1. Scope

The goal of the New York City Department of Environmental Protection (DEP) is to run the safest operations and capital program in the country with the best environmental compliance record of any large water and wastewater utility. To achieve that goal, DEP strives to hire safe and environmentally compliant contractors and to systematically manage, monitor and evaluate contractors that are working on DEP projects and at DEP locations.

As such, DEP has developed procedures to ensure that contractors' environmental, health and safety (EHS) records and programs are evaluated when DEP is selecting a contractor or approving a subcontractor. These procedures require that all contractors are properly prepared and trained to safely complete the work and to adhere to all EHS laws, rules, and applicable standards as contractually required. DEP work sites are subject to requirements regarding qualification, supervision, and activities of contractors.

These contract requirements (Specifications) set forth the EHS eligibility standards for contract award as well as the applicable EHS training requirements and requirements specific to working on a DEP project. The Contractor must comply with applicable federal, state, and local codes and standards, including environmental and occupational safety and health requirements, as well as any additional special requirements invoked by other sections of the Contract.

Unless otherwise specified, these Specifications do not apply to:

- Contractors providing services with little likelihood of affecting DEP employee safety, DEP property, the public, and the environment, such as consulting services, light janitorial work, laundry, delivery (e.g., food and drink, furniture, filing cabinets), other supply services and shipping, or other products/services as determined by the contracting Bureau.
- Entities funded by DEP which do not directly provide labor or services to DEP, but which utilize funds to independently contract with others to provide services. Examples include other governmental agencies, grant recipients, and non-profit groups. Bureaus may require such entities to comply with the requirements of this policy by specifically adding these criteria into an agreement or contract;
- Other products or services, as determined by the contracting Bureau that do not have the potential to impact safety, public health or the environment.

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2. Pre-Award

2.1 Contractor Safety Record Submittals

Within 5 business days of DEP request, the apparent low bidder shall provide the information specified below. Failure to provide the required information may result in a rejection of the bid.

2.1.1 NY Intrastate Experience Modification Rating (EMR) for past 3 years.

Bidder shall provide its NY Intrastate EMR for the past 3 years on its insurance broker's letterhead. EMR information provided by the New York State Insurance Rating Board is also acceptable. If the bidder does not have a NY Intrastate EMR, its out-of-state EMRs shall be submitted. DEP may also request a company's Workers Compensation Loss Runs to verify EMR.

Bidders that do not have an EMR shall provide, for the past 3 years, their: (a) Workers Compensation Loss Runs (this information shall be provided by their insurance broker); (b) OSHA Total Recordable Cases (TRC); and (c) Days Away, Restricted, or Transferred (DART) rates.

Note: if the bidder is not required to maintain such information, it shall provide an explanation for the exemption.

Bidders are expected to have an EMR of 1.0 or below. If a bidder's EMR is greater than 1.0 in any single year within the 3-year period, the bidder shall submit the following:

- An explanation and supporting documentation explaining why the EMR is greater than 1.0 and detailed steps that have been taken to improve the bidder's EHS performance.
- Five years of Workers Compensation Loss Runs (this information shall be provided by the insurance broker) and documentation of payroll during that same period.
- For each indicated loss, the bidder shall provide a summary of the loss facts and investigation, including a summary of corrective actions undertaken and modifications or development of EHS programs.
- If the bidder has been notified by the New York Compensation Insurance Rating Board (NYCIRB) within the past 3 years that they must participate in the Industrial Code Rule 59, Workplace Safety and Loss Prevention, program then the bidder shall provide a copy of their Consultation Report from a Certified Consultant, documentation of the implementation of the Report identified

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corrective action(s) and recommendation(s), and a copy of the carrier required re-inspection. If the bidder elected to instead receive a worker's compensation premium surcharge, they shall so indicate.

- 2.1.2 Last 3 years of OSHA 300 Forms (Logs of Work-Related Injuries and Illnesses) and/or 300A redacted summary worksheets (as available, to verify accuracy of information provided).

Note: if the bidder is not required to maintain such information, it shall provide an explanation for the exemption.

If a bidder's EMR is greater than 1.0, the bidder shall submit their OSHA 300A redacted forms for the entire period covered by the work loss runs indicated in Section 2.1.1 above.

- 2.1.3 List of all federal, state and local regulatory agency (e.g., OSHA, NYSDEC, USEPA, USDOT, DEP, FDNY and NYCDOB, etc.) notices of violation, notices of deficiencies, and fines issued/received in the past 3 years; the letter listing these (or stating that no notices of violation, notices of deficiencies, and no fines have been issued/received in the past 3 years) shall be on company letterhead and certified as complete and accurate by the sworn, notarized statement of a principal or officer of the bidder.
- 2.1.4 List of reportable releases of chemical or petroleum products associated with the bidder's operations during, at a minimum, the last 3 years; the letter listing these (or stating that no reportable releases associated with the bidder's operations have occurred during the past 3 years) shall be on company letterhead and certified as complete and accurate by the sworn, notarized statement of a principal or officer of the bidder.
- 2.1.5 A written description of the bidder's EHS programs (and associated training), including any EHS programs and procedures employees will be required to follow while providing labor or services for DEP. Upon request by DEP, the bidder shall also provide a protocol for the EHS evaluation of any subcontractors that could be proposed by it for DEP approval.
- 2.1.6 A sworn, notarized certification from a principal or officer that, if the bidder is awarded the Contract, its EHS programs shall meet all OSHA, USEPA, NYS and local regulations, and the bidder shall abide by applicable DEP policies and procedures, as appropriate, and as provided by DEP. (Refer to Bidder's EHS Performance and Program Review Questionnaire/Checklist that is included with the bid submission materials in the Invitation for Bids package).
- 2.1.7 For bidders that are joint ventures, the above information must be provided and will be reviewed for the joint venture itself and the individual joint venture partners.

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2.2 Responsiveness

The items submitted under 2.1 will be evaluated as the contractor's safety record. Further, the bidder's EHS submittals and training program descriptions must indicate that the bidder:

- understands its regulatory requirements
- has a proactive and acceptable EHS and training program in place
- has performed acceptably on prior DEP projects as applicable.
- has adequate EHS professionals available for the project
- has demonstrated an acceptable safety record for the time periods reviewed.
- has demonstrated an acceptable safety record on similar projects over the past three years; and
- has certified that its program and training comply with all regulatory requirements.

3. Proposed Subcontractors

- 3.1 The subcontractor approval process requires an information submittal that includes the proposed subcontractor's EMR, EHS program descriptions and certifications like those in sections 2.1 and 2.2.
- 3.2 The standards listed in Section 2.2, above, shall also apply to the approval of proposed subcontractors that would be performing a significant volume or aspect of the project.

4. Contractor Orientation

- 4.1 Prior to commencing any work at any DEP location, the Contractor shall be required to attend an orientation. After attending the initial orientation, the Contractor shall, in turn, provide an orientation to any of the Contractor's employees assigned to work at the DEP location. This training must also be provided to subcontractors, suppliers¹, and Contractor visitors who will be onsite.
- 4.2 During orientation, DEP will provide the Contractor with the most current:
- 4.2.1 Work site-specific hazardous conditions and related information (e.g., hazardous chemicals present at the work site, locations of Safety Data Sheets, and required safe work practices including minimum Personal Protective Equipment (PPE) requirements);
 - 4.2.2 Facility-specific lockout/tagout requirements;

¹ This requirement does not apply to suppliers providing services or products that are determined by the Bureau administering the Contract to have little likelihood of affecting DEP employee safety, property, the public, or the environment.

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- 4.2.3 Applicable sections of the work site’s Emergency Action Plan and, at a minimum, the emergency contact numbers, facility map, notification procedures, evacuation procedures, evacuation routes, assembly areas, and description of alarms;
 - 4.2.4 Access control procedure;
 - 4.2.5 Location of restricted areas accessible from the work area or approaches to the work area (e.g., Process Safety Management/Risk Management Plan-covered processes, permit-required confined spaces, and other high-hazard areas) and procedures for working in and around restricted areas;
 - 4.2.6 DEP’s Workplace Violence Prevention Policy;
 - 4.2.7 DEP’s Possession of Firearms in the Workplace Policy;
 - 4.2.8 All other applicable DEP policies and procedures that will, or may, be necessary for the work; and
 - 4.2.9 Information on known constituents of concern in the work area, including areas known to contain, or having historically contained, lead, asbestos, PCBs, and mercury.
- 4.3 If provided one by DEP, the Contractor shall distribute to all workers who are to attend the orientation a hazardous material and safe work practices information package. If possible, it will be distributed at least two days prior to the orientation. The workers shall sign for the packages and indicate that they have reviewed the contents prior to their attending the orientation.
 - 4.4 Prior to commencing any work, a responsible official of the Contractor shall certify that it understands its obligations to train its employees and that it has been informed of and will abide by applicable DEP policies and procedures while it is working at DEP work sites.
 - 4.5 If the Contractor or a subcontractor needs to add additional or replacement worker(s) to its crews, the new worker(s) must be provided with the same information received by other workers and receive the orientation for the work site(s).
 - 4.6 The Contractor shall use the Contractor Training Certification form provided by DEP (or an equivalent form), as the record of those Contractor and subcontractor employees who have completed the facility orientation.

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5. Requirements During Work

- 5.1 When and where required by the DEP Bureau of Police and Security, the Contractor, and its subcontractors, and all their respective employees shall, always when working at the site(s), wear photo-identification badges.
- 5.2 The Contractor shall develop a work plan that identifies and addresses safety hazards and environmental requirements prior to starting any work.
- 5.3 PPE must be utilized in accordance with the work plan.
- 5.4 The Contractor and its subcontractors and all their respective employees shall, upon request, produce certificates, licenses, and other documentation that laws or regulations require them to obtain them to conduct activities they are performing (e.g., Asbestos Worker Certificate, FDNY Certificate of Fitness in New York City).
- 5.5 The Contractor's and its subcontractors' employees are restricted from entering all high-hazard process areas unless access is required to perform their work. In coordination with the Contract Supervisor, the Contractor or subcontractor employees entering such process areas must obtain permission from the on-duty operator or supervisor in person or by the telephone before entering these areas. Further, Contractor or subcontractor employees must inform the on-duty operator or supervisor in person or by telephone upon leaving and follow all other facility access control procedures.
- 5.6 Any worker who fails to abide by the EHS requirements presented in the safety orientation shall, at the sole discretion of the DEP, be denied access to the facilities and shall be replaced by the Contractor, as directed by DEP.
- 5.7 The Contractor shall immediately inform the DEP Contract Supervisor and the facility's most senior manager of all incidents and all near misses; and of any notices of violation (NOVs), notices of deficiencies (NODs), and fines issued by and/or received from regulatory agencies resulting from work performed. Initial written reports shall be submitted by the next day. Note that other specification sections in this Contract may include additional investigation and reporting requirements and must be consulted. The more stringent requirements will apply in the event of any conflict.
 - 5.7.1 The Contractor must close out all NOVs, and all other violations/deficiencies, and pay the appropriate fines before final or subsequent payments can be made by DEP. The Contractor will not receive final payment if there are open violations or notices of non-compliance.

6. Evaluations of Contractor EHS Performance

- 6.1 DEP will perform evaluations of the Contractor's performance to ensure compliance with all EHS laws and regulations and DEP and facility EHS requirements. Such

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evaluations will be considered when evaluating the Contractor’s bids for future contracts.

- 6.2 The Contractor shall be rated on each category shown on the Contractor EHS Evaluation form a copy of which should be provided to the Contractor by the Contract Supervisor. (“NA” is acceptable where the requirement was not applicable). The Contract Supervisor may include other specific EHS categories under “Other” that are of particular importance to the project. The Contract Supervisor shall inform the Contractor prior to commencement of work when this is the case.
- 6.3 DEP considers compliance with and conformance to EHS requirements to be of the utmost importance, and recognizes that, on particular projects, the importance of compliance with certain requirements may carry more weight than others, as failure to comply may present a greater level of risk. The final rating for the job in such a case may be weighted more heavily on specific categories (one or two) if compliance with that/those program requirement(s) is paramount to worker safety and/or environmental protection. In this case, the Contractor shall be notified prior to the commencement of work or through the development of risk-based safety plans during the project.
- 6.4 The following rating scale shall be utilized in conducting the Contractor evaluations:
- Excellent** – Contractor exceeded EHS contractual, policy, and/or regulatory requirements. Work was accomplished with no observed deficiencies and no violations. Contractor proactively and effectively addressed potential risks. Contractor demonstrated EHS leadership and best practices and showed alignment with DEP’s EHS goals.
 - Good** – Contractor met or exceeded most EHS contractual, policy, and/or regulatory requirements. Work was accomplished with limited or minor observed deficiencies or minor violations. Correction and preventative actions taken by the Contractor were timely and effective.
 - Fair** – Contractor met EHS contractual, policy, and/or regulatory requirements. Observed deficiencies or violations were satisfactorily corrected and did not indicate a pattern of repetition. The correction and preventative actions taken by the Contractor were completed in a timely manner.
 - Poor** – Contractor did not meet some EHS contractual, policy, and/or regulatory requirements. EHS deficiencies and/or violations were identified, but the Contractor either did not identify corrective and preventative actions or proposed correction and preventative actions that appeared to be only marginally effective.
 - Unsatisfactory** – Contractor did not meet a significant number of EHS contractual, policy, and/or regulatory requirements. EHS deficiencies and/or violations were identified, but Contractor did not develop a Corrective and Preventative Action Plan, or failed to implement a Corrective and Preventative Action Plan, or implemented an unsuccessful Corrective and Preventative Action Plan. Deficiencies and/or violations indicated a pattern of repetition.

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- 6.5 A Contractor that disagrees with an overall evaluation of “Poor” or “Unsatisfactory” can submit a written request for reconsideration to the DEP Contract Supervisor within 10 business days after receipt of the written evaluation. The request for reconsideration must set forth all the relevant information and arguments and be accompanied by any documentation relied on in support of the request. The request for reconsideration will be reviewed by the Deputy Commissioner overseeing the Bureau or his or her designee. The Deputy Commissioner or designee will notify the Contractor of the determination of the request in writing. Such determination will be final.
- 6.6 If its evaluation (other than the final evaluation) is “Poor” or “Unsatisfactory,” the Contractor must prepare a Corrective and Preventive Action Plan to correct and prevent recurrence of the deficiencies identified through the evaluation.

* * * * *

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EXHIBIT B

**BIDDER’S EHS SAFETY RECORD AND PROGRAM REVIEW
QUESTIONNAIRE
REV 4, 6/23/2022**

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DEP Contract Name or Number:		
Contractor Name:		
Location(s) and description of work to be performed (attach work summary from contract):		
Provide as part of the pre-award submittal:	<input type="checkbox"/>	EMR Rating (1.0 or below) ¹
	<input type="checkbox"/>	OSHA 300 logs and/or 300A redacted worksheets
	<input type="checkbox"/>	Sworn, certified and notarized letter with information on all regulatory violations and reportable releases in the past 3 years
	<input type="checkbox"/>	Sworn, certified and notarized letter from principal that if awarded the contract, its EHS programs shall meet all OSHA, US EPA, NYS and local regulations and shall abide by all DEP policies and procedures (with information on all reportable releases in the past 3 years
	<input type="checkbox"/>	Written description of firm's EHS and training programs
Attach Table of Contents of Firm's EHS programs and describe below		
Describe employee EHS training below, including new employee training (or attach)		
Describe protocol for subcontractor approval and onboarding below (or attach)		

¹ Contractors with EMRs over 1.0 must provide the documents references in sections 2.1.1 of the DEP Contractor Selection and Management Policy Attachment A (Rev. 4).

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Certifications

I certify that the EHS and Training Programs for:

(Company Name) _____

comply with applicable OSHA, USEPA, NYSDEC and NYC regulatory requirements and that the information presented on this form and attachments is accurate and complete. Our company is aware and understands its obligations under the OSHA, USEPA, state and NYC standards (if applicable).

Signature: _____ Title: _____

Print Name: _____ Date: _____

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NO TEXT ON THIS PAGE

**SECTION 01 35 44 – WORKING IN HAZARDOUS (CLASSIFIED) LOCATIONS
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PART 1 GENERAL

1.01 SUMMARY

- A. Hazardous (Classified) Locations
- B. Combustible Gas Detection
- C. Qualifications of Combustible Gas Detection Employees
- D. Task Hazard Analysis
- E. Hot Work Permit
- F. Air Monitoring Notices and Reports
- G. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Section 01 35 27 – Environmental, Health and Safety Requirements

1.04 REFERENCES

- A. Combustible Gas Detection: Performed by use of a gas detector to detect the presence of flammable vapors and gases and to warn when concentrations in air approach the explosive range.
- B. Hazardous (Classified) Locations: A location that is classified based on the properties of the flammable vapors, liquids, or gases, or combustible dusts or fibers, that might be present and the likelihood that a flammable or combustible concentration or quantity that is present.
- C. Hot Work: Any Work involving burning, welding, grinding, or similar operations that are capable of initiating fires or explosions.
- D. Rated Equipment and Wiring:
 - 1. Explosion Proof: Equipment and wiring that is enclosed in a case that is capable of withstanding an explosion of a specified gas or vapor that may occur within it and of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes, or explosion of the gas or vapor within, and that operates at such an external temperature that a surrounding flammable atmosphere will not be ignited thereby.
 - 2. Intrinsically Safe: Equipment and wiring that are incapable of releasing sufficient electrical energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture.
 - 3. Approved Industrial Truck: A truck that is listed or approved by a nationally recognized testing laboratory for fire safety purposes for the intended use and designated for the Hazardous (Classified) Location in accordance with the OSHA regulation at 29 CFR 1910.178(b).
- E. Lower Explosive Limit (LEL): The concentration of a combustible material in air below which ignition will not occur.
- F. Upper Explosive Limit (UEL): The highest concentration of a combustible substance in a gaseous oxidizer that will propagate a flame.

1.05 DESCRIPTION

- A. Hazardous (Classified) Locations
 - 1. The Contractor's attention is directed to the fact that certain Work areas where process equipment, tanks or piping systems exist above or below the ground may be configured such that they may be classified to be Hazardous (Classified) Locations as defined in this Section.

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2. Hazardous (Classified) Locations at the Work Site include, but are not limited to, the following areas:
 - a. Shaft 18
 - b. Fluoride Building
 - c. Lower Effluent Chamber
 3. The Contractor shall be aware of the classification of all work areas and understand that the introduction of certain equipment and materials may cause an area to be re-classified as a Hazardous (Classified) Location.
 4. The Contractor shall prevent unauthorized work from taking place in any Hazardous (Classified) Location:
 - a. Before entering any Hazardous (Classified) Location, the Contractor shall ensure that a safe working atmosphere exists;
 - b. When working within the Hazardous (Classified) Locations, the Contractor shall take suitable precautions to ensure a safe working atmosphere;
 - c. The Contractor shall take all necessary protective measures to ensure the safe completion of the Work.
 5. Atmospheric monitoring to ensure the protection of employee health and safety must comply with the requirements of the Contractor's Environmental Health and Safety Plan (EHASP) as per Section 01 35 27 – Environmental Health and Safety Requirements.
- B. Working in Hazardous (Classified) Locations:
1. All Hazardous (Classified) Locations and the extent of such locations shall be identified prior to the performance of Work in Hazardous (Classified) Locations.
 2. Work in Hazardous (Classified) Locations shall be performed using only equipment and wiring rated and clearly marked for such use, unless approved Combustible Gas Detection equipment and qualified Combustible Gas Detection personnel are provided to ensure a safe working atmosphere for the duration of the time that employees are working in Hazardous (Classified) Locations.
 3. The performance of Hot Work in Hazardous (Classified) Locations is prohibited unless performed under the issuance of a DEP Hot Work permit from the Permit Authorizing Individual (PAI). The Engineer and/or DEP shall provide the PAI.
 - a. Where the Engineer and DEP are not routinely present on Site, the DEP may authorize the Contractor to obtain PAI certification for a Contractor employee in order to issue Hot Work permits.

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- b. In active DEP facilities, the Hot Work permit will also be signed off by the DEP Operating Bureau Designee (OPD).
 - 4. The Contractor shall provide the Engineer with a Job Hazard Analysis (JHA) at least 48 hours prior to the performance of Hot Work in a Hazardous (Classified) Location. The JHA shall identify the following:
 - a. The Hazardous (Classified) Locations where the Work is to be performed;
 - b. Equipment and wiring to be used in the Hazardous (Classified) Location;
 - c. Gases or vapors within or adjacent to the Hazardous (Classified) Location that have the potential to create a combustible atmosphere;
 - d. Controls required to mitigate or prevent the accumulation of gases or vapors in quantities that have the potential to create a combustible atmosphere;
 - e. Controls or methods to promptly discontinue the use of and de-energize non-rated equipment when a combustible atmosphere is detected.
 - 5. The Contractor shall not use any non-rated equipment (e.g., powered industrial trucks not specifically rated for the areas to be used) in Hazardous (Classified) Locations without obtaining approval from the Engineer.
 - a. Where approval is provided the Contractor shall provide the Engineer with documentation that workers using non-rated equipment in the Hazardous (Classified) Location have been provided training and information on the applicable JHA and emergency procedures prior to working with non-rated equipment.
- C. Combustible Gas Detection:
 - 1. The Contractor shall arrange for Combustible Gas Detection to be performed by qualified Combustible Gas Detection personnel, as identified within this Section, anytime Work is to be performed in Hazardous (Classified) Locations with equipment and wiring that is not rated for such use. The Contractor shall certify that all Work in Hazardous (Classified) Locations is being performed in a safe atmosphere.
 - 2. Prior to commencing the Work for Combustible Gas Detection, the Contractor shall submit for the approval of the Engineer a communications protocol detailing the type and sequence of warning signals to be utilized, and describing the evacuation procedure to be employed, whenever a hazardous condition occurs.
 - 3. The Contractor shall ensure that Combustible Gas Detection equipment, which is listed by Underwriters Laboratories (UL) and rated for use in

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Hazardous (Classified) Locations, is calibrated, tested and maintained prior to use in a Hazardous (Classified) Location by qualified persons in accordance with the requirements of the equipment's manufacturer.

4. Prior to the start of Combustible Gas Detection, the Contractor shall:
 - a. Ensure the gas detection manager has performed an analysis of the work area to evaluate the combustible gas hazards of the location, determine the arrangement of Combustible Gas Detection equipment and implement any further controls necessary to mitigate or prevent the accumulation of a combustible atmosphere (i.e., ventilation controls, equipment positioning, etc.).
 - b. Calibrate all Combustible Gas Detection equipment in accordance with the manufacturer's requirements, and perform any necessary test functions (e.g., "bump test") at a minimum daily to ensure appropriate use of the equipment in accordance with the manufacturer's requirements.
 - c. Where the use of non-rated equipment is approved as described within this Section, Position Combustible Gas Detection equipment to establish monitoring results at least 15 minutes prior to the use of any non-rated equipment in a Hazardous (Classified) Location. The following conditions must be present to allow for the initial use of non-rated equipment:
 - 1) An oxygen level greater than 19.5 percent and less than 23.5 percent concentration;
 - 2) A LEL less than 5 percent concentration.
 - d. Ensure the JHA for performing Hot Work in a Hazardous (Classified) Location is prepared, reviewed and updated by the Contractor's gas detection manager prior to the start of Hot Work and any time:
 - 1) The scope of Work changes to introduce hazards or a potential for combustible gases or vapors to be present was not previously identified;
 - 2) The JHA's hazard evaluation does not adequately address the identified hazards;
 - 3) Hazard controls of the JHA have changed or do not sufficiently mitigate or prevent the accumulation of a combustible atmosphere.
 - e. Provide written verification to the Engineer that all gas detection equipment has been properly calibrated and tested prior to the start of Work in any Hazardous (Classified) Location.

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- f. Provide written verification to the Engineer that all work areas where non-rated equipment and wiring being used is safe through the issuance of a Notice of Safe Atmosphere upon calibration and testing of gas detection equipment and prior to the use of non-rated equipment in a Hazardous (Classified) Location.
- 5. Continuously monitor the Hazardous (Classified) Location with documented readings every 15 minutes. Electronic data logging where gas detection equipment possesses such capabilities is adequate so long as readings are recorded at least every 15 minutes and results are capable of being provided to the Engineer as written documentation.
- 6. Combustible Gas Detection equipment shall be capable of providing a continuous digital output measuring:
 - a. Oxygen in percent concentration;
 - b. LEL in percent concentration.
- 7. A warning condition shall be declared to all affected persons in the area, and the Engineer, by radio, PA, or in person anytime the following condition exists:
 - a. LEL greater than 5 percent.
- 8. Work shall be immediately stopped and non-rated equipment de-energized when any hazardous atmosphere is measured by gas detection equipment. A hazardous atmosphere is determined by the presence of any of the following:
 - a. Oxygen levels less than 19.5 percent or greater than 23.5 percent concentration;
 - b. LEL greater than 10 percent.
- 9. When a hazardous atmosphere is present, a hazardous condition shall be declared and the gas detection technicians shall immediately implement the following actions:
 - a. Sound a portable air horn to warn all personnel that a hazardous atmosphere exists;
 - b. Notify the Contractor and the Engineer by radio communication, PA, or in person that a hazardous condition has been declared;
 - c. Notify all persons in the potentially affected areas to immediately evacuate the area and discontinue use of non-rated equipment in Hazardous (Classified) Locations until the Engineer determines the conditions leading to the presence of a hazardous atmosphere, identified corrective actions to mitigate or prevent a re-accumulation of an unsafe atmosphere, and the atmosphere of the Hazardous

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(Classified) Location has returned to levels that personnel can safely resume operations in the area;

- d. Issue a Notice of Unsafe Atmosphere to the Engineer and ensure access is precluded by the Contractor's personnel in areas where a hazardous atmosphere is present;
 - e. The Contractor shall make combustible gas detection equipment available to the Engineer during the investigation and corrective/preventative action review.
10. When the Contractor determines that a hazardous atmosphere no longer exists, Work may resume upon issuance of a Notice of Safe Atmosphere in accordance with the procedures identified in this Section.
11. Provide all required Combustible Gas Detection equipment in sufficient quantities, with backups.
- a. The number of required equipment shall be determined by the gas detection manager and shall consider the size of Work area, Work to be performed, location of personnel, and configuration. Gas detection shall be adequate to identify potentially hazardous conditions in any area which could present a hazard to personnel.

1.06 QUALITY ASSURANCE

A. Qualification of Combustible Gas Detection Employees:

- 1. The Contractor shall ensure the following qualified personnel are available when performing Combustible Gas Detection:
 - a. A gas detection manager who meets at least one (1) of the following and has been approved by DEP:
 - 1) Certified Industrial Hygienist (CIH) by the American Board of Industrial Hygienists (ABIH) with at least five (5) years of documented professional industrial hygiene and air monitoring management experience.
 - 2) Certified Safety Professional (CSP) by the Board of Certified Safety Professionals (BCSP) with at least five (5) years of documented professional industrial hygiene and air monitoring management experience.
 - 3) Bachelor of Science degree in industrial hygiene, occupational safety and health, or environmental health and science and ten (10) years of documented professional industrial hygiene and air monitoring management experience.
 - b. Gas detection technicians shall be present as necessary to ensure the continuous monitoring for the presence of combustible gases and

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shall have no other responsibilities than those of a combustible gas detection technician. Technicians shall meet the following prior to operating Combustible Gas Detection equipment:

- 1) Trained in the calibration, testing, maintenance and operation of the Combustible Gas Detection equipment being used;
 - 2) Have a minimum of six (6) months' experience in the monitoring of combustible gases and vapors;
 - 3) Where confined spaces are involved, possess confined space training to include the responsibilities of the confined space entrant, attendant and entry supervisor.
- c. The Engineer shall have the right to interview and review the qualifications of all personnel performing Combustible Gas Detection.

1.07 SUBMITTALS

A. At a minimum, submittals shall include:

1. Prior to the commencement of any Work of this Section, the following items shall be submitted to the Engineer:
 - a. Qualifications of the Combustible Gas Detection employees.
2. In addition, during the performance of Work, the Contractor shall submit the following items as required in this Section:
 - a. JHA;
 - b. Communications protocol;
 - c. Written verification of equipment calibration;
 - d. Written review and verification of conditions;

B. Air Monitoring Notices and Reports

1. The Contractor shall prepare and submit the following air monitoring notices and reports to the Engineer:
 - a. Notice of Safe Atmosphere:
 - 1) When a previously determined hazardous atmosphere has been eliminated, and immediately after completing the procedures required above, the Contractor shall prepare and deliver a Notice of Safe Atmosphere to the Engineer;
 - 2) If the Notice of Safe Atmosphere is issued to rescind a Notice of Unsafe Atmosphere, it shall identify the contributing factors leading to the unsafe atmosphere and the necessary corrective actions to prevent reoccurrence.

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b. Notice of Unsafe Atmosphere:

- 1) This notice shall be prepared on Site when a hazardous condition is detected and immediately after all notifications required above within this Section have been completed. The Notice of Unsafe Atmosphere shall specify the type(s) and concentration(s) of gas(es) detected, the nature of the gas hazard and the location where, and the time when the hazard has been detected;
- 2) This notice shall be presented to the Engineer immediately upon completion.

C. Daily Log Report

1. The daily log report shall be provided to the Engineer daily and provide the Combustible Gas Detection equipment's readings in 15 minute intervals. Location and other task specific information shall be included in the daily report.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 01 35 45 – HAZARDOUS MATERIALS CONTROL
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PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Known Hazardous Materials
2. Unforeseen Hazardous Materials
3. Hazardous Materials Investigation and Remediation
4. Hazardous Waste Management and Regulatory Compliance

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A.** No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A.** Section 01 27 00 – Measurement and Payment

SECTION 01 35 45 – HAZARDOUS MATERIALS CONTROL
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- B. Section 01 35 27 – Environmental, Health and Safety Requirements
- C. Section 02 24 20 – Soil Sampling and Analysis
- D. Section 02 82 05 – Asbestos Management
- E. Section 02 83 05 – Lead Management
- F. Section 02 84 05 – PCB Management
- G. Section 02 84 10 – Mercury Management

1.04 REFERENCES

- A. Competent Person: One who is capable of identifying existing and predictable hazards in the Work area or unsanitary, hazardous, or dangerous working conditions, and who has authority to take prompt corrective measures (29 CFR 1926.32(f)).
- B. Large Quantity Generator (LQG): A facility that generates (in a calendar month) $\geq 1,000$ kg of total hazardous waste or >1 kg of acute hazardous waste or >100 kg of acute hazardous waste spill residue or soil, or at any time stores hazardous and acute hazardous wastes in greater quantities (at any time) than 6,000 kg of hazardous waste, 1 kg acute hazardous waste, or 100 kg of acute hazardous waste spill residue or soil.

1.05 DESCRIPTION

- A. Known Hazardous Materials
 - 1. There are materials present within the designated Work areas that will require special handling and other safeguard measures in order to minimize chemical exposure hazards to site workers and to prevent environmental impacts to offsite areas. As applicable to its Work, the Contractor shall incorporate these minimum requirements into its Environmental, Health and Safety Plan (EHASP) or other applicable submittal to ensure a safe and healthful working environment. The EHASP shall be designed in accordance with Section 01 35 27 – Environmental, Health and Safety Requirements.
 - a. Upon completion of any additional material sampling at the Work Site(s), the Contractor's EHASP shall be updated as needed to incorporate new data generated by analysis of the samples.
 - 2. The Contractor shall not initiate or proceed with any Work in areas associated with the contaminated, potentially hazardous, or hazardous materials until these materials have been removed from these areas or managed in accordance with the DEP Hazardous Waste Management Policy and the following Specifications:
 - a. Asbestos-containing material shall be handled in accordance with Section 02 82 05 – Asbestos Management

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- b. Mercury-containing material shall be handled in accordance with Section 02 84 10 – Mercury Management
 - c. Lead-containing paint shall be handled in accordance with Section 02 83 05 – Lead Management
 - d. PCB-containing material shall be handled in accordance with Section 02 84 05 – PCB Management
3. The Contractor shall attend an initial site inspection, a coordination conference, and any other meetings to review hazardous materials control issues in connection with the progress of the Work. The initial site inspection and coordination conference shall be as described below. Other meetings to monitor hazardous materials control issues associated with the Work, including any briefing of DEP personnel, including, but not limited to, facility managers and supervisors, shall be scheduled as necessary.
- a. Initial Site Inspection: Within five (5) business days after approval of the environmental health and safety (EHS) Resources, the Contractor, the Engineer, and applicable DEP personnel shall perform an initial site inspection to review all the Work areas that will be affected by contaminated, potentially hazardous and hazardous materials. EHS Resources are defined in Section 01 35 27 – Environmental Health and Safety Requirements.
 - 1) Initial site inspection shall be organized by the Contractor who shall contact DEP, and the Engineer to determine the representatives that should attend.
 - 2) A minimum of one representative from each party shall be present for the inspection.
 - 3) Competent Persons shall lead the site inspection.
 - 4) Wipe sampling or sampling outside of the Work to be performed may not be performed without DEP approval.
 - 5) A site inspection report shall be distributed by the Contractor at the beginning of the site inspection. The site inspection report shall include drawing(s) and associated text that describes the Work in sufficient detail to aid in the site inspection.
 - 6) The Contractor shall note in the site inspection report any special requirements that they have to perform their Work during the inspection.
 - 7) The Contractor shall prepare and distribute a summary of the site inspection and any comments noted during the inspection to all parties present at the site inspection.

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- 8) In the event that the initial site inspection does not satisfactorily identify the contaminated, potentially hazardous, and hazardous materials potentially affecting the Work, follow-up inspection(s) shall be organized and held as required.
 - b. Coordination Conference: Within five (5) business days after receipt of the submittals from the initial site inspection, the Engineer will direct the Contractor to schedule and organize a coordination conference. The coordination conference shall be held at the Engineer's field office, and shall include DEP facility managers and supervisors as relevant.
 - 1) The coordination conference shall be led by the Contractor.
 - 2) The Contractor shall prepare and distribute a summary of the conference and any comments noted during the conference to all parties present at the conference.
 - c. Coordination Plan: Within 14 business days after the coordination conference, the Contractor shall submit a coordination plan for Work affected by contaminated, potentially hazardous, and hazardous materials, incorporating all the Engineer's comments, for the Engineer's approval.
 - d. Follow-up Conferences: Within 14 business days of receiving the coordination plan, the Engineer will review and notify the Contractor of the approval of the coordination plan or of required changes. In the event that the plan is not approved, follow-up conference(s) shall be organized and held as required to receive approval.
 - 1) The follow-up conference dates shall be as directed by the Engineer.
- B. Unforeseen Hazardous Material
1. The Work Sites may contain unforeseen hazardous materials. When a potentially hazardous material that was previously unforeseen is discovered or an upgrade of its EHASP is necessary for managing unforeseen hazardous material, the Engineer will direct the Contractor to engage the services of a hazardous materials specialist to perform the necessary investigation, develop a remediation plan, and perform the remediation work. Additionally, the Engineer will direct the Contractor to update its EHASP as necessary.
 2. The Contractor shall be responsible for identifying previously unknown and suspect hazardous materials as they are encountered using approved techniques and analytical methodologies. The Contractor shall submit a sampling plan to the Engineer for acceptance prior to sample collection.

SECTION 01 35 45 – HAZARDOUS MATERIALS CONTROL
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Indication of the presence of hazardous materials, including but not limited to odorous or stained soils, sediment or liquids, mercury sources and suspect asbestos containing materials must be immediately reported to the Engineer. All Work in the area shall stop until otherwise directed by the Engineer.

3. In the event that hazardous material is detected, the Engineer will provide the Contractor with a scope of work for the remediation services and direct the Contractor to obtain cost proposals for such work from at least three (3) hazardous material specialists unless otherwise required by the DEP depending upon the magnitude and timing of the work. The Contractor shall submit the proposals, indicating which hazardous material specialist the Contractor proposes to engage, to the Engineer within ten (10) business days of receiving the scope of remediation work. The Engineer shall review the proposals and approve such selection or direct the Contractor to submit an alternative selection or obtain additional proposals. Remediation work shall not commence until the Contractor receives written notice from the Engineer to proceed with the work. As directed by the Engineer, pre-remediation inspections and coordination may also be required, in a manner similar to the procedures for known hazardous materials.
4. Soils testing and analysis shall be performed in accordance with Section 02 24 20 - Soil Sampling and Analysis. In the event that hazardous levels of lead are detected in soil, the DEP will provide the Contractor with a Community Air Monitoring Program (CAMP) to include particulate air monitoring. The Engineer will direct the Contractor to obtain cost proposals for work of the CAMP from at least three (3) experienced firms unless otherwise required by the DEP depending upon the magnitude and timing of the work. Within five (5) business days of receiving the CAMP, the Contractor shall submit the cost proposals to the Engineer, indicating which firm the Contractor proposes to engage. The Engineer shall review the cost proposals and approve such selection or direct the Contractor to submit an alternative selection or obtain additional proposals. CAMP work shall not commence until the Contractor receives written notice from the Engineer to proceed with the work.
5. The Contractor shall not initiate or proceed with any other Work in areas associated with contaminated, potentially hazardous, or hazardous materials until these materials have been removed from these areas or managed, “in accordance with the following Specifications:
 - a. Asbestos-containing material shall be handled in accordance with Section 02 82 05 – Asbestos Management
 - b. Mercury-containing material shall be handled in accordance with Section 02 84 10 – Mercury Management
 - c. Lead-containing paint shall be handled in accordance with Section 02 83 05 – Lead Management

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- d. PCB-containing material shall be handled in accordance with Section 02 84 05 – PCB Management
 - 6. Some of the remediation work may be critical to maintaining construction schedules. When this occurs, the Engineer will establish a time for completion.
- C. Hazardous Waste Management and Regulatory Compliance
- 1. Hazardous Waste Contingency Plan and Hazardous Waste Minimization Plan
 - a. If the location of the Project is on a site which has a Large Quantity Generator (LQG) status or subsequently obtains LQG status during the course of the Work, then the Contractor shall conform to the requirements of the Hazardous Waste Contingency Plan and Hazardous Waste Minimization Plan for that site.
 - 2. Hazardous Waste Storage Compliance
 - a. The Contractor shall maintain compliance with hazardous waste storage requirements at the Work Site. Storage areas and inspections of storage areas must comply with the hazardous waste regulations detailed within 6 NYCRR Parts 370 through 375.
 - 3. Waste Management Records
 - a. Disposal of wastes generated by remediation Work will be based on the results of testing and shall be at a site permitted to accept such waste by the U.S. Environmental Protection Agency (EPA) or an authorized state or local government Agency. The Contractor shall provide remediation waste profiles for DEP signature as generator, permit documentation required for the selected Treatment, Storage, or Disposal Facility (TSDF) to receive these wastes, and the transporter's 6 NYCRR Part 364 Waste Transporter Permit(s) required to transport wastes to the TSDF. The Contractor will conduct due diligence of the TSDF, including a list of violations received. The Contractor shall also provide advance copies of the waste manifest(s) for the Engineer's review and approval. The Contractor will keep and update a Hazardous Waste Inventory Log and will document weekly inspections by a Competent Person in the management of hazardous waste.
 - b. The Contractor shall submit written evidence that selected TSDF's will accept or have accepted the wastes generated during remediation. The Contractor shall also submit copies of the completed manifest, signed and dated by the initial transporter, in accordance with federal and state requirements and with associated documentation (e.g., Waste Profile and Hazardous Waste Land Disposal Restrictions (LDR) Notification and Certification Form).

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Copies of completed and signed waste manifests from TSDF's shall be provided to the Engineer as soon as possible but no later than thirty (30) days of waste shipment offsite.

4. Changes to Hazardous Waste Generator Status
 - a. The Contractor shall be aware that work activities may result in a change to the Work Site's hazardous waste generator status. Compliance with the revised generator status is required.
5. Hazardous Waste Regulatory Program Fees and Taxes
 - a. The Contractor may be directed to pay the New York State Department of Taxation and Finance for special assessments on hazardous waste generated at the Project Site or the NYSDEC regulatory program fees charged to the facility operating at the Site. When directed by the Engineer, the Contractor shall pay the amount indicated within 48 hours of notification. The Contractor will be reimbursed for the amount paid, with no provision for overhead and profit, from Allowance A-1 provided for unforeseen hazardous materials remediation as specified in Section 01 27 00 – Measurement and Payment.

1.06 QUALITY ASSURANCE

- A. Remediation plans for unforeseen hazardous materials shall comply with all applicable requirements of federal, state, and local hazardous waste regulations and shall include, but not be limited to the following:
 1. Identification of hazardous and regulated/non-hazardous wastes associated with the Work.
 2. Estimated quantities of wastes to be generated and disposed of.
 3. Names and qualifications of each Subcontractor that will be testing, transporting, storing, and disposing of wastes. Include the facility location and a 24-hour telephone contact number and applicable transporter and TSDF permits, EPA Identification Numbers, and insurance certificates.
 4. Names and qualifications (experience and training) of personnel who will be responsible for on-site management of hazardous wastes.
 5. Detailed description of the containment and removal procedures.
 6. List of waste handling equipment to be used in performing the remediation Work, to include cleaning, volume reduction, and transport equipment.
 7. Spill prevention and cleanup contingency measures to be implemented.
 8. Work plan for waste management, on-site storage, removal and disposal.
 9. Detailed schedule indicating the beginning and completion dates for each activity and each Work area, including time for clean-up, inspection, and monitoring activities.

SECTION 01 35 45 – HAZARDOUS MATERIALS CONTROL
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1.07 SUBMITTALS

- A. The following items shall be submitted as described above for the Engineer's approval:
 - 1. Site Inspection Report
 - 2. Coordination Plan for Known Hazardous Materials and, when required, for Unknown Hazardous Materials.
 - 3. Remediation Plan for Unforeseen Hazardous Materials, when required.
 - 4. Three (3) cost proposals from hazardous materials specialists for remedial action work, when required.
 - 5. Written evidence of disposal of hazardous and non-hazardous waste at an approved facility in accordance with the requirements of this Section.
 - 6. EHASP upgrades as needed in accordance with Section 01 35 27 – Environmental, Health and Safety Requirements.
- B. The Contractor, when requested by the Engineer, shall provide additional copies of all reports and related materials as may be needed for conferences with the Commissioner and other agencies having jurisdiction.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

SECTION 01 35 45 – HAZARDOUS MATERIALS CONTROL
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NO TEXT ON THIS PAGE

**SECTION 01 35 55 – SITE SECURITY PROCEDURES
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish personnel, uniforms, equipment and supplies necessary to provide Security Guard Services at the Site 24 hours per day, 7 days per week, year-round as described herein. The services shall be provided as specified and as directed by the Engineer.
- B. Attachments
 - 1. DEP Bureau of Police and Security Site Security Personnel Requirements
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

SECTION 01 35 55 – SITE SECURITY PROCEDURES
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1.03 RELATED SECTIONS

- A. Section 01 14 00 - Work Restrictions

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. General Requirements

1. The Contractor shall employ Security Guard Services to be used specifically and exclusively to safeguard the Site. The Security Services shall be provided 24 hours per day, 7 days per week, year-round. The Security Services shall primarily consist of one (1) uniformed security guard per shift.
2. The Contractor will be directed in writing by the Engineer as to the date of commencement of the security services two (2) weeks prior to starting the actual services. Once the Security Service starts, it will be a continuous operation until Project close-out.
3. The security guard shall be provided based on an 8-hour shift. No security guard shall be scheduled by the Contractor for more than twelve (12) hours in any twenty-four (24) hour period, including placements at other assignments.
4. The Contractor shall be responsible for the necessary supervision of the guards and shall make unannounced visits to the property, for the purpose of monitoring each Guard's performance.
5. Photo identification cards shall be issued by the Contractor to each guard and shall either be a photo insert or a photo type card. The identification badges shall be worn by the guard in full view at all times while on duty. Each card shall indicate:
 - a. The Contractor's name
 - b. The full name of the guard
 - c. The guard's identification number
 - d. The guard's signature
6. The Contractor shall ensure that meal breaks are provided for each guard, and shall provide a relief guard if the guard takes the meal break away from the assigned post.
7. All Work pursuant to this Contract shall be performed in compliance with the DEP Bureau of Police and Security Site Security Personnel Requirements, attached at the end of this Section, and with all applicable Federal, State and local Laws and regulations.
8. The Contractor shall provide a guard booth for the security guard.

SECTION 01 35 55 – SITE SECURITY PROCEDURES
CONTRACT KENS-EAST-2

- a. The guard booth shall be located inside the new Site gated perimeter and immediately adjacent to the Contractor’s entrance to the Site for RWLD construction.
 - b. Once RWLD is open to the public and EWLD is closed to the public, the contractor shall relocate the guard booth to the new EWLD contractor entrance. The guard booth shall be located inside the gated perimeter immediately adjacent to the EWLD entrance. See Contract Drawings for reference.
 9. If a phone is not available at the Security Guard’s booth, they shall be provided with a cellular phone that they shall use to call police if necessary.
 - B. The Contractor shall provide security guards in accordance with the requirements of the General Conditions, Article 9, to safeguard the Site of the Work and prevent access by unauthorized persons.
- 1.06 QUALITY ASSURANCE
- A. Qualifications
 1. The Contractor shall employ a Security Service Firm that is fully licensed under New York State Law to provide the required security guards. The Contractor shall provide a copy of a valid New York State Guard Service License prior to commencement of the Work.
 2. The Security Service Firm shall have been engaged in the business of providing uniformed security guard services for a minimum of five (5) years and shall provide details of this experience prior to commencement of the Work.
 3. The Contractor shall assure that all assigned Security Guards possess a valid security guard registration under New York State Law and meet the following criteria:
 4. Guards shall be at least eighteen (18) years of age and be a high school graduate or possess a General Equivalency Diploma.
 5. Guards shall be able to understand, speak, read and write English fluently. They shall be able to intelligently communicate with visitors and prepare accurate written reports of any incidents.
 6. All guards shall have undergone fingerprinting pursuant to New York State Division of Licenses regulations.
 7. Guards shall have no physical or mental disability or disability by reason of intoxication or the use of, addiction to or dependence on alcohol or drugs which, as determined by the NYS Department of State, renders the applicant unable to perform the essential functions of the security guard position, with or without reasonable accommodation, or who, as determined by the NYS Department of State, poses a direct threat to health and safety.

SECTION 01 35 55 – SITE SECURITY PROCEDURES
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8. Guards shall not have been convicted of a felony or other criminal offense which in the NYS Department of State determination would inhibit the guard's ability to perform the duties of a security guard in a reliable, competent and trustworthy manner in accordance with the Contract terms and conditions.
9. Guards shall perform their duties in full uniform.
10. Any security guard found not to meet the above qualifications shall be immediately replaced within 24 hours upon the direction of the Engineer. The replacement shall be made so that no interruption in security guard coverage takes place.

B. Training

1. All guards employed under this Contract shall receive training as per Section 89-N of the New York State General Business Law and the NYS Security Guard Act of 1992.
2. Training shall include, but not be limited to, the following:
 - a. Radio communication principles and radio use.
 - b. Laws of arrest, search and seizure (New York State).
 - c. Emergency evacuation procedures.
 - d. Bomb threat procedures.
 - e. Procedures in reporting a violation of the Law to a duly constituted Law enforcement agency.
 - f. Site specific emergency training procedures.
3. Guards shall receive a written copy of the training curriculum.
4. A representative from the City may attend any or all training sessions and shall receive a copy of the training curriculum upon request.
5. All guards shall receive a 2-hour DEP Police Training and shall meet all DEP security requirements.

C. Miscellaneous

1. No guards shall be under the influence or carry the odor of alcoholic beverages while on duty, nor shall any guard carry or consume any alcoholic beverage while on duty.
2. No guard shall be under the influence of, carry or ingest a controlled substance as defined in the Penal Law of the State of New York while on duty, except as prescribed by medical authorities and then only if the guard's performance or his/her duties will not be impaired in any way. Any such prescribed drugs shall be carried in a bonafide pharmaceutical container indicating the doctor's name, patient's name and date of issuance.

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3. If any of the above articles are violated, the guard shall be immediately removed from his/her post and replaced.
4. Sanitary facilities for the guards shall be made available by the Contractor..

1.07 SUBMITTALS

- A. Within thirty (30) days of Notice to Proceed, the Contractor shall submit to the Engineer the Security Service Firm for approval.
- B. Within twenty-four (24) hours of employment, the Contractor shall be required to maintain a personnel folder on each Security guard employed under this Contract. Only guards for whom the following information is submitted may be assigned. The folder shall contain the following information:

1. Guard's name
2. Home address
3. Date of birth
4. Duplicate photo ID card
5. Social security number
6. Copy of employment application
7. Copy of New York State Division of Licensing Application Form 307
8. Copy of birth certificate
9. Copy of high school diploma
10. Military record
11. Documentation of prior employment
12. Copy of New York State fingerprint card
13. Record of security training
14. Medical exam certificate
15. Certificate citing Security Guard's receipt of security contract scope of service
16. Result, if any, of criminal record check

- C. The above referenced files shall be made accessible and delivered to the Engineer within twenty-four (24) hours of the request.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Reporting
 1. All unusual occurrences that require a security guard to take official action must be reported immediately to the police and the Engineer as appropriate.

SECTION 01 35 55 – SITE SECURITY PROCEDURES
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2. It is the responsibility of the Contractor to keep all reports in a binder according to location.

B. Site Security

1. **Additional Security**

- a. Should the Contractor consider the security requirements outlined above inadequate, he may provide such additional security as he thinks necessary. The additional cost of such approved increased protection shall be paid by the Contractor.
- b. Nothing contained herein shall diminish in any way the responsibility of the Contractor for safeguarding and protecting his own work, materials, tools and equipment.
- c. Warning signs, lanterns and other devices shall be provided and maintained as required for protection of the public and site working personnel. The cost of providing additional Site security shall be deemed included by the Contractor in the lump sum price bid for the Contract.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. **Uniform and Appearance**

1. The Contractor shall supply all uniforms. All security guards appearance shall be neat and clean on every tour of duty.
2. The uniform and appearance shall be the following:
 - a. Cap with logo
 - b. Uniform trousers
 - c. Uniform shirt with badge or jacket with badge
 - d. Black shoes (polished and in good repair)
 - e. A name tag clearly identifying guard shall be worn on his/her uniform

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- f. Photo identification card
- g. Whistle and flashlight
- h. All guards' uniforms shall be matching.
- i. All items of uniform shall be maintained in a clean, well pressed condition.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Contractor is responsible for ensuring security is on for the duration of the Contract and will coordinate security responsibilities with Other Contractors who may be on Site concurrently, directly before, or directly after this Contract. For other contracts, please refer to Section 01 14 00 Work Restrictions.

3.02 APPLICATION

- A. Security Guard Duties/Responsibilities
 1. Security guards shall be responsible for maintaining order and upgrading property in and near the posts to which they are assigned.
 2. Guards shall be required to patrol accessible spaces and make periodic rounds of the assigned areas to ensure that no unauthorized persons are on the premises or grounds. Upon intrusion by an unidentified person, Guards shall make inquiry as to the authorization to enter the premises and take the necessary action.
 - a. Request the intruder to vacate the premises or
 - b. If a threatening situation or criminal activity occurs, notify the police.
 3. The guard shall immediately notify the Contractor of the presence of any unauthorized person or incident which could cause or bring about harm or damage to the Site or property. Contractor to follow any other outlined security procedures.
 4. Guards shall be responsible for preventing City property from entry by unauthorized individuals.
 5. Guards shall be stationed at guard booth.
 6. Guards shall not leave assigned posts until relieved.

SECTION 01 35 55 – SITE SECURITY PROCEDURES
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7. Guards shall sign in and out upon arrival and departure. Log books and sign in sheets shall be provided by the Engineer for this purpose.
8. Guards shall keep a record of any security related incidents that occur during shifts.
9. All records generated as per above articles shall be the property of the City.
10. Guards must escort visitors to the appropriate individual when required by the Engineer.
11. Guards shall maintain their security post in an orderly manner.
12. Guards shall guard against loitering, theft, personal assaults and other types of suspicious, wrongful or unlawful acts. Guards shall cooperate with all Law enforcement authorities.
13. Guards shall perform any other duties related to security as directed by the Engineer.
14. No guard shall carry packages, cartons, containers or luggage to or from any City post, unless permitted or directed by the City.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

SECTION 01 35 55 – SITE SECURITY PROCEDURES
CONTRACT KENS-EAST-2



BUREAU OF POLICE & SECURITY
SECURITY SYSTEMS ENGINEERING DIVISION

SITE SECURITY PERSONNEL REQUIREMENTS

Introduction: Applies to security personnel posted at DEP Construction Sites. Coverage will be according to what is outlined in individual contracts. Each site will have its own site specific post orders which will be outlined at the security orientation.

General:

1. All site security personnel must:
 - a. Comply with the 1992 New York State Security Guard Act and New York State General Business Law Articles 6 & 7
 - b. Be unarmed
 - c. Write and clearly speak English
 - d. Receive 2 hour security orientation from DEP BPS Security Manager prior to assignment
2. Security personnel can be from a security company or hired directly by the prime contractor. All must meet the general requirements outlined in item 1a-d listed above
3. Site supervision of all security personnel must be provided by whatever entity that directly hires them

Equipment:

1. In uniform bearing company insignia that clearly identifies the wearer as a security officer
2. 24 hour communication that can contact at a minimum 911 and DEP Police
3. Working flashlight
4. Log Book and pen
5. Timekeeping/Guard Tour system (turnkey or electronic) that is accessible to DEP BPS Security Manager when requested
6. *Fixed Post* – in sturdy booth with:
 - a. Power/HVAC capability
 - b. 4-side visibility with UV Protection
 - c. Chair with adjustable seat height
 - d. Close access to a port-a-john
7. *Roving Patrol* – vehicle must have valid state registration and current inspection sticker. Effort required so vehicle can be identified as “security”

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NO TEXT ON THIS PAGE

**SECTION 01 35 63 – SUSTAINABILITY CERTIFICATION PROJECT
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the Envision requirements of this Project. Work includes environmental and sustainable practice requirements related to the Institute for Sustainability Infrastructure’s (ISI) Envision Rating System. A goal of this Project is to construct a facility that meets ISI’s Envision Rating System.
- A. The intent of the Envision goals described herein is to execute this Contract in a manner that provides a safe and healthy environment for building occupants and community members with minimal negative impact on the environment.

1.02

- A. Attachments
 - 1. Attachment A: Sustainability Construction Envision Documentation
 - 2. Attachment B: Environmental Materials Reporting Form
- B. The following index of this Section is presented for convenience:

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1.03 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.
- B.

1.04 RELATED SECTIONS

- A. Section 01 14 00 – Work Restrictions
- B. Section 01 35 27 – Environmental Health and Safety Requirements
- C. Section 01 74 20 – Construction Waste Management
- D. Section 04 05 00 – Common Work Result for Masonry
- E. Section 04 22 00 – Concrete Unit Masonry
- F. Section 05 05 13.01 – Galvanizing
- G. Section 05 05 23.01 – Welding
- H. Section 05 05 23.02 – Miscellaneous Metal Fastenings
- I. Section 05 06 00.01 – Schedule for Stainless Steel Work
- J. Section 05 12 00 – Structural Steel Framing
- K. Section 05 50 00 – Metal Fabrications
- L. Section 05 52 13.05 – Welded Pipe Railings (Stainless Steel)
- M. Section 05 53 01.02 – Stainless Steel Floor Gratings
- N. Section 05 56 00.01 – Miscellaneous Metal Castings
- O. Section 06 10 00 – Rough Carpentry
- P. Section 07 22 16 – Roof Board Insulation
- Q. Section 07 62 00 – Sheet Metal Flashing and Trim
- R. Section 07 71 00 – Roof Specialties
- S. Section 07 90 00 – Joint Protection
- T. Section 08 11 19 – Stainless-Steel Doors and Frames
- U. Section 08 71 01 – Finish Door Hardware
- V. Section 09 29 00 – Gypsum Board
- W. Section 10 14 01 – Identifying Devices
- X. Section 32 12 16 – Asphalt Paving
- Y. Section 32 31 15 – Chain Link Fence

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1.05 REFERENCES

- A. ISI’s Envision Version 3 (V3) as released on April 17, 2018, is the Envision framework used and referenced herein.
- B. “Pathway A” refers to the Envision V3 compliance pathway being utilized for this Project. Pathway A includes a submission to ISI during 90% Design and a follow-up submission to ISI Post-Construction. The first submission is herein referred to as the ISI Design Submission.

1.06 DESCRIPTION

A. General

- 1. The Contractor shall comply with sustainability requirements as indicated in this Section, other Sections and Contract Drawings. The Contractor shall make a good faith effort to meet all sustainability targets as stipulated in Attachment A through the New Materials Sustainable Implementation Plan, and the Envision Evidence Documentation.
- 2. Contractor role within Envision certification:
 - a. The Contractor shall develop a New Materials Sustainable Implementation Plan and the Envision Evidence Documentation, which will be submitted the Design Engineer for use as evidence to support a “Platinum” certification.
 - b. The ISI Design Submission is generated by the Engineer. The ISI Design Submission is expressly excluded from and is not a part of this Contract.
 - c. The Contractor shall submit evidence as listed in Attachment A - Sustainability Construction Envision Documentation. The Contract Documents are not intended to limit alternative means of achieving Envision requirements. Suggestions from the construction team during Project meetings for implementing sustainability goals are encouraged.
- 3. All new materials shall be procured in accordance with the Environmentally Preferred Purchasing guidelines per Local Laws 118-121 of 2005.

1.07 QUALITY ASSURANCE

- A. The Contractor shall have an Envision Qualified Professional on staff who shall be responsible for Envision issues compliance and coordination.
 - 1. The Envision Qualified Professional shall be an Envision Sustainability Professional (ENV SP). The Envision Qualified Professional shall be responsible for sustainability considerations described in this section including the New Materials Sustainable Implementation Plan and the Envision Evidence Documentation.

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1.08 SUBMITTALS

A. New Materials Sustainable Implementation Plan

1. The Contractor shall develop and implement the New Materials Sustainable Implementation Plan for the Project, where new materials refer to any item, supply, equipment, or other physical object being newly purchased for the single-use or long-term use for the duration of the Project.
2. The New Materials Sustainable Implementation Plan shall provide a method for how the Contractor plans to meet the targets stipulated in Attachment A for recycled material, regional material, and sustainably sourced content.
3. The Contractor shall prepare and submit the New Materials Sustainable Implementation Plan for review and approval by the Engineer thirty (30) days after receipt of Notice to Proceed and prior to the selection of any new materials.
4. The Contractor shall use the Recycled and Regional Content Plan (RRCP) as reference for the development of the New Materials Sustainable Implementation Plan. The RRCP is generated by the Engineer and included in the bid exhibit documents. The RRCP is expressly excluded from and is not a part of this Contract and is available for information purposes only.
5. The following equations shall be used to calculate values to input in the Environmental Materials Reporting Form (EMRF) (Attachment B):

- a. Equation 1: Percent Recycled Content

$$\text{Percent Recycled Content} = \frac{\text{Estimated Material Weight from Recycled Source}}{\text{Estimated Total Material Weight}} \times 100$$

- b. Equation 2: Overall Percent Recycled Content

$$\text{Overall Percent Recycled Content} = \frac{\text{Estimated Total Material Weight from Recycled Sources}}{\text{Estimated Total Project Material Weight}} \times 100$$

- c. Equation 3: Percent Regional Content

$$\text{Percent Regional Content} = \frac{\text{Estimated Material Weight Sourced Regionally}}{\text{Estimated Total Material Weight}} \times 100$$

- d. Equation 4: Overall Percent Regional Content

$$\text{Overall Percent Regional Content} = \frac{\text{Estimated Total Material Weight Sourced Regionally}}{\text{Estimated Total Project Material Weight}} \times 100$$

- e. Equation 5: Percent Sustainably Sourced Content

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Percent Sustainably Sourced Content

$$= \frac{\text{Estimated Material Weight Sustainably Sourced}}{\text{Estimated Total Material Weight}} \times 100$$

f. Equation 6: Overall Percent Sustainably Sourced Content

Overall Percent Sustainably Sourced

$$= \frac{\text{Estimated Total Material Weight Sustainably Sourced}}{\text{Estimated Total Project Material Weight}} \times 100$$

6. The New Materials Sustainable Implementation Plan shall include estimates of recycled material content, regional material content, and sustainably sourced content as described:

a. Recycled material content estimate:

- 1) Identify the percentage of recycled content of at least five (5) materials, which will meet the recycled content targets as stipulated in Attachment A.
- 2) The total recycled material shall be estimated by including the total proposed weight in tons of all new materials and supplies procured for the Work, excluding mechanical equipment, electrical equipment, and plumbing equipment and their components, and excluding plants, soils, rocks, and water.
- 3) The estimated recycled content shall be calculated in tons per Attachment B – EMRF.

b. Regional material content estimate:

- 1) Identify the percentage of regional content of at least five (5) materials, which will meet the regional content targets as stipulated in Attachment A.
- 2) Regional content shall be defined per material by a distance of the supplier from the Site requirement in radii as the crow flies from the Project Site, as listed in Table 1.

Table 1: Regional Content Requirements

Material	Distance from the Site Requirement
Soils and mulches	50 miles
Aggregates, Sands	50 miles
Concrete	100 miles
Plants	250 miles
Other materials (excluding equipment)	500 miles
Mechanical, electrical, plumbing	N/A

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- 3) The total regional content shall be estimated by including the total proposed weight in tons of all new materials and supplies procured for the Work, excluding mechanical equipment, electrical equipment, and plumbing equipment and their components.
 - 4) The estimated regional content shall be calculated in tons per Attachment B - EMRF.
- c. Sustainably sourced content estimate:
- 1) Identify the percentage of sustainably sourced content of at least five (5) materials, which will meet the sustainably sourced content targets as stipulated in Attachment A.
 - 2) Sustainably sourced content shall be defined as procuring materials, supplies, and equipment from a manufacturer that is demonstrably protective of human health and the environment. Demonstrably protective may include third party sustainability certification programs, environmental product declarations, or corporate sustainability policies. Examples of qualifying requirements include but are not limited to:
 - a) Environmental management systems consistent with ISO (International Organization for Standardization) 14001
 - b) Product-specific type III Environmental Product Declaration (EPD) conforming to ISO 14025, 14044.
 - c) Third-party verified sustainability program (e.g., Forest Stewardship Council (FSC), Green Seal, EcoLogo, Underwriters Laboratory, National Biosolids Partnership (NBP), Concrete Sustainability Council (CSC), etc.)
 - d) Third-party verified corporate sustainability report consistent with the Global Reporting Initiative (GRI) Sustainability Report or equivalent.
 - 3) The total sustainably sourced material shall be estimated by including the total proposed weight in tons of all new materials, supplies, and equipment procured for the Work.
 - 4) The estimated sustainably sourced content shall be calculated in tons per Attachment B - EMRF.

B. Envision Evidence Documentation

1. The Contractor's Envision Qualified Professional shall be responsible for preparing and submitting the Envision Evidence Documentation. The

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Envision Evidence Documentation will be submitted to the Engineer on a quarterly basis following Notice to Proceed. At Project closeout, the Envision Evidence Documentation shall be completed and submitted to the Engineer.

2. The Envision Evidence Documentation shall include the following items:
 - a. A cover sheet that describes updates since the last submission, how the new materials reporting documentation differs from the New Materials Sustainable Implementation Plan, and a projection of how the Project is projected to meet the targets stipulated in Attachment A.
 - 1) The Contractor shall make a good faith effort to meet the targets stipulated in Attachment A.
 - b. The EMRF (Attachment B) and supplementary articles including shop drawings, Specifications and receipts/invoices for materials containing recycled, regional, and/or sustainably sourced content. The Contractor shall work with the vendor(s) to obtain the supplementary articles. The Contractor shall save such original documents for the life of the Project plus two (2) years. The Specifications shall include the following, as applicable:
 - 1) Name of the product
 - 2) Name of the manufacturer
 - 3) Weight of the material
 - 4) Percentage of recycled content (either post-industrial or post-consumer recycled content)
 - 5) Location of the manufacturer
 - 6) Manufacturer’s sustainable qualifying documentation
 - c. Construction waste information shall be collected per requirements described in Section 01 74 20 – Construction Waste Management.
 - d. Local Law 77: DEP Monthly Reporting Form 1, as described and included in Exhibit A in Section 01 14 00 – Work Restrictions.
 - e. Local Law 77: Compliance Monthly Reporting Form 2, as described and included in Exhibit A in Section 01 14 00 – Work Restrictions.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Not used.

1.10 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not used.

1.11 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not used.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not used.

2.02 MATERIALS / EQUIPMENT

A. Not used.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not used.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not used.

3.02 APPLICATION

A. Not used.

3.03 FIELD TESTING / QUALITY CONTROL

A. Envision Qualified Professional Site Meetings

1. The Envision Qualified Professional shall attend a minimum of three (3) on-site coordination meetings. The Envision Qualified Professional shall make available for review at each meeting a set of Contract Drawings and Specifications, the New Materials Sustainable Implementation Plan, and the updated Envision Evidence Documentation.
 - a. The first meeting will be a preconstruction meeting to review the New Materials Sustainable Implementation Plan and establish roles including the Envision Qualified Professional and the Engineer.
 - b. The second meeting will be a pre-closeout meeting to review the Envision Evidence Documentation for completeness and identify any outstanding issues relating to targets stipulated in Attachment A.
 - c. The third meeting will be a closeout meeting to review the completed Envision Evidence Documentation.

3.04 STARTUP / DEMONSTRATION

A. Not used.

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not used.

**SECTION 01 35 63 – SUSTAINABILITY CERTIFICATION PROJECT
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END OF SECTION

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Attachment A

Sustainability Construction Envision Documentation

Indicator	Minimum Required Level ¹	Pkg 2 Expected Performance	Envision Credit Reference	Reporting Template
Recycled Material	10% ²	47%	RA1.2	Attachment B
Regional Material	60% ³	55%	-	Attachment B
Sustainable Procurement	No Minimum Level ⁴	89%	RA1.1	Attachment B
Waste Reduction	95% ⁵	98%	RA1.4	Section 01 74 20 – Construction Waste Management, and Section 01 35 27 – Environmental Health and Safety Requirements

- 1.
2. Minimum required levels were established based on Project-specific goals, and represent the overall minimum required for the Project to meet as a whole. The Envision Qualified Professional shall reference the RRCP for the expected contribution from Pkg 2 to the overall Project goals.
3. Based on all new materials or supplies, procured during the Work, excluding mechanical, electrical, and plumbing equipment and their components, and excluding plants, soils, rocks, and water
4. Based on all new materials or supplies, procured during the Work, excluding mechanical, electrical, and plumbing equipment
5. Based on all new materials, supplies, equipment, or anything procured during the Work
6. Total material streams contributing to Project diversion goal must be recycled, reused, and/or salvaged

**SECTION 01 35 63 – SUSTAINABILITY CERTIFICATION PROJECT REQUIREMENTS
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Attachment B

Environmental Materials Reporting Form (EMRF)

Material	Type/ Product	Recycled Content			Regional Content				Sustainably Sourced Content				
		Total weight (tons) ¹	Total Recycled Material Content (%) ²	Total Recycled Content (tons)	Total weight (tons) ³	Source of material (miles from Project Site)	Total Regional Material Content (%) ⁴	Total Regional Content (tons)	Total weight (tons)	Manufacturer/Supplier Certifications ⁵	Certificate Obtained? (yes/no)	Total Sustainably Sourced Content (%) ⁶	Total Sustainably Sourced Content (tons)
Total			-			-	-			-	-	-	
Percentage of Recycled, Regional, or Sustainably Sourced Content by weight ⁷													

1. Total weight of material for recycled content shall not include landscaping material such as planting soil, mulch or sodding, and mechanical, electrical, and plumbing equipment, as stipulated in Article 1.07.A.6.a.2
2. Per Article 1.07.A.5.a Equation 1
3. Total weight of material for regional content estimates shall not include mechanical, electrical, and plumbing equipment, as stipulated in Article 1.07.A.6.b.3
4. Per Article 1.07.A.5.c, Equation 3 and Article 1.07.A.6.b Table 1: Regional Content Requirements

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5. May include third party sustainability certification programs, environmental product declarations, or corporate sustainability policies; option to include “no certification” if the manufacturer / supplier is not demonstrably protective of human health and the environment
6. Count as sustainably procured content if “yes” certification has been obtained; Per Article 1.07.A.5.e, Equation 5
7. Per Article 1.07.A.5.b-e, Equation 2 (recycled), Equation 4 (regional), and Equation 6 (sustainably sourced); final percentages shall be greater than or equal to the Minimum Percentage by weight as provided in Attachment A

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NO TEXT ON THIS PAGE

**SECTION 01 41 00 – REGULATORY REQUIREMENTS
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PART 1 GENERAL

1.01 SUMMARY

- A. Inspection by City, State and Federal Government
- B. Permits, Licenses, Work Approvals and Certificates
- C. Electrical Inspections, Department of Buildings
- D. Existing Utilities
- E. Existing Flows
- F. Diversion of Water
- G. Disposal of Water
- H. Conformance to Industrial Code
- I. Conformance to Other Codes and Standards
- J. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 57 00 – Temporary Controls

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. Inspection by the City, State and Federal Government
 - 1. The Contractor shall provide proper facilities for access to and inspection of the Work at all times for authorized representatives of the City, State and federal governments, the latter two in the presence of the Engineer.
- B. Permits, Licenses, Work Approvals and Certificates
 - 1. Unless otherwise specified in this Section, the Contractor shall obtain, pay for and comply with all necessary permits, licenses, approvals, certificates of inspection, and controlled inspection reports, and shall give all notices and pay all legal fees to local, City, State and federal departments having jurisdiction in connection with the Work of this Contract.
 - 2. In order to obtain the necessary permits in a timely manner so as to not affect the design or construction schedules, DEP has initiated applications for some permits. However, the Contractor shall be responsible for following up on and updating these permit applications, as needed, and for obtaining all required permits necessary for the performance of this Contract, for renewing permits before they expire, and for maintaining these permits by paying for them regularly and complying with their requirements during the period of performance of the Work.
 - a. Permits being acquired by DEP:
 - 1) NYCPDC -- Public Design Commission Approval
 - 2) NYSDEC – Endangered and Threatened Species: Incidental Take Permit
 - 3) NYCDEP -- City Environmental Quality Review Environmental Impact Statement
 - 4) NYSDOH – Approval of Plans for Public Water Supply Improvements

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- 4) NYSDEC --State Pollutant Discharge Elimination System General Permit for Stormwater Discharges Associated with Construction Activity (GP-0-20-001)
 - 5) NYCDEP -- Stormwater Pollution Prevention Plan Approval
 - 6) U.S. Fish and Wildlife Service – Federal Fish and Wildlife Permit
 - 7) TMP --Municipal Separate Storm Sewer System (MS4) Approval
 - 8) TMP -- Site Plan Approval
 - 9) Utility Companies – Utility Coordination
- b. Other permits to be acquired for construction phase activities include but not limited to the following:
- 1) FEMA - Elevation Certificate (at end of construction phase)
 - 2) USEPA - Remedial Action Plans
 - 3) USEPA – Spill Prevention Control and Countermeasure Plan (SPCC)
 - 4) NYSDEC - Beneficial Use Determination
 - 5) NYSDEC - Minor Facility Registration: Permit to Construct
 - 6) NYSDEC - Waste Transporter Permit
 - 7) NYSDEC - Hazardous Substance Bulk Storage Registration (Chemical Bulk Storage Registration)
 - 8) NYSDEC - United States Environmental Protection Agency (USEPA) Identification Number
 - 9) NYSDEC - Petroleum Bulk Storage Facility Registration
 - 10) NYSDOT - Divisible Load Overweight Permits (Form PERM 92)NYSDOT Special Hauling Permit
 - 11) NYSDOT Highway Work Permit for Non-Utility Work
 - 12) TMP -- Building Permit
 - 13) TMP -- Street Opening/Curb Cut Permit
 - 14) TMP -- Plumbing Permit

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- 15) TMP -- Electrical Permit
 - 16) TMP – Grading Permit
 - 17) TMP – Tree Cutting / Removal Permit
 - 18) TMP – Hazardous/Chemical/Flammable Liquid Storage Permit
 - 19) Westchester County DOH Certificate to Operate – Air Quality
 - 20) Westchester County Road Access / Opening Permit
 - 21) TMP – Water and Sewer Connection Permit
 - 22) NYSDOH – Backflow Prevention Device Approval
3. All Work performed under the Contract shall conform to the applicable rules and regulations of all City/Local, State and Federal government Departments having jurisdiction.
 4. Upon completion of the various stages of construction, the Contractor shall schedule inspections and obtain certificates of approval and/or acceptance from the various agencies and departments having jurisdiction and shall deliver these certificates to the Engineer.
- C. Electrical Inspections
1. The Contractor, as mandated by law, shall make application for a certificate of electrical inspection to the local authorities having jurisdiction for electrical Work furnished under this Contract. Proof of filing for the certificate shall be submitted to the Engineer in the form of notification email issued by such authority at the time of application. Such proof shall be submitted within fifteen (15) days after the date upon which the Contractor is notified by the City to commence Work.
 2. After completion of the Work, the Contractor shall notify the Town of Mt. Pleasant, requesting that a final inspection be made.
 3. Prior to final Substantial Completion, the Contractor shall provide evidence to the Engineer that a Certificate of Inspection, as made by the Town of Mt. Pleasant.
- D. Existing Utilities
1. All subsurface utility and structure information shown on the Contract Drawings were obtained from various plans, maps and field investigations; however, they are not guaranteed to be complete or accurate. It shall be the Contractor's responsibility to locate all such necessary utilities or structures by using field investigation methods acceptable to the Engineer prior to the start of construction. No separate payment will be made for field investigations.

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2. During the progress of the Work, the Contractor shall protect from damage any existing utilities or services within the Work areas until, they have been re-routed, disconnected or capped off.
- E. Existing Flows
1. The Contractor shall, as approved by the Engineer, provide and construct flumes, temporary sewers, dams and all incidental and related facilities necessary to divert or otherwise take care of groundwater and surface drainage, and to prevent any sediments from being conveyed into the existing storm sewer inlets, combined sewer inlets or watercourses.
- F. Diversion of Water
1. The Contractor shall, as approved by the Engineer, provide and construct flumes, temporary sewers, dams and all incidental and related facilities necessary to divert or otherwise take care of groundwater and surface drainage, and to prevent any sediment from being conveyed into the existing storm sewer inlets or watercourses. All such structures, methods, and practices shall be in accordance with the existing stormwater pollution prevention plans (SWPPPs) at the site(s) of the Work and with the permits (e.g., NYSDEC) obtained for the site(s) and regulations governing such activity.
- G. Disposal of Water
1. Water from open cut and/or sheeted excavations, manholes, structures, trenches, or from whatever source, shall be disposed of in accordance with regulations of authorities having jurisdiction, permits and methods approved by the Engineer. All such structures, methods, and practices shall be in accordance with the existing SWPPPs at the site(s) of Work and with permits (e.g., NYSDEC) obtained for the site(s) and regulations governing such activity.
- H. Conformance to Industrial Code
1. The Contractor's attention is directed to requirements of the Industrial Code of the State of New York, Department of Labor, Board of Standard and Appeals, latest edition and amendments or supplements thereto (the Code). New York State Industrial Code rules applicable to the Work include, but are not limited to, the following:
 - a. Rule No. 2: Exit enclosures, vertical opening and floors in factory buildings.
 - b. Rule No. 8: Construction, guarding, equipment, maintenance and operation of elevators, dumbwaiter, escalators, hoists and hoistways in factories, and mercantile establishments.
 - c. Rule No. 16: Floor and stair surfaces, railings and toeboards.

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d. Rule No. 19: Guarding of dangerous machinery, vats and pans.

I. Conformance to Other Codes and Standards

1. All devices, materials and installations shall conform to the current latest edition of the applicable requirements of the, the National Electrical Code (NFPA 70), ANSI, ASTM, IEEE, NEMA, OSHA, UL, local code, and the Contract Documents and the documents specified elsewhere in the specifications. In the event of a conflict between any referenced codes or laws and any other applicable code or standard, the specified codes and laws shall take precedence.

1.06 QUALITY ASSURANCE

A. Not Used

1.07 SUBMITTALS

A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

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- 3.02 INSTALLATION
 - A. Not Used
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

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NO TEXT ON THIS PAGE

SECTION 01 42 00 – REFERENCES
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PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Abbreviations
2. Acronyms
3. Reference Standards

B. The following index of this Section is presented for convenience:

Article	Title	Section Page
PART 1	GENERAL	1
1.01	Summary	1
1.02	Payment	1
1.03	Related Sections	2
1.04	References	2
1.05	Description	2
1.06	Quality Assurance	3
1.07	Submittals	3
1.08	Delivery, Storage, and Handling	3
1.09	Spare Parts, Special Tools, and Supplies	3
1.10	Special Warranty Provisions / Guarantee Periods	3
PART 2	PRODUCTS	3
2.01	Manufacturers	3
2.02	Materials / Equipment	3
2.03	Fabrication / Assembling / Finishes	3
2.04	Source Quality Control / Shop Tests	3
PART 3	EXECUTION.....	3
3.01	Examination / Preparation	3
3.02	Installation.....	3
3.03	Field Testing / Quality Control	3
3.04	Startup / Demonstration	3
3.05	Adjusting / Protection / Cleanup.....	4

C. The following tables, located after the "End of Section" designation, are a part of this Section:

1. Table 01 42 00-1 – Abbreviations
2. Table 01 42 00-2 – Acronyms
3. Table 01 42 00-3 – Standards Developing / Publishing Organizations

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. References applicable to all Specification Sections are listed in Tables 01 42 00-1 through -3, located after the "End of Section" designation.

- B. Use of the abbreviations or acronyms in Tables 01 42 00-1 through -3 is optional.

1. Reference to a technical society, organization, body, or code may be made in the Specifications by using the acronyms listed in Table 01 42 00-3 or by using the full organization name.

- C. Use of Reference Standards:

1. All Work shall comply with the standards referenced, except as follows:

- a. Where more stringent requirements are shown or specified, and/or
b. Where more stringent requirements are required by Law.

2. Referenced standards shall be current as of the time of bidding the Contract Documents, unless otherwise specified.

3. Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization, or body, the reference shall be construed to mean the latest standard, code, specifications or tentative specification adopted and published, unless otherwise specified by the Engineer.

4. When no reference is made to a code, standard or specification, the standards of the ASTM or the IEEE shall govern.

5. Where an item of equipment is specified to be explosion- proof, it shall be so certified by an independent agency recognized by the insurance industry, namely, UL, FM, etc. In all cases, materials shall be of the quality and character which, in the opinion of the Engineer, are best suited for the purpose for which they are required.

6. The Contractor shall obtain copies of the referenced standards when required by the Contract Documents.

- D. Additional references and definitions may be defined in individual Sections, and these additional references and definitions shall be applicable only to the Work specified under those Sections.

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1.06 QUALITY ASSURANCE

- A. To ensure proper use of reference standards in the preparation of Shop Drawings, the Contractor shall employ qualified personnel with at least five (5) years' construction project experience including the use of industry standards and compliance with construction codes and regulations.

1.07 SUBMITTALS

- A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 INSTALLATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

SECTION 01 42 00 – REFERENCES
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3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

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TABLE 01 42 00-1
LIST OF ABBREVIATIONS

alternating current	a-c
ampere	A
antemeridian	a.m.
Architectural Barriers Act	ABA
Americans with Disabilities Act	ADA
Americans with Disabilities Act Accessibility Guidelines	ADAAG
ante meridian	a.m.
average	avg
biochemical oxygen demand	BOD
five-day biochemical oxygen demand	BOD ₅
brake horsepower	bhp
British thermal unit	Btu
building information model	BIM
carbonaceous biochemical oxygen demand	CBOD
five-day carbonaceous biochemical oxygen demand	CBOD ₅
chemical oxygen demand	COD
Centigrade (or Celsius)	C
chlorinated polyvinyl chloride	CPVC
chlorofluorocarbons	CFC
Code of Federal Regulations	CFR
computer-aided drafting and design	CADD, or CAD
consecutive calendar day(s)	ccd
cubic inch	cu in
cubic foot	cu ft
cubic yard	cu yd, or CY
cubic feet per minute	cfm
cubic feet per second	cfs
day(s)	d
decibel	db
degree Centigrade (or Celsius)	degrees C, °C, or deg C
degrees Fahrenheit	degrees F, °F, or deg F
diameter	dia
direct current	d-c
dollars	\$
each	ea
efficiency	eff
Fahrenheit	F
feet	ft
feet per hour	fph, or ft/hr
feet per minute	fpm
feet per second	fps, or ft/sec

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TABLE 01 42 00-1
LIST OF ABBREVIATIONS
(Continued)

figure	fig
flange	flg
foot-pound	ft-lb
gallon	gal
gallons per hour	gph, or gal/hr
gallons per minute	gpm or gal/min
gallons per second	gps or gal/sec
gram	g
grams per liter	g/L
Hertz	Hz
horsepower	hp or HP
hour	hr
human-machine interface	HMI
inch	in.
inches of mercury	in. Hg
inches water gage	in. w.g.
inch-pound	in.-lb
inside diameter	ID
iron pipe size	IPS
thousand pounds	kips
thousand pounds per square inch	ksi
kilovolt-ampere	kva
kilowatt	kw
kilowatt-hour	kwhr or kwh
linear foot	lin ft or LF
liter	L
Leadership in Energy and Environmental Design (USGBC)	LEED
maximum	max
mercury	Hg
milligram	mg
milligrams per liter	mg/l or mg/L
milliliter	ml
millimeter	mm
million gallons per day	mgd or MGD
million gallon	MG
minimum	min
national pipe thread	NPT
net positive suction head	NPSH

SECTION 01 42 00 – REFERENCES

CONTRACT KENS-EAST-2

TABLE 01 42 00-1
LIST OF ABBREVIATIONS
(Continued)

net positive suction head available	NPSHA
net positive suction head required	NPSHR
nitrogen oxide (total concentration of mono-nitrogen oxides such as nitric oxide (NO) plus nitrogen dioxide (NO ₂))	NO _x
nominal pipe size	NPS
number	no.
operator interface terminal	OIT
ounce	oz
ounce-force	ozf
outside diameter	OD
parts per hundred	pph
parts per million	ppm
parts per billion	ppb
polyvinyl chloride	PVC
post meridian	p.m.
pound	lb
pounds per square inch	psi
pounds per square inch absolute	psia
pounds per square inch gauge	psig
pounds per square foot	psf
process control system	PCS
programmable logic controller	PLC
revolutions per minute	rpm
second	sec
specific gravity	sp gr, or SG
square	sq
square foot	sq ft, sf, or ft ²
square inch	sq in., or in ²
square yard	sq yd, or SY
standard	std
standard cubic feet per minute	scfm
thousandth of an inch	mil
total dynamic head	TDH
totally-enclosed fan-cooled	TEFC
volt	V
volts alternating current	vac
volts direct current	vdc
volatile organic compounds	VOC

SECTION 01 42 00 – REFERENCES

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BLDG	BUILDING
B/	BOTTOM
BC	BOTTOM OF CURB
CB	CATCH BASIN
CLF	CHAIN LINK FENCE
CY	CUBIC YARD
DWLS	DOWELS
EL	ELEVATION
ENGR	ENGINEERING
EX.	EXISTING
FA	FIRE ALARM
FAC	FURNISH AS CORRECTED
FAS	FURNISH AS SUBMITTED
FT	FOOT, FEET
G	GAS
GV	GAS VALVE
LF	LINEAR FOOT
MON	MONUMENT
NIC	NOT IN CONTRACT
#, NO	NUMBER
OD	OUTER DIAMETER
PR.	PROPOSED
PVC	POLY VINYL CHLORIDE
PW	POTABLE WATER
RQD	REQUIRED
RW	RAW WATER
R&R	REVISE AND RESUBMIT
S	SLOPE, SOUTH
SAN SWR	SANITARY SEWER
S.F.	SILT FENCE
SMP	STORMWATER MANAGEMENT PRACTICE
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
SC	SCREEN CHAMBER
SQ	SQUARE
SS	SANITARY SEWER
SPEC	SPECIFICATION
T/C	TOP OF CONCRETE
TBR	TO BE REMOVED
TC	TOP OF CURB
THK	THICKNESS
TW	TOP OF WALL
V	VALVE
W	WATER, WEST
WV	WATER VALVE

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WWF
PCC

WELDED WIRE FABRIC
PORTLAND CEMENT CONCRETE

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TABLE 01 42 00-2
LIST OF ACRONYMS

AA	Aluminum Association
AASHTO	American Association of State Highway and Transportation Officials
ABS	American Bureau of Shipping
ACI	American Concrete Institute
ACRI	Air Conditioning and Refrigeration Institute
AFBMA	Anti-Friction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHDGA	American Hot Dip Galvanizers Association
AISC	American Institute of Steel Construction
AISE	Association of Iron and Steel Engineers
ANSI	American National Standards Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM Des.	American Society for Testing and Materials Designation
AWS	American Welding Society
AWWA	American Water Works Association
BEC	Bureau of Electrical Control
BEDC	Bureau of Engineering Design and Construction
BWS	Bureau of Water Supply
BWT	Bureau of Wastewater Treatment
CAT	Catskill
CDUV	CAT DEL Ultraviolet Facility
CFR	Code of Federal Regulations
CRSI	Concrete Reinforcing Steel Institute
DEL	Delaware
DEMA	Diesel Engineer Manufacturers Association
DGRT	Dike Grade Return Tunnel
DIPRA	Ductile Iron Pipe Research Association
DOD	Department of Defense
DTSH	Downtake Shaft
EAST	Eastview
EOH	East of Hudson
EWLD	Existing Westlake Drive
FED Spec.	Federal Specification
FM	Factory Mutual
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute of Electrical & Electronics Engineers
IPCEA	Insulated Power Cable Engineer's Association
ISO	International Organization for Standardization

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KEC	Kensico Eastview Connection
KECT	Kensico Eastview Connection Tunnel
KENS	Kensico
LEC	Lower Effluent Chamber
MIL -Spec	Military Specification (Department of Defense)
MTA	Metropolitan Transportation Association
NAVY Spec.	Navy Department Specification
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NIST	National Institute of Standards and Technology
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
NTP	Notice to Proceed
NYCBC	New York City Building Code
NYCEC	New York City Electrical Code
NYCDEP	New York City Department of Environmental Protection
NYCDOT	New York City Department of Transportation
OSHA	Occupational Safety & Health Administration (U.S. Department of Labor)
PANYNJ	Port Authority of New York and New Jersey
PPS	Power Piping Society
RWLD	Relocated Westlake Drive
SAE	Society of Automotive Engineers
SC	Screen Chamber
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
TMP	Town of Mount Pleasant
UEC	Upper Effluent Chamber
UL	Underwriters Laboratories, Inc.
UNS	Unified Numbering System of Alloys
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
UTSH	Uptake Shaft
WC	Westchester County

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TABLE 01 42 00-2
LIST OF ACRONYMS
(Continued)

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TABLE 01 42 00-3
STANDARDS DEVELOPING / PUBLISHING ORGANIZATIONS

<p>AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE (AHRI) 2111 Wilson Blvd. Suite 500 Arlington, VA 22201 Phone: 703-524-8800 Fax: 703-562-1942 ahrinet.org</p>	<p>THE ALUMINUM ASSOCIATION (AA) 1400 Crystal Dr. Arlington, VA 22202 Phone: 703-358-2960 aluminum.org</p>
<p>AMERICANHORT 2130 Stella Ct. Columbus, OH 43215 Phone: 614-487-1117 americanhort.org</p>	<p>AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) 444 North Capital St., NW Suite 249 Washington, DC 20001 Phone: 202-624-5800 transportation.org</p>
<p>AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA) 330 N. Wabash Ave. Suite 2000 Chicago, IL 60611 Phone: 202-367-1155 americanbearings.org</p>	<p>AMERICAN BUREAU OF SHIPPING (ABS) ABS World Headquarters ABS Plaza 16855 Northchase Dr. Houston, TX 77060 Phone: 281-877-6000 Fax: 281-877-4976 eagle.org</p>
<p>AMERICAN CONCRETE INSTITUTE (ACI) 38800 Country Club Dr. Farmington Hills, MI 48331-3439 Phone: 248-848-3700 Fax: 248-848-3701 concrete.org</p>	<p>AMERICAN CONCRETE PIPE ASSOCIATION (ACPA) 8445 Freeport Pkwy. Suite 350 Irving, TX 75063 Phone: 972-506-7216 Fax: 972-506-7682 concretepipe.org</p>
<p>AMERICAN GALVALNIZERS ASSOCIATION (AGA) 6881 South Holly Cir. Suite 108 Centennial, CO 80112 Phone: 720-554-0900 Fax: 720-554-0909 galvanizeit.org</p>	<p>AMERICAN GAS ASSOCIATION (AGA) 400 North Capitol St., NW Suite 450 Washington, DC 20001 Phone 202-824-7000 aga.org</p>

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TABLE 01 42 00-3
STANDARDS DEVELOPING / PUBLISHING ORGANIZATIONS
(Continued)

<p>AMERICAN GEAR MANUFACTURERS ASSOCIATION (AGMA) 1001 N. Fairfax St. Suite 500 Alexandria, VA 22314-1587 Phone: 703-684-0211 Fax: 703-684-0242 agma.org</p>	<p>AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) 130 East Randolph St. Suite 2000 Chicago, IL 60601-2001 Phone: 866-275-2472 aisc.org</p>
<p>AMERICAN IRON AND STEEL INSTITUTE (AISI) 25 Massachusetts Ave., NW Suite 800 Washington, DC 2001 Phone 202-452-7100 steel.org</p>	<p>AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) 1899 L St., NW 11th Floor Washington, DC 20036 Phone: 202-293-8020 Fax: 202-293-9287 ansi.org</p>
<p>AMERICAN PETROLEUM INSTITUTE (API) 1220 L St., NW Washington, DC 20005-4070 Phone: 202-682-8000 api.org</p>	<p>AMERICAN SOCIETY OF HEATING, REFRIGERATING and AIR- CONDITIONING ENGINEERS (ASHRAE) 1791 Tullie Cir., NE Atlanta, GA 30329 Phone: 404-636-8400, 800-527-4723 Fax: 404-321-5478 ashrae.org</p>
<p>AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) 2 Park Ave. New York, NY 10016-5990 Phone: 800-843-2763 asme.org</p>	<p>AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE) 18927 Hickory Creek Dr., Suite 220 Mokena, IL 60448 Phone: 708-995-3019 Fax: 708-479-6139 asse-plumbing.org</p>
<p>AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) P.O. Box C700 West Conshohocken, PA 19428-2959 Phone: 610-832-9500 Fax: 610-832-9555 astm.org</p>	<p>AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) 1801 Alexander Bell Dr. Reston, VA 20190 Phone: 800-548-2723 asce.org</p>

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TABLE 01 42 00-3
STANDARDS DEVELOPING / PUBLISHING ORGANIZATIONS
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<p>AMERICAN WATER WORKS ASSOCIATION (AWWA) 6666 W. Quincy Ave. Denver, CO 80235 Phone: 303-794-7711, 800-926-7337 Fax: 303-347-0804 awwa.org</p>	<p>AMERICAN WELDING SOCIETY (AWS) 8669 NW 36 St. # 130 Miami, FL 33166-6672 Phone: 305-443-9353, 800-443-9353 awsnow.org</p>
<p>AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) P.O. Box 361784 Birmingham, AL 35236-1784 Phone: 205-733-4077 Fax: 205-733-4075 Secure Fax: 205-733-4078 awpa.com</p>	<p>ASPHALT INSTITUTE (AI) 2696 Research Park Dr. Lexington, KY 40511-8480 Phone: 859-288-4960 Fax: 859-288-4999 asphaltinstitute.org</p>
<p>ASSOCIATION FOR IRON AND STEEL TECHNOLOGY (AIST) 186 Thorn Hill Rd. Warrendale, PA 15086-7528 Phone: 724-814-3000 Fax: 724-814-3001 aist.org</p>	<p>NEW YORK CITY DEPARTMENT OF BUILDINGS BUREAU OF ELECTRICAL CONTROL (BEC) 1 Centre Street Room 2324 New York, NY 10007 Phone 212-669-8338 buildingviolation.com/newyork.html</p>
<p>NEW YORK CITY BOARD OF STANDARDS AND APPEALS (BSA) 250 Broadway 29th Floor New York, NY 10007 Phone: 212-386-0009 www1.nyc.gov/site/bsa/index.page</p>	<p>THE BRICK INDUSTRY ASSOCIATION (BIA) 12007 Sunrise Valley Dr. Suite 430 Reston, VA 20191 Phone: 703-620-0010 gobrick.com</p>
<p>CALIFORNIA REDWOOD ASSOCIATION (CRA) 347 Healdsburg Ave. Suite L Healdsburg, CA 95448 calredwood.org</p>	<p>CAST IRON SOIL PIPE INSTITUTE (CISPI) 2401 Fieldcrest Dr. Mundelein, IL 60060 Phone: 224-864-2910 cispi.org</p>

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TABLE 01 42 00-3
STANDARDS DEVELOPING / PUBLISHING ORGANIZATIONS
(Continued)

<p>THE CHLORINE INSTITUTE (CI) 1300 Wilson Blvd. Suite 525 Arlington, VA 22209 Phone: 703-894-4140 Fax: 709-894-4130 chlorineinstitute.org</p>	<p>CODE OF FEDERAL REGULATIONS (CFR) U.S. Government Publishing Office 732 N. Capitol St., NW Washington, DC 20401-0001 Phone: 202-512-1800, 866-512-1800 Fax: 202-512-210 ecfr.gov/cgi-bin/ECFR</p>
<p>COMPRESSED GAS ASSOCIATION (CGA) 14501 George Carter Way Suite 103 Chantilly, VA 20151 Phone: 703-788-2700 Fax: 703-961-1831 cganet.com</p>	<p>CONCRETE REINFORCING STEEL INSTITUTE (CRSI) 933 North Plum Grove Rd. Schaumburg, IL 60173-4758 Phone: 847-517-1200 Fax: 847-517-1206 crsi.org</p>
<p>CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION (CEMA) 5672 Strand Ct. Suite 2 Naples, FL 34110 Phone: 239514-3441 cemanet.org</p>	<p>U.S. ARMY CORPS OF ENGINEERS (USACE) Engineer Research and Development Center (Formerly Waterways Experiment Station) 3909 Halls Ferry Rd. Vicksburg, MS 39180-6199 Phone: 601-634-2355 erdc.usace.army.mil/Library/</p>
<p>DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA) P.O. Box 19206 Golden, CO 80402 Phone: 205-402-8700 dipra.org</p>	<p>FM APPROVALS 1151 Boston-Providence Turnpike P.O. Box 9102 Norwood, MA 02062 Phone: 781-762-4300 Fax: 781-762-9375 fmapprovals.com</p>
<p>GENERAL SERVICES ADMINISTRATION FEDERAL SPECIFICATIONS (FS) 1800 F St., NW Washington, DC 20405-0001 Phone: 703-605-2566 Fax: 202-219-3004 fedspecs.gsa.gov/ FedSpecs Federal Specifications page</p>	<p>HYDRAULIC INSTITUTE (HI) 6 Campus Dr. Floor 1 North Parsippany, NJ 07054 Phone: 973-267-9700 Fax: 973-267-9055 pumps.org</p>

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STANDARDS DEVELOPING / PUBLISHING ORGANIZATIONS
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<p>ILLUMINATING ENGINEERING SOCIETY (IES) 120 Wall St. 17th Floor New York, NY 10005-4001 Phone: 212-248-5000 Fax: 212-248-5017 ies.org</p>	<p>INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) Phone: 800-701-4333 ieee.org</p>
<p>MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS) 127 Park St., NE Vienna, VA 22180-4602 Phone: 703-281-6613 msshq.org</p>	<p>METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA) 1300 Sumner Ave. Cleveland, OH 44115-2851 Phone: 216-241-7333 Fax: 216-241-0105 mbma.com</p>
<p>Materials and Equipment Acceptance (MEA) Division, New York City Department of Buildings 280 Broadway 7th Floor New York, NY 10007 Phone: 212-566-5000 www.nyc.gov</p>	<p>MILITARY SPECIFICATIONS (MIL-SPECS) DLA Document Services, Building 4/D 700 Robbins Ave. Philadelphia, PA 19111-5094 Phone: 215-737-8000 quicksearch.dla.mil</p>
<p>NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM) 800 Roosevelt Rd. Building C, Suite 312 Glen Ellyn, IL 60137 Phone: 630-942-6591 Fax: 630-790-3095 naamm.org</p>	<p>NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA) 1300 N. 17th St. Suite 900 Arlington, VA 22209 Phone: 709-841-3200 nema.org</p>
<p>NATIONAL ELECTRICAL CODE (NEC or NFPA 70) See National Fire Protection Association</p>	<p>NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 1 Batterymarch Pk. Quincy, MA 02169-7471 Phone: 800-344-3555 Fax: 800-593-6372 nfpa.org</p>

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STANDARDS DEVELOPING / PUBLISHING ORGANIZATIONS
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<p>NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) 100 Bureau Dr. Stop 1070 Gaithersburg, MD 20899-1070 Phone: 301-975-2758 nist.gov</p>	<p>NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA) 900 Spring St. Silver Spring, MD 20910 Phone: 240-485-1165 nrmca.org</p>
<p>NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA) 10255 W. Higgins Rd. Suite 600 Rosemont, IL 60018-5607 Phone: 847-299-9070 Fax: 847-299-1183 nrca.net</p>	<p>NATIONAL SANITATION FOUNDATION INTERNATIONAL (NSF) 789 N. Dixboro Rd. Ann Arbor, MI 48105 Phone: 734-769-8010, 800-673-6275 Fax: 734-769-0109 nsf.org</p>
<p>NEW YORK CITY DEPARTMENT OF BUILDINGS 2014 CONSTRUCTION CODES: BUILDING CODE 280 Broadway New York, NY 10007 Phone: 212-566-5000 www1.nyc.gov/site/buildings/codes/2014-construciton-codes.page#bldgs</p>	<p>NEW YORK CITY DEPARTMENT OF BUILDINGS 2011 ELECTRICAL CODE 280 Broadway New York, NY 10007 Phone: 212-566-5000 www1.nyc.gov/site/buildings/codes/electrical-code.page</p>
<p>U.S. DEPARTMENT OF LABOR – OCCUPATIONAL SAFETY AND HEALTH (OSHA) 200 Constitution Ave., NW Washington, DC 20210 Phone: 800-321-6742 OSHA.gov/law-reg.html</p>	<p>PLASTIC PIPE AND FITTINGS ASSOCIATION (PPFA) 800 Roosevelt Rd. Building C, Suite 312 Glen Ellyn, IL 60137 Phone: 630-858-6540 Fax: 630-790-3095 ppfahome.org</p>
<p>PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI) 200 W. Adams St. Suite 2100 Chicago, IL 60606 Phone: 312-786-0300 pci.org</p>	<p>PORCELAIN ENAMEL INSTITUTE (PEI) P.O. Box 920220 Norcross, GA 30010 Phone: 770-676-9366 Fax: 770-409-7280 porcelainenamel.com</p>

SECTION 01 42 00 – REFERENCES
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TABLE 01 42 00-3
STANDARDS DEVELOPING / PUBLISHING ORGANIZATIONS
(Continued)

<p>SHEET METAL & AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA) 4201 Lafayette Center Dr. Chantilly, VA 20151-1219 Phone: 703-803-2980 Fax: 703-803-3732 smacna.org</p>	<p>SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) 400 Commonwealth Dr. Warrendale, PA 15096 Phone: 724-776-4841 Fax: 724-776-0790 sae.org</p>
<p>STEEL DECK INSTITUTE (SDI) P.O. Box 426 Glenshaw, PA 15116 Phone: 412-487-3325 Fax: 412-487-3326 sdi.org</p>	<p>STEEL DOOR INSTITUTE (SDO) 30200 Detroit Rd. Westlake, OH 44145 Phone: 440-899-0010 Fax: 440-892-1404 steeldoors.org</p>
<p>THE SOCIETY FOR PROTECTIVE COATINGS (SSPC) 800 Trumbull Dr. Pittsburgh, PA 15205 Phone: 877-281-7772 Fax: 412-444-3591 sspc.org</p>	<p>STEEL TANK INSTITUTE and STEEL PLATE FABRICATORS ASSOCIATION (STI/SPFA) 944 Donata Ct. Lake Zurich, IL 60047 Phone: 847-438-8265 steeltank.com</p>
<p>STEEL WINDOW INSTITUTE (SWI) 1300 Sumner Ave. Cleveland, OH 44115-2851 Phone: 216-241-7333 Fax: 216-241-0105 steelwindows.com</p>	<p>TILE COUNCIL OF NORTH AMERICA (TCNA) 100 Clemson Research Blvd. Anderson, SC 29625 Phone: 864-646-8453 Fax: 864-646-2821 tcnatile.com</p>
<p>UNDERWRITERS LABORATORIES (UL) 333 Pfingstem Rd. Northbrook, IL 60062 Phone: 847-272-8800 Fax: 847-509-6249 ul.com</p>	<p>WESTERN WOOD PRODUCTS ASSOCIATION (WWPA) 1500 SW 1st Ave. Suite 870 Portland, OR 97201 Phone: 503-224-3930 Fax: 503-224-3934 wwpa.org</p>

**SECTION 01 43 05 – CONTRACTOR’S WORK QUALITY
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Contractor’s Quality Assurance / Quality Control Management Plan
2. Defective Work, Equipment or Materials
3. Welding Certification and Welding Inspection
4. Inspection and Testing of Concrete
5. Leakage Tests
6. Contractor's Surveyor

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A.** No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Section 01 43 10 – Quality Assurance Inspection
- B. Section 01 43 15 – Witness Shop Testing

1.04 REFERENCES

- A. AWS – D1.X American Welding Society
- B. ASME American Society of Mechanical Engineers
- C. NYS Steel Construction Manual

1.05 DESCRIPTION

A. Contractor Quality Assurance / Quality Control Plan

1. The Contractor shall establish, execute and submit to the Engineer a Quality Assurance / Quality Control (QA/QC) Management plan for the services and equipment which will be supplied under this Contract. The plan shall provide the Contractor with adequate measures for verification and conformance to defined requirements by its personnel and all Subcontractors, fabricators, suppliers, and vendors.
2. The Contractor shall provide a suitable space for the Engineer and the Engineer’s authorized representatives conveniently located near that part of each plant where materials or equipment to be furnished under this Contract are being manufactured, assembled, or shop tested. Each space shall be furnished with facilities for the making and keeping of records and correspondence. The reasonable use of a photocopier, telephone, and email shall be provided, as required by the Engineer.

B. Defective Work, Equipment or Materials

1. Any defective or imperfect Work, equipment, or materials furnished by the Contractor which is discovered before the Final Acceptance of the Work, or during the warranty period, shall be removed immediately even though it may have been overlooked by the Engineer and approved for payment. The Contractor shall repair such defect, without compensation, in a manner satisfactory to the Engineer.
2. Unsuitable materials and equipment may be rejected, notwithstanding that such defective Work, materials and equipment may have been previously overlooked by the Engineer and accepted or approved for payment.
3. If any workmanship, materials or equipment shall be rejected by the Engineer as unsuitable or not in conformity with the Specifications or Contract Drawings, the Contractor shall promptly replace such materials and equipment with acceptable materials and equipment at no additional cost to the City. Equipment or materials rejected by the Engineer shall be tagged as such and shall be immediately removed from the Site.

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4. The Engineer may order tests of imperfect or damaged Work, equipment, or materials to determine the required functional capability for possible acceptance, if there is no other reason for rejection. The cost of such tests shall be borne by the Contractor, and the nature, tester, extent and supervision of the tests will be as determined by the Engineer. If the results of the tests indicate that the required functional capability of the Work, equipment, or material was not impaired, the Work, equipment or materials may be deemed acceptable, in the discretion of the Engineer. If the results of such tests reveal that the required functional capability of the questionable Work, equipment or materials has been impaired, then such Work, equipment or materials shall be deemed imperfect and shall be replaced. The Contractor may elect to replace the imperfect Work, equipment or material in lieu of performing the tests.
5. If, in the making of any test, it is ascertained by the Commissioner that the material or equipment does not comply with the Contract, the Contractor will be notified thereof, and it will be directed to refrain from delivering said material or equipment, or to promptly remove it from the Site or from the Work and replace it with acceptable material at no additional cost to the City. Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Contract, the Contractor shall immediately proceed to furnish the named material or equipment.
6. All welding must conform to the requirements of AWS D1.X, ASME Code or New York State Steel Construction manual as applicable and as approved by the Engineer. Additional certification requirements are as follows:
 - a. Certification for Welding – For all field- and shop-welding, the following welding qualification provisions shall apply:
 - 1) For all field welding, all required permits and safety plans shall be in place and adhered to.
 - 2) All shop welding shall be performed in accordance with the relevant work-specific requirements in the Specifications and Contract Drawings.
 - 3) If existing certification is not approved or not submitted, then the welders/welding shop/tack welders must be qualified in accordance with the above procedures and tests, as administered by an inspection agency approved by the Engineer. All costs associated with the required tests for certification and/or retests, if any, shall be borne by the Contractor. The Quality Assurance Section shall be given a notice of not less than 5 business days prior to such tests and may elect to witness any or all of these tests

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4) Any deviation from the above shall not be permitted without a written waiver from the Engineer or the Engineer’s designee.

b. All welds shall be inspected visually by the Engineer in accordance with Section V of the ASME Code, or D1.1, Clause 6, Table 6.1 as approved by the Engineer.

C. Inspection and Testing of Concrete

1. Inspection and testing of concrete shall be in accordance with the relevant work-specific requirements in this Contract.

D. Leakage Tests

1. All new pipelines and appurtenant structures and all new liquid containing structures shall be field tested for leakage after installation in accordance with the relevant work-specific requirement in this Contract.

E. Contractor’s Surveyor

1. The Contractor shall retain the services of a licensed land surveyor, registered in the State of New York, to perform survey work including but not limited to establishing line and grade, in advance of the construction; and to perform other surveying services for the Work included under this Contract. The surveyor shall be subject to the approval of the Commissioner. Survey drawings shall be submitted to the Engineer for approval.

2. The Contractor shall erect, install and maintain survey platforms, targets, benchmarks and similar facilities to be used by the Engineer in the performance of its inspection services; shall perform all survey work required before, during and after construction; and shall comply with the requirements specified under the General Conditions.

3. The Contractor’s licensed land surveyor shall submit as-built survey and metes and bounds description of the Relocated Westlake Drive roadway and parking lot.

1.06 QUALITY ASSURANCE

A. A Quality Management Plan must be submitted for review and approval.

1.07 SUBMITTALS

A. Quality Assurance / Quality Control Management Plan

1. Within 15 days after the commencement work date given in the Notice to Proceed (NTP), the Contractor shall provide its QA/QC management plan to the Engineer for approval. The Engineer’s review and acceptance of the Contractor’s QA/QC plan shall not relieve the Contractor from any of its obligation to perform the Work.

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2. Inspection of the Work by the Engineer is made solely for the benefit of the City. The inspection of the Work shall not relieve the Contractor of any of its obligations to fulfill the Contract as herein prescribed, and defective Work shall be repaired or replaced at the Contractor’s sole expense. The Contractor’s assigned QA/QC personnel are subject to the Engineer’s review and continued acceptance. No Work covered by the QA/QC plan shall start until the Engineer’s written acceptance of the Contractor’s QA/QC plan has been obtained.
 3. The QA/QC plan should consist of the following quality elements:
 - a. Roles and Responsibilities, communication protocols
 - b. Management and Production Inspections
 - c. Off-Site Supplier Quality
 - d. Vendor Capability Inspections
 - e. Notification and Coordination with DEP
 - f. Inspection Instructions
 - g. Traceability
 - h. Pre-Activity Meeting
 - i. Initial Inspections
 - j. Witness Shop Testing and QA Inspections
- B. QA Acceptance / Shipping / Material Marking and Identification
1. On-Site Receiving and Materials / Equipment Control
 2. Material / Equipment Receiving
 3. CMTRs / Certificate of Compliance
 4. Traceability
 5. On-Site Storage, Care, and Maintenance
 6. QA/QC Process and Operational Procedures
 7. Submittal Management
 8. Request for Information (RFI)
- C. Five-Phases of Inspection Procedures
1. Phase 1 – Client Pre-Activity Meeting
 2. Phase 2 – Initial Inspections
 3. Phase 3 – On-Going Inspections
 4. Phase 4 – Witness Shop Test Inspection and QA Inspections
 5. Phase 5 – Final Inspections – Punch lists

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- D. Inspection and Test Plan (ITP)
 - 1. Build Work Plan Procedure
 - 2. Checklist and Hold Point Procedure
 - 3. Witness and Hold Points
 - 4. Control of Measuring and Calibrated Test Equipment Procedure
 - 5. Reporting and control non-conforming work
- E. Control and Responsibility
 - 1. Non-Conformance Reporting (NCR) Disposition
 - 2. QC Verification
 - 3. Documentation
- F. Root Cause Analysis (RCA) Process
 - 1. Thresholds for RCA
 - 2. Process
 - 3. Preventive Action Plan
 - 4. Implementation
 - 5. Measurement of Effectiveness
- G. Continuous Improvement
 - 1. Recognition and Accountability
 - 2. Measurement and Monitoring
 - 3. Performance and Issues Matrix
 - 4. Management Reviews
 - 5. Audit and Assessments
- H. Welding Control
 - 1. Full Compliance with Specifications and Applicable Codes
- I. Additional Submittals

The Contractor shall submit the following information prior to entering into a supply or service subcontract.

- 1. Contract number, supplies or services to be provided and a general description of the proposed item(s), such as trade name, type, etc. The name and address of the manufacturer or Service Company and the location of the plant at which supplies will be manufactured and tested as required, or at which the services will be performed.

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- 2. Experimental and test data required to support the claimed performance of the supplies.
 - 3. A description of the testing plant, including the hydraulic, electrical and other facilities, in sufficient detail to show that the plant is adequately equipped for performing the tests, if such testing is required.
 - J. Any additional information that the Engineer may deem necessary in order to determine the ability of the supply or service company to produce the item as called for by the Specifications.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. All materials and equipment must be received, stored in a safe and adequate environment as per approved procedures.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used
- PART 2 PRODUCTS**
- 2.01 MANUFACTURERS
- A. Not Used
- 2.02 MATERIALS / EQUIPMENT
- A. All Work of assembly, installation, and construction shall be done in a neat, first class, and workman like manner. Material, fixtures, fittings, supplies, equipment or Work required by the Contract Drawings that does not agree with the Specifications will not be accepted, and the Contractor shall supply the required quality. In asking for prices on, or placing orders for, materials, fixtures, fittings, supplies, and equipment intended for use or installation under this Contract, the Contractor shall provide the manufacturer or dealer with such complete information from these Specifications as may in any case be necessary. In every case, the Contractor shall quote in full to each such manufacturer or dealer the text of this subparagraph, as well as the text of such other portions of the Contract, as are appropriate.
- 2.03 FABRICATION / ASSEMBLING / FINISHES
- A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Notice of Intent to Commence Manufacture

1. The Contractor shall give notice in writing to the Commissioner sufficiently in advance of its intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction as detailed in Section 01 43 10 – Quality Assurance Inspection and Section 01 43 15 – Witness Shop Testing. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Commissioner will: arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials; or notify the Contractor that the inspection will be made at a point other than the point of manufacture; or notify the Contractor that inspection will be waived.
2. In those instances, where the DEP inspector(s) arrive at the agreed-upon location, at the agreed-upon date and time, and find that the article(s) to be inspected are not ready for inspection, the inspector(s) shall return to their home office and all expenses incurred shall be borne by the Contractor and shall be deducted from the Contractor’s next payment, unless otherwise determined by DEP.

B. Field Measurements

1. The Contractor shall take all necessary measurements in the field to determine the exact dimensions for all Work and verify all pertinent data and dimensions shown on the Contract Drawings.

3.02 IMPLEMENTATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. All materials and equipment must be protected and wrapped during transport, storage and post installation.**

END OF SECTION

**SECTION 01 43 10 – QUALITY ASSURANCE INSPECTION
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Quality Assurance Inspection
2. Inspection Expenses

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 43 05 - Contractor's Work Quality
- B. Section 01 31 25 – Web Based Project Management Information System

SECTION 01 43 10 – QUALITY ASSURANCE INSPECTION
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1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

A. List of Equipment Subject to Quality Assurance (QA) Inspection

1. DEP’s Bureau of Engineering Design and Construction, Quality Assurance Section intends to perform QA inspection for specific items being supplied under this Contract.
2. The selected equipment is subject to QA inspection by the Quality Assurance Section during any or all stages of manufacture. The Contractor shall adhere to the QA inspection requirements indicated in the respective Specifications for the items designated for QA inspection. The related Specifications for each item furnishes specific inspection requirements for that item.
3. See Table 1 - List of Equipment Scheduled for Quality Assurance Inspection, attached at the end of this Section.

B. QA Inspection of Contract Items

1. The City may, as deemed necessary, perform QA inspection of any items that have not been designated as such in the Contract. The City also may remove items from the list of items designated for inspection, at its discretion.
2. The Engineer may require, at their discretion, inspection of any item required by the Contract at any stage of manufacture, assembly, inspection or testing. Inspection or shop witness testing may be required even when not explicitly requested in the Contract Documents. The Engineer shall have access at all times, while Work under this Contract is being performed, to all parts of the Contractor’s or manufacturers’ plants or other locations where the equipment, materials, fittings, supplies or any other articles required under this Contract are manufactured, assembled, tested, or inspected; and the Engineer shall be permitted to witness any or all of these operations as they may deem necessary to determine that all Work is being performed in accordance with the Contract specifications and the approved shop drawings.
3. In the event that the City chooses to perform QA inspection of any items in the Contract, the City will issue a notice to the Contractor that identifies the items and provides direction to the Contractor to facilitate the inspections. This notice will be followed by formal inspection instructions for the QA inspection of each item.
4. For all equipment, the Contractor shall be subject to all requirements described for the manufacture of equipment in the Contract. Regardless of the level of QA inspection activities required by the City, the Contractor

SECTION 01 43 10 – QUALITY ASSURANCE INSPECTION
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shall be responsible to submit, at a minimum, all documentation and samples that are required in the applicable Specification.

C. Requirements for Inspection of Equipment Designated for QA Inspection by the City

1. The Contractor is responsible for facilitating the inspection process and shall coordinate the same by contacting the Chief of the Quality Assurance, DEP Bureau of Engineering Design and Construction.
2. For items designated for QA inspection, the following statement shall appear on the face of purchase orders and shop drawings issued by the Contractor for work to be incorporated in this Contract. The Contractor shall also instruct the approved manufacturers or dealers to place this statement on purchase orders and shop drawings issued by them for such work.

"This order is subject to inspection by the Bureau of Engineering Design and Construction of the Department of Environmental Protection of The City of New York and shall not be processed until inspection instructions have been issued by the Engineer. Please contact the Chief of Quality Assurance, DEP Bureau of Engineering Design and Construction, 96-05 Horace Harding Expressway, Corona, New York 11368. 718-595-3000"

3. For items designated for QA inspection, the Contractor shall submit each purchase order to the Engineer when placed with the manufacturer or dealer. Submittals of preliminary/initial shop drawings, with detailed assembly drawings and bill of materials, shall be provided to the Quality Assurance Section as soon as they are available, or have been sent to the Engineer for review. Upon receipt of the purchase order and shop drawings, the Quality Assurance Section will issue inspection instructions to the Contractor (a copy of which will also be sent to the manufacturer/supplier.)
4. For items designated for QA inspection, the Contractor shall not proceed with the Work until the inspection instructions have been issued. Once the receipt of the inspection instructions has been acknowledged and verified, the Contractor shall provide advance notice of readiness for inspection at the required witness points. Advanced notice shall be provided in accordance with Article 3.02D. The inspection instructions will indicate what specific phases of manufacture, QA inspections, and/or tests that the Quality Assurance Section inspectors intend to witness.
5. The Contractor shall provide Quality Assurance Section with the approved shop drawings as soon as possible after receiving approval from the Engineer. The Quality Assurance Section reserves the right to issue revisions/clarifications to the original inspection instructions based on the approved drawings, and/or as deemed necessary.

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6. The requirements for inspection are in addition to and separate from any specified witness shop testing and shall in no way affect procedures or requirements with respect to the same.
7. The Engineer may reject any item or material if manufactured prior to inspection or where the requirements specified in the inspection instructions are not followed.

D. Selection of Inspection Agencies

1. The Engineer will select and designate all persons, firms or corporations to make or witness each and every and all inspections, tests or analyses, with or without reports unless indicated otherwise in the Specifications.
2. If a retest is required, the cost shall be borne by the Contractor.
3. When Quality Inspections are waived by the Engineer, the manufacturer's data and the interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be submitted to the Engineer for approval.
4. All equipment and material shall be identified with serial numbers and/or approved permanent type identification marks.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

A. Certified Material Test Reports

1. When no direct test, inspection, or analysis of materials, products or equipment is required to be performed at the point of manufacture, and when the Commissioner so requires, the Contractor shall furnish authoritative evidence in the form of Certified Material Test Reports (CMTRs) that the materials, products, or equipment to be used in the Work have been manufactured and tested in conformity with the applicable material specification. The CMTRs shall indicate the results of physical tests and chemical analyses made directly on the same heat or heats from which any and all materials are furnished under this Contract. The costs of furnishing CMTRs and the results of tests or analyses shall be borne by the Contractor and shall be deemed to be included in the overall price bid for the Contract.
2. When materials or manufactured products comprise such small quantities that it is not practicable to make physical tests or chemical analyses directly on the materials or products furnished, a certificate stating the results of such tests or analyses of similar materials or products which were concurrently produced may, at the discretion of the Commissioner, be considered as the basis for the acceptance of such materials or manufactured products Delivery, Storage, and Handling

SECTION 01 43 10 – QUALITY ASSURANCE INSPECTION
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B. Submittal of Samples of Materials for Testing

1. When required or requested by the Engineer, specified samples of materials, equipment, and appliances, identified in a manner acceptable to the Engineer shall be submitted by the Contractor for approval by the Engineer. The samples shall be submitted sufficiently in advance of the time when the materials are to be used so that rejections thereof will not delay the approved construction schedules. Approved samples will be labeled and dated.
2. As directed and specified below, the Contractor shall be required to furnish and deliver to the DEP Bureau of Engineering Design and Construction Quality Assurance Chemical Laboratory located at 96-05 Horace Harding Expressway, Corona, New York 11368-5107, or any other designated location, samples of metals from vendor's plants engaged in the manufacture of mechanical equipment and structural components.
3. A minimum of two (2) un-machined material samples of sufficient size shall be supplied from each material heat lot for the components identified as requiring samples for independent verification of both chemical and physical test results. Material samples shall be provided in accordance with the applicable material specifications (ASTM, etc.) and shall be provided with unique product markings in the form of a stamped-on heat number, etc. that is traceable to the applicable CMTR.
4. Samples shall be taken in the presence of the Engineer and at the location point determined by the Engineer, from material, equipment, or appliances at the work-site or at the manufacturing or testing facilities of the Contractor's vendors or sub-vendors during the normal eight-hour shift, unless otherwise approved.
5. Approved samples will be retained for record purposes at a location designated by the Engineer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. All materials & equipment must be received, stored in a safe & adequate environment as per approved procedures.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

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2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 IMPLEMENTATION

- A. Contractor to Maintain Traceability during Stages of Fabrication and Testing

- 1. The Contractor shall be responsible to maintain traceability of most equipment components such as castings, structural members, plate, forgings, piping, machining, etc., and all other articles required under this Contract during all stages of fabrication and testing.

- B. Contractor Responsible for all Tests

- 1. The chemical and physical tests, including the optional tests, called for in the ASTM, federal and other specifications cited in this Contract shall be made as specified, unless otherwise approved.

- C. Testing Compliance

- 1. Contractor's testing personnel shall make the necessary inspections and tests.
- 2. The reports thereof shall be in such form as will facilitate checking to determine compliance with the Specifications and shall indicate all the analyses and/or test data and interpreted results thereof.

- D. Contractor to Provide Engineer with Advance Notice of Sampling and Testing

- 1. The Engineer shall be informed in advance of all times of sampling and testing, and shall witness these operations if the Engineer so desires.
- 2. A minimum notice of two (2) weeks shall be provided for items of domestic manufacture and eight (8) weeks for items of foreign manufacture.

- E. Testing Performed in Engineer's Presence

- 1. When requested or specified, testing and examinations of all kinds and any weighing required under this Contract shall be done in the presence of the Engineer unless otherwise approved.

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2. Testing shall be scheduled during the normal eight (8) hour day shift with adequate advance notice of intent to schedule tests shall be given to the Engineer.
- F. Contractor to Provide Engineer with Calibrated Instruments
1. The Contractor shall provide, for use by the Engineer, all measuring devices, instruments, and other appliances that the Engineer may deem necessary to carry out the designated inspection of the Work. All such instruments and devices shall be calibrated, as per manufacturer's instructions, and shall bear the calibration marks, stamps, or seals of an approved testing body or agency with reference standards traceable to those held by the National Institute of Standards and Technology, or other approved standard. The Contractor shall maintain all instruments and devices in good working order and shall recalibrate them when so directed by the Engineer. The cost, if any, of providing and maintaining such equipment shall be considered part of the normal expense of conducting business and therefore non-reimbursable.
- G. Contractor to Provide Utilities, Equipment, and Services to Assist Testing
1. Electric power, instruments, gages, threaded fasteners, bulkheads, blind flanges, gaskets, piping, equipment, materials, tools, other appurtenances, services necessary for the various specified shop and field tests, scales for weighing, and assistance for measuring or weighing any of the materials shall be provided by the Contractor.
- H. Contractor's Responsibility for Testing Laboratory
1. The Contractor shall provide the services of approved testing laboratories to perform such physical and chemical tests and such examinations as required, if the manufacturer's testing facilities are not approved. In such a case, the Contractor shall provide and prepare test specimens and promptly submit reports of all tests.
- I. Contractor's Responsibility for Schedule Reports
1. The Engineer shall be provided with detailed daily and weekly schedules of manufacturing plant operations pertaining to Work, sufficiently in advance of such operations, so that adequate preparation can be made for inspecting the Work. The sequence of operations for the complete manufacturing process as well as periodic production status reports shall also be provided. Any Work performed without such sufficient advance notice to the Engineer is subject to rejection.
- J. Approval of Work Subject to Contractor's Inspection Reports
1. Completion of all requests for the approval of completed Work shall be accompanied by the Contractor's own inspection report of such Work, submitted on the form or forms previously approved and with the applicable approved shop drawings. Any equipment part which has been manufactured and/or assembled using uninspected or unapproved parts or materials shall

SECTION 01 43 10 – QUALITY ASSURANCE INSPECTION
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be disassembled, as ordered by the Engineer, in order that it may determine the acceptability of such parts or materials by means of any tests or examinations it may require. The cost of such ordered disassembly and subsequent reassembly shall be borne by the Contractor.

K. Approval of Inspection Activities prior to Shipping

1. Upon completion of the designated QA inspection activities at the facility where the inspection has occurred, the Contractor shall obtain from the Engineer a formal release from inspection indicating that no further inspection is required prior to shipping.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. All materials and equipment must be protected & wrapped during transport, storage & post installation.

END OF SECTION

NO TEXT ON THIS PAGE

SECTION 01 43 10 – QUALITY ASSURANCE INSPECTION
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NO TEXT ON THIS PAGE

**SECTION 01 43 15 – WITNESS SHOP TESTING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified, and required, to perform all Witness Shop Tests. The Contractor shall be responsible for all expenses for scheduled Witness Shop Testing.

B. The following index of this Section is presented for convenience:

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	3.02	Choose an item.....	6
	3.03	Field Testing / Quality Control	6
	3.04	Startup / Demonstration	6
	3.05	Adjusting / Protection / Cleanup.....	6

D. The following schedule, attached after the End of Section designation, is a part of this Section:

1. Schedule 01 43 15–1, Witness Shop Test Schedule.

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

SECTION 01 43 15 – WITNESS SHOP TESTING
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1.03 RELATED SECTIONS

- A. Section 01 43 05 – Contractor's Work Quality
- B. Section 01 43 10 – Quality Assurance Inspection

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. All equipment listed in Schedule 01 43 15-1, Witness Shop Test Schedule, located after the End of Section designation, shall undergo witness shop testing as specified.

- B. Witness Shop Testing of Additional Items: The City reserves the right to require Witness Shop Tests for additional items that are not listed in Schedule 01 43 15-1 or designated as requiring Witness Shop Tests in the Contract Documents.

- 1. When additional Witness Shop Tests are required by the Engineer, any additional costs (within the limits of Directive 6) resulting therefrom shall be paid:

- a. By change order procedure.

- C. Advance Notice for Witness Shop Testing:

- 1. The Contractor shall notify the Engineer in advance of all scheduled witness shop tests as follows:

- a. Sixty consecutive calendar days (60 ccd) in advance for witness shop tests in the continental United States.
- b. Ninety consecutive calendar days (90 ccd) in advance for witness shop tests outside the continental United States.

- 2. The Contractor's advance notification shall include, at a minimum, the following information, which will be submitted to the Engineer for approval as specified herein:

- a. A diagram of the proposed testing arrangement.
- b. A description of the proposed manufacturer's inspection and testing facilities and procedures.
- c. A list of all instruments the manufacturer proposes to use for the tests with initial and last calibration reports certified by an approved independent testing laboratory. (All instruments shall be of ranges suitable for the quantities to be measured.)
- d. Sample test data sheets.
- e. Sample calculations.

SECTION 01 43 15 – WITNESS SHOP TESTING
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- f. Descriptive matter on the testing equipment which shall contain illustrative photographs, drawings, and such other matter as may be requested by the Engineer.
 - g. The approved Shop Drawing(s) for installation of the equipment to be tested shall be listed in the Contractor's notice and made available to Agency representatives during witness shop testing.
- D. Should the equipment or instrumentation not be ready, as per prior submitted approved data, the witnesses shall return to the home office at Contractor's expense. The cost of the additional trip will be borne by the Contractor.
- E. Witness Shop Testing Attendee Requirements:
 - 1. Contractor: A duly authorized representative of the Contractor shall be present during each witness shop test.
 - 2. Engineer: When Schedule 01 43 15-1 and/or the Engineer require witness shop tests for equipment, the only tests which will be accepted are those made in the presence of the Engineer or the Engineer's representative.
- F. Witness Shop Test Facility: Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function, or special requirements are specified, shall be tested in an approved facility in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents.
- G. Tests shall be conducted in accordance with the test codes of the ASME and the IEEE.
- H. Witness Shop Test Results:
 - 1. The results of the shop tests shall be considered official and conclusive for the purpose of determining whether or not the equipment is in accordance with the performance requirements as specified.
 - 2. No such equipment shall be shipped to the Work Site until the Engineer notifies the Contractor in writing that the results of the Witness Shop Test(s) are acceptable.
- I. Certificate of Authenticity:
 - 1. Inspection and shop test data and interpreted results thereof accompanied by a certificate of authenticity sworn to, before a notary, by an officer of the manufacturing company, shall be forwarded to the Engineer for review and approval as required.
 - 2. When witness shop tests are waived by the Engineer, the manufacturer's actual test data and the interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be submitted to the Engineer for approval.

SECTION 01 43 15 – WITNESS SHOP TESTING
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- J. Serial Numbers: All equipment and material to be Witness Shop Tested shall be identified with serial numbers and/or approved permanent type identification marks.
- K. Expenses:
 - 1. Witness Shop Testing:
 - a. For the equipment to be witness shop tested, whether of foreign or domestic manufacture, the Contractor shall be responsible for the costs for a minimum of two (2) representatives of the Engineer or the Agency, including all transportation, food, lodging, and miscellaneous expenses for each witness shop test.
 - 1) Refer to the corresponding Section(s) listed in Schedule 01 43 15-1 for additional requirements.
 - b. The Contractor shall make all required travel and lodging arrangements in accordance with the New York City Comptroller's Office Directive No. 6 or later or equivalent City document. All arrangements shall be submitted for approval of the Engineer.
 - 2. The duration of each witness shop test shall be as required for conducting all specified performance tests, as determined by the Agency.
 - 3. Retesting:
 - a. If a retest is required, the entire retest cost of the retest shall be borne by the Contractor.

1.06 QUALITY ASSURANCE

- A. Unless otherwise approved by the Engineer, all Witness Shop Tests for equipment shall take place at the point of manufacture and/or origin.
- B. Witness shop testing of equipment shall be performed in accordance with:
 - 1. The procedures described herein, and
 - 2. The Witness Shop Test requirements of the Section(s) referenced in Schedule 01 43 15-1, Witness Shop Test Schedule, located after the End of Section designation.
- C. Where applicable, prior to the witness shop testing, the Contractor shall ensure that the equipment to be witness shop tested have met the requirements and approved by the Engineer as specified in Section 01 43 10 – Quality Assurance Inspection.

1.07 SUBMITTALS

- A. Submittals shall comply with the requirements of the Contract Documents.

SECTION 01 43 15 – WITNESS SHOP TESTING
CONTRACT KENS-EAST-2

- B. In addition, for each item of equipment listed in Section 01 43 15-1, Witness Shop Test Schedule, located after the End of Section designation, the Contractor shall submit the following:
 - 1. Action Submittals:
 - a. Advance notice for each item, as specified herein.
 - b. Test Report Documents: Submit two (2) copies of a detailed Witness Shop Test performance test report, including but not limited to the followings documents:
 - 1) Copy of the Witness Shop Test procedure.
 - 2) Final diagram of the testing arrangement.
 - 3) Copies of the raw test data sheets.
 - 4) Copies of the tabulated test data work sheets.
 - 5) Copies of the instrumentation calibration certificates.
 - 6) Calculations.
 - 7) Characteristic curves, for graphical representation of the performance test data.
 - 8) Copies of the photos taken during the test.
 - 9) Certification of authenticity by the Manufacturer, as specified herein.
 - 10) Non-editable electronic (e.g., PDF) copy of the complete report including all supporting documents.
 - 11) Additional information necessary for evaluating performance of the equipment against the requirements of the Contract Documents.
 - C. Refer to the individual Section(s) referenced in Schedule 01 43 15-1 for additional submittal requirements regarding Witness Shop Testing.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Not Used
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used

**SECTION 01 43 15 – WITNESS SHOP TESTING
CONTRACT KENS-EAST-2**

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 APPLICATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

SECTION 01 43 15 – WITNESS SHOP TESTING
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NO TEXT ON THIS PAGE

**SECTION 01 43 15 – WITNESS SHOP TESTING
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SCHEDULE 01 43 15-1
WITNESS SHOP TEST SCHEDULE

Specification Reference:		Equipment Scheduled for Witness Shop Testing:
Section No.	Section Title:	
26 05 91	Low Voltage Electric Motors	Low-voltage motors
26 05 92	Medium-Voltage Electric Motors	Medium-voltage motors
26 11 16	Unit Substations	Unit substations
26 13 10	Service Entrance Medium-Voltage Cast Coil Transformers	MV Transformer & NGR
26 13 11	Service Entrance Switchgears (SES)	Service entrance switchgear
26 13 26	Medium-Voltage Metal-Clad Switchgear	Medium-voltage switchgear
26 23 23	Low-Voltage Switchgear	Low-voltage switchgear
26 23 24	Low-Voltage Generator Paralleling Switchgear	Generator paralleling switchgear
26 32 13	Engine Generators	Engine generators
26 32 36	Resistive Load Banks	Resistive load banks
26 33 23	Central Battery System	Central battery system
26 33 53	Static Uninterruptible Power Supply	Uninterruptible power supply
26 36 23	Automatic Transfer Switches	Automatic transfer switches

**SECTION 01 43 20 – APPROVAL OF PRODUCT MANUFACTURERS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. This Section describes the requirements for the use of Product Manufacturers of materials and equipment and the substitution requirements for the use of equivalent materials and equipment.

B. The following index of this Section is presented for convenience:

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2.04	Source Quality Control / Shop Tests	6
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3.03	Field Testing / Quality Control	6
3.04	Startup / Demonstration	6
3.05	Adjusting / Protection / Cleanup.....	6

1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Not Used

1.04 REFERENCES

A. A “Named Manufacturer” is defined as a company cited by name in a Specification Section that manufactures, fabricates, assembles, and/or integrates materials,

SECTION 01 43 20 – APPROVAL OF PRODUCT MANUFACTURERS
CONTRACT KENS-EAST-2

fixtures, equipment, appliances, or other fittings. Named Manufacturer does not mean a distributor, sales representative, and/or supplier.

1.05 DESCRIPTION

A. Approval of Manufacturers (General)

1. All transactions with manufacturers shall be through the Contractor.
2. Similar materials and equipment of one and the same kind, type or classification that are used for identical purposes shall be made by the same manufacturer, except that multiple manufacturers may be approved for commodity items including, but not limited to, such items as concrete, conduit and cable, at the discretion of the Engineer.
3. Approval of a proposed manufacturer is conditional upon compliance with the Contract Documents as determined by the Engineer during the subsequent review of the Contractor's submitted Shop Drawings.
4. Unless otherwise approved by the Engineer, the Contractor shall be granted approval for one manufacturer per item.
5. For items of significant import or requiring specialized manufacturing, the Engineer may deny approval based on a determination that the proposed manufacturer:
 - a. Does not have a plant of sufficient capacity with a production force and plant facilities of the type and size suitable to produce the specified equipment or material required;
 - b. Does not have an operating quality control department with an experienced and qualified staff;
 - c. Has not successfully produced similar equipment or materials for at least three (3) years; or
 - d. Has previously failed to adhere to product specifications, scheduling, delivery requirements, or warranty obligations in connection with City contracts and projects.

B. List of Named Manufacturers in the Bid Booklet

1. The bidder shall indicate on the form in the Bid Booklet (when included) entitled "LIST OF EQUIPMENT/MATERIAL MANUFACTURERS," which manufacturer the bidder intends to use for each item of equipment or material listed on that form, by either:
 - a. Writing in one of the Named Manufacturers specified in the Specifications for that equipment or material, in which case the indicated Named Manufacturer is not subject to approval by DEP and shall be utilized for that item as part of the Work of the Contract;
or

**SECTION 01 43 20 – APPROVAL OF PRODUCT MANUFACTURERS
CONTRACT KENS-EAST-2**

- b. As an alternative to selecting a Named Manufacturer, a proposed “or equal” may be submitted for any of the items.

The proposed “or equal(s)” must be indicated in the designated column on the form. The submittal of more than one manufacturer for each item of equipment/material will not be permitted. No other requests for substitutions for these items may be submitted during the Work of the Contract, unless otherwise approved by the Engineer.
 - c. The bidder shall certify its selection of manufacturers by signing the List of Equipment/Material Manufacturers form.
2. The procedure for review by the Engineer for the “or equal” items proposed with a bid on the List of Equipment/Material Manufacturers form shall be as follows:
 - a. Within 14 days following bid opening, the apparent low bidder shall submit sufficient information to substantiate that the item proposed is the equivalent of that of the Named Manufacturer.
 - b. Wherever:
 - 1) Information substantiating the request for approval of a substitution is not submitted within said 14-day period, or
 - 2) The submission in support of proposed “or equal” material or equipment has been judged to be unacceptable by the Engineer, then the bidder (if awarded the Contract) shall provide the material or equipment of a Named Manufacturer as specified in the Contract Documents and must submit, within seven calendar days after notice, a revised List of Equipment/Material Manufacturers form identifying the manufacturer of the material or equipment to be provided. If the Contractor fails to timely make this submission, the award may be rescinded and the bid rejected as non-responsive
 - c. No Shop Drawing submittals shall be made for a proposed “or equal” item prior to approval of List of Equipment/Material Manufacturers form.
- C. Named Product Manufacturers Not on the List in the Bid Booklet
 - 1. Whenever materials or equipment not included on the Bid Booklet List of Equipment/Material Manufacturers are indicated in the Contract Documents by referring to a particular Named Manufacturer, the naming is intended to establish the type, function, and quality required. Unless the Contract specifies an item as "Brand Name Only" with no substitution of any “approved equal” allowed, then materials or equipment of other manufacturers may be approved, if sufficient information is submitted to allow the Engineer to determine that the material or equipment proposed is equivalent or equal to that of the Named Manufacturer.
 - 2. For such materials or equipment, proposed “or equals” may be submitted and reviewed as part of the Contractor’s Shop Drawing approval process. The following shall apply to such determinations:

SECTION 01 43 20 – APPROVAL OF PRODUCT MANUFACTURERS
CONTRACT KENS-EAST-2

- a. The Engineer will be the sole judge as to the type, function, and quality of any proposed “or equal” and the Engineer's decision shall be final.
 - b. The Engineer may require the Contractor to furnish additional data about the proposed "or equal."
 - c. Approval by the Engineer of an “or equal” item shall not relieve the Contractor of the responsibility for full compliance with the Contract Documents.
 - d. The Contractor shall pay all costs of implementing approved "or equal(s)", including any redesign and changes to the Work necessary to accommodate the substitution. These shall include resulting costs incurred by other Contractors (if any) on the project.
- D. The following provisions shall apply to all requests to substitute equipment or material manufacturers:
1. The Contractor may be granted approval for one manufacturer per item. However, during the performance of Work, multiple manufacturers may be approved for certain commodity items at the sole discretion of the Engineer, upon written request by the Contractor. The Contractor must include a justification in the written request.
 2. The Engineer will evaluate each proposed “or equal” within a reasonable period of time.
 3. No substituted item shall be ordered, installed, or utilized without the Engineer's prior written approval of the proposed “or equal.”
 4. The bidder’s or Contractor’s substantiating information, which will be considered by the Engineer in evaluating a proposed “or equal”, shall address the following factors:
 - a. Whether it is equal in construction, function and efficiency to that of the Named Manufacturer.
 - b. Whether acceptance of the proposed “or equal” will cause delay in the Contractor's achievement of Substantial Completion.
 - c. Whether acceptance of the “or equal” for use in the Work will require a change in any of the Contract Documents to adapt the design to the proposed substitution.
 - d. Whether incorporation or use of the “or equal” in connection with the Work is subject to payment of any ongoing license fee or royalty.
 - e. The availability of maintenance, repair, and replacement service. The proposed Manufacturer shall have a service agency that is staffed by properly trained personnel and maintains adequate spare parts, and is able to respond and complete repairs within 24 hours.

SECTION 01 43 20 – APPROVAL OF PRODUCT MANUFACTURERS
CONTRACT KENS-EAST-2

- f. An itemized estimate of all costs that will result directly or indirectly from approval of such “or equal,” including cost of any required redesign and potential claims of other Contractors affected by the resulting change.
 - g. Whether the proposed “or equal” item meets or exceeds the requirements listed in the appropriate Specifications.
- E. Changes Resulting From Approval of Proposed "Or Equal"
 - 1. The Specifications and Contract Drawings were prepared to accommodate the equipment furnished by the Named Manufacturers. All motor horsepower, connecting pipe sizes, equipment dimensions, etc., shown are based on the best information available at the time of design.
 - 2. If proposed "or equal" equipment is different in dimensions, horsepower requirements, pipe connection sizes or other material characteristics from that provided for in the Contract Documents, and such difference is not the result of changes in design conditions or concept ordered by the Engineer, then the Contractor shall be responsible for the furnishing of all properly sized pipe connections, motor starters, motor control centers, and electrical wiring and connections, and all other Work required to properly install the equipment in complete operating condition.
 - 3. Any necessary redesign resulting from any proposed “or equal” shall be submitted to the Engineer for approval, along with the submission of substantiating information in support of the proposal.
 - 4. The cost of all such revisions shall be considered to be included in the bid price(s) on the Contractor’s Bid Schedule of Prices.
 - 5. The Contractor shall, at no additional cost to the City, be responsible for and pay all costs in connection with any proposed “or equal,” including, without limitation, inspections and testing of equipment or materials submitted for review prior to the Contractor's purchase thereof, whether or not the Engineer approves the proposed “or equal.” The Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Engineer in considering an “or equal” proposed by the Contractor or by reason of the failure of the Engineer to approve a substitution proposed by the Contractor.
- 1.06 QUALITY ASSURANCE
 - A. Not Used
- 1.07 SUBMITTALS
 - A. Not Used
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Not Used
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
 - A. Not Used

**SECTION 01 43 20 – APPROVAL OF PRODUCT MANUFACTURERS
CONTRACT KENS-EAST-2**

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 CHOOSE AN ITEM.

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

SECTION 01 51 11 – TEMPORARY WATER AND SANITARY SERVICES
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances to furnish, install, and test all temporary water services and temporary sanitary services, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Not Used

SECTION 01 51 11 – TEMPORARY WATER AND SANITARY SERVICES
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1.05 DESCRIPTION

- A. The Contractor shall provide and maintain temporary City water and sanitary services for the use of Contractor’s personnel on the Site. In addition, the Contractor shall provide all water required to perform the Work of this Contract.
 - 1. Temporary Sanitary Services:
 - a. Toilet facilities, both exterior and interior, shall be furnished and installed for use by the Contractor’s personnel. Toilet fixtures shall be furnished, installed and maintained in satisfactory operating condition. The Contractor shall keep the temporary toilet fixtures in a clean and sanitary manner.
 - b. Enclosures for the toilet fixtures shall be erected and maintained in a clean and sanitary manner.
 - c. Heating and lighting for the enclosures shall be furnished, installed and maintained by the Contractor.
 - 2. Temporary Water Services:
 - a. The Contractor shall extend branch piping with outlets located so City water is available by hoses with threaded connections. The Contractor shall be responsible for preventing all temporary pipes and hoses from freezing.
 - b. The Contractor shall be responsible for providing water meters and appropriate backflow preventers where necessary to protect against contamination of the City water supply.
 - c. The Contractor shall provide sufficient potable quality drinking water for all personnel employed by the Contractor at the Site.
- B. The Contractor shall provide and maintain all temporary City water and sanitary services at the Site during construction in compliance with all applicable State, City and local regulations.
 - 1. It shall be the Contractor's responsibility to obtain all necessary permits from the Bureaus within DEP and other agencies or from local authorities having jurisdiction.
- C. Potable water shall be used for testing of potable water lines and domestic needs.
- D. The Contractor shall either remove all temporary water and sanitary services at the completion of the Work or coordinate with future contractors at Kensico for handover of temporary water and sanitary services.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Not Used

SECTION 01 51 11 – TEMPORARY WATER AND SANITARY SERVICES
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- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Not Used
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
 - A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
 - A. Not Used

PART 2 PRODUCTS

- 2.01 MANUFACTURERS
 - A. Not Used
- 2.02 MATERIALS / EQUIPMENT
 - A. Not Used
- 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

PART 3 EXECUTION

- 3.01 EXAMINATION / PREPARATION
 - A. Not Used
- 3.02 IMPLEMENTATION
 - A. Not Used
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

SECTION 01 51 11 – TEMPORARY WATER AND SANITARY SERVICES
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

**SECTION 01 51 12 – TEMPORARY HEAT AND VENTILATION
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as specified and required, to furnish, install, and test all Temporary Heat and Ventilation, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Not Used

SECTION 01 51 12 – TEMPORARY HEAT AND VENTILATION
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1.05 DESCRIPTION

A. General:

1. In order to permit construction to continue as scheduled during all seasons of the year, the Work of the Contract shall be protected at all times from the harmful effects of low temperature and from accumulation of harmful gases such as chlorine, methane and hydrogen sulfide.
2. Labor may be required seven days a week and during other than Normal Project Working Hours for the period of time required by seasonal weather conditions.
3. The Contractor shall begin to supply temporary heat only when so directed in writing by the Engineer and shall continue to supply temporary heat until directed in writing by the Engineer to discontinue.
4. In prosecuting the Work of this Contract, the Contractor shall provide all temporary ventilation necessary for the protection of the Contractor's employees, all other persons at or about the Contractor's Work area, Work, and equipment of the Contractor. Temporary ventilation shall be in accordance with all applicable regulations of the Federal Occupational Safety and Health Act of 1970.

B. Temperature Requirements:

1. When directed by the Engineer, the Contractor shall provide sufficient heat to maintain the temperature requirements prescribed herein. Temperatures shall be maintained at a level sufficient to meet construction requirements, but in no event shall the temperature fall below 50 degrees Fahrenheit.

C. Method of Temporary Heat:

1. Temporary heat shall be in conformance with all applicable Federal, State, and Local regulations and shall be subject to the approval of the Engineer.
2. The method of temporary heat shall:
 - a. Not cause the deposition of dirt or smudge upon any finished Work or any defacement or discoloration.
 - b. Not be injurious or harmful to personnel or materials.
 - c. Not interfere with the operation of the facility or with DEP Operations.
3. The following methods of heat shall not be permitted:
 - a. Open fires.
 - b. Electric heating.
 - c. Salamanders or other direct-fired equipment will not be allowed in construction areas.

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- d. Torpedo blowers and/or propane heaters will not be allowed in construction areas.
 - 4. The method of temporary heat shall not require any unnecessary demolition or penetration through existing or new structures.
 - D. Temporary Heating System:
 - 1. Systems shall include boilers, pumps, radiators, unit heaters, water and heating piping, insulation, controls, fuel storage and/or any other equipment as necessary, all furnished and installed by the Contractor.
 - E. Method of Temporary Ventilation:
 - 1. Temporary ventilation shall be in conformance with all applicable Federal, State, and Local regulations and shall be subject to the approval of the Engineer.
 - F. Temporary Ventilation System:
 - 1. The temporary ventilation system shall be forced or gravity type and shall include, but not limited to fans, motors, inlets, outlets, ductwork, heaters, controls and all appurtenances.
 - G. Operation and Maintenance:
 - 1. Temporary Heating:
 - a. The Contractor shall coordinate operations in the Work of providing temporary heat to ensure sufficient and timely performance of the Work under this Contract.
 - 1) The Contractor shall maintain all permanent or temporary enclosures at no additional cost to the City.
 - b. The Contractor shall maintain the temporary heating system in operating condition at all times during the temporary heating period.
 - 1) Temporary heating system equipment shall be placed so as to comply with the requirements specified hereinbefore, and shall be connected, disconnected and suitably supported and located so as to permit construction Work, including finish Work such as wall plastering and painting, to proceed.
 - 2) The installation of the temporary heating system and the placing of ancillary system equipment and components shall be coordinated with the operations of all Subcontractors so as to ensure sufficient and timely performance of the Work.
 - 2. The Contractor shall either remove all portions of the temporary heating system or hand over temporary heating to the City if and when so directed by the Engineer.
 - 3. Temporary Ventilation:

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- a. The Contractor shall maintain the temporary ventilation system in operating condition at all times during the performance of Work.
 - 1) Temporary ventilation system equipment shall be placed so as to comply with the requirements specified hereinbefore, and shall be connected, disconnected and suitably supported and located so as to permit construction Work, including finish Work such as wall plastering and painting, to proceed.
 - 2) The installation of the temporary ventilation system and the placing of ancillary system equipment and components shall be coordinated with the operations of the Subcontractors so as to ensure sufficient and timely performance of the Work.

H. Electrical Power for Temporary Heating and Ventilation System:

- 1. Temporary Heating System:
 - a. The Contractor shall provide all labor, materials, and equipment necessary to provide and maintain the temporary electrical system and power necessary for the operation of the temporary heating systems.
- 2. Temporary Ventilation System:
 - a. The Contractor shall provide all labor, materials, and equipment necessary to provide and maintain the temporary electrical system and power necessary for the operation of the temporary ventilation systems.
- 3. Temporary electrical system shall comply with the latest applicable regulations and codes referenced elsewhere in the Specifications.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

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- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
 - A. Not Used
- 2.02 MATERIALS / EQUIPMENT
 - A. Not Used
- 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

- PART 3 EXECUTION
- 3.01 EXAMINATION / PREPARATION
 - A. Not Used
- 3.02 IMPLEMENTATION
 - A. Not Used
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

SECTION 01 51 12 – TEMPORARY HEAT AND VENTILATION
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NO TEXT ON THIS PAGE

**SECTION 01 51 30 – TEMPORARY ELECTRICAL SYSTEM
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, material, equipment, and incidentals as specified, shown in the Drawings, or otherwise required to furnish, install, operate, and maintain the temporary electrical systems at the worksite in accordance with the requirements of this Section and the Contract Drawings.
- B. The temporary electrical system shall supply power and light as required for the construction related activities. The temporary electrical system shall be complete and shall include all auxiliary equipment necessary to support the construction.
- C. The Contractor shall provide generators for electrical power for Kensico site as backup in case of failure of utility power supplies. Contractor is responsible to furnish and install adequate electrical power systems for constructions at Kensico site prior to availability of construction power systems.
- D. The Contractor shall provide site lighting for the temporary operations entrance and booth near Shaft 18. Site lighting shall be provided from intersection at Columbus Avenue to intersection at existing access road to Shaft 18. Site lighting shall be maintained the entire duration the booth is in operation.
- E. Attachments
 - 1. Schematic Diagram for Temporary Electrical System Arrangement
- F. The following index of this Section is presented for convenience:

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3.03	Field Testing / Quality Control	10
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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 57 00 – Temporary Controls
- B. Section 26 05 11 – General Electrical Requirements
- C. Section 26 05 27 – Grounding

1.04 REFERENCES

- A. Temporary electrical system shall comply with the latest applicable provisions and recommendations of the following:
 - 1. NFPA 70, National Electrical Code.
 - 2. National Electrical Safety Code (NESC), ANSI Standard C2.
 - 3. New York State and Local Building Codes
 - 4. Local Utility Requirements
 - 5. OSHA Regulations Standards for Construction, 29 CFR 1926
 - 6. NFPA 70E, Standard for Electrical Safety in the Workplace
 - 7. New York State Department of Labor- Industrial Grade
 - 8. IEEE Recommended Practice for Electric Power Distribution for Industrial Plants.
 - 9. Con Edison of New York

1.05 DESCRIPTION

- A. System Description Standard for Electrical Safety in the Workplace
 - 1. The Contractor shall make all necessary arrangements with the Utility and shall provide a temporary electrical service point connection. Connecting lines and service supply shall be of sufficient capacity to supply all temporary light and power required on the site. The temporary electrical system shall be complete and shall include all auxiliary equipment necessary to support the construction.

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CONTRACT KENS-EAST-2

2. The Contractor is responsible for delivering and installing the adequately sized systems for the service in compliance with all code and safety regulations.
3. The Contractor shall be responsible for obtaining all applicable permits, certificates, etc. for using power from the electric utility and/or generator(s) for the site.
4. The Contractor shall be responsible for all branches of electrical power system feeding the Engineer's trailer, Contractor's trailer, general lighting, and tools used throughout the Work sites.
5. Arrangements shall be made with the Con Edison immediately after notice to commence work in accordance with these Specifications.
6. The service shall have provisions for meter connections for the Contractor on the worksite and the Engineer's field office. The service shall be branched and metered using circuit breakers or fused switches and meters.
 - a. The Contractor shall provide, at a minimum, distribution metering to each of the following:
 - 1) Contractor's field office and shops
 - 2) Engineer's field office
 - 3) Construction temporary light, power, and security system(s)
 - 4) Site construction equipment/tools.
7. The Contractor shall be responsible for making arrangements with Con Edison to have a sealed meter installed and for payment of same.
8. The energy charges for the Contractor's field office and shop usage shall be the responsibility of the Contractor.
9. Energy charges associated with the work areas general power and lighting and the security site lighting shall be the responsibility of the Contractor. Energy charges associated with the Engineer's field office shall be the responsibility of the Contractor.
10. The Contractor shall provide minimum of three (3) Dual Port Bollard Mounted Electric Vehicle (EV) Charging Stations for six (6) parking spaces. The Contractor shall be responsible for furnishing and installing of EV charging stations and electrical distribution system for the EV charging stations. At minimum, the EV Charging Station shall comply with the following requirements.
 - a. Dual Port
 - b. 208/240V AC, Two independent 40A circuit, 60Hz
 - c. Level 2, 7.2kW per vehicle
 - d. 18 ft cable with cable management system

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- e. Bollard Mounted
- f. Outdoor Rated NEMA 3R

B. Design Requirements

1. The Contractor shall supply and distribute power for construction purposes from Con Edison and by providing necessary generators and appurtenances for the construction site until the required Work is completed, as determined by the Engineer. The Contractor shall provide backup generators for the duration of the Contract. The Contractor shall provide all systems and circuits in accordance with the NFPA 70, the National Electrical Safety Code, local codes, utility codes, and OSHA requirements.
2. The temporary electrical system shall be provided in accordance with the following design requirements:
 - a. The Contractor and the Engineer's trailer shall have a separate branch.
 - b. A separate branch shall supply the Work area general lighting, power, and security. Receptacles (GFCI type) shall be located throughout the work area. Receptacle connected equipment shall be suitable for 120-volt operation. Operating input shall not exceed 1500 volt-amperes. Illumination levels shall be as required by OSHA.
 - c. Security site lighting circuits shall supply a system of security lighting for the Work area, field office complex(s), Contractors' staging areas, and all parking areas. Unless specifically shown otherwise on the Drawings or stated in the Specifications, the system shall be arranged to provide a minimum lighting intensity of 5 foot-candles in these areas. Site lighting for Shaft 18 Temporary booth shall be LED Solar all-in-one type fixtures.
 - d. A total of six (6) meter pans and fused disconnect switches shall be furnished, installed, and wired.
 - e. See attached schematic diagram for Temporary Electrical System Arrangement.
 - f. Satisfactory lighting shall be provided where Work is being done under this Contract and where workers must traverse in the customary discharge of their duties, and in any other locations where Work is being done or machinery is in operation other than daylight conditions. Lights shall be of appropriate sizes and in sufficient number to ensure safety.
 - g. All lamps shall be promptly replaced when broken or worn out. At places where Work is going on or inspection is to be made, and the general illumination is not sufficient, adequate special illumination

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CONTRACT KENS-EAST-2

shall be provided to ensure proper Work and inspection. All types of lighting shall meet the requirements of the New York State Department of Labor and other authorities having jurisdiction.

- h. All lighting used at the site that has the potential to impact offsite structures shall be internally shielded to reduce reflections on adjacent structures. Fixtures that are internal to the site, with no potential for external impact do not require shielding.
 - i. The Contractor shall furnish complete arc flash studies for all temporary electrical systems. All temporary electrical systems shall be marked with labels to identify the level of arc flash hazards.
- 3. Electricity supplied by the Contractor shall be the source of power for hoists, compressors, and all other equipment at the construction sites unless otherwise approved. All power machinery and tools within the construction site, shafts and in enclosed or confined spaces shall be operated by electricity or other approved power. The Contractor shall provide electric and other energy for all Work required under this Contract.
 - 4. All wiring for lighting and power circuits shall be installed and maintained in a neat and workmanlike manner, as ordered or approved, according to the electrical codes and regulations of authorities having jurisdiction, and at all points securely fastened in place. Unless otherwise permitted, circuits separate from lighting circuits shall be used for all purposes. Lighting and power wires shall be kept as far as practicable away from telephone and signal wires, or from wires used for firing blasts. Special precautions shall be taken to avoid short circuits in any part of the wiring system.
 - 5. A temporary generation system shall be provided at the Kensico site. The generation system provided shall be obtained from a supplier that specializes in the rental of generation systems, whose fleet has been factory-designed and prototype tested.
 - 6. The generation system shall be properly connected, inspected, tested and ready to operate the existing equipment for the durations necessary for execution of the Work. The generation system shall remain connected and ready to operate for the entire period necessary and shall be disconnected and removed from the sites when directed by the Engineer after the generator supplies are no longer needed.
 - 7. The Contractor shall provide temporary enclosures for electrical distribution equipment and controls as required.
 - 8. The generation system shall be totally complete with all auxiliaries necessary, including distribution equipment, power cabling and initial fuel for full load operation. Additional fuel shall be provided to re-fuel the generators in order to maintain proper fuel levels after all testing and periods of operation.

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9. The services of a factory-trained service technician shall be provided. The service technician shall be responsible for supervising the installations, inspecting and all testing requirements. The service technician shall also maintain and test the systems on a periodic basis and be available during system operation.
10. Provide noise controls for generators for temporary pumping systems, as applicable. Noise emissions from temporary pumping system shall conform to all applicable laws and regulations and the requirements in Section 01 57 00 -Temporary Controls.
11. Temporary generators shall be in accordance with all Federal, New York State and local codes and regulations, and DEP-Petroleum Bulk Storage (PBS) Policy and Checklists.
12. Fuel tanks shall be sized for at least eight (8) hours of uninterrupted operations at the site load demanded capacity and have a means to automatically notify the Contractor upon the generator high and low suction water level and low fuel level.

1.06 QUALITY ASSURANCE

- A. The Contractor shall provide the temporary electrical systems in accordance with the Local building codes, Con Edison, and OSHA Standards for construction.
- B. The temporary general lighting system shall provide lighting for access to and egress from the Work and for safe and expeditious construction within designated enclosed areas of the structure or structures.
- C. All temporary electrical system equipment and components shall be of recent manufacture and of proper working order for the intended purpose.
- D. The Contractor shall maintain in proper working order and repair the temporary electrical system.
- E. The Contractor shall modify, extend, and relocate the temporary electrical system components, as needed, to support construction activities.
- F. The Contractor shall either remove the temporary electrical system or handover to the City when directed by the Engineer.
- G. Electrical Generation System Requirements
 1. A licensed Professional Engineer, registered in the State of New York, shall perform calculations, and prepare generation system diagrams, equipment, and grounding plan drawings. All electrical design calculations and drawings shall be signed and sealed by the licensed engineer.
 2. The Contractor shall retain an independent testing firm to perform inspection and testing of the grounding system. Testing firm shall have experience in inspecting and testing the equipment specified and shall be a

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member company of InterNational Electrical Testing Association or possess substantially equivalent qualifications as determined by the Engineer.

1.07 SUBMITTALS

- A. Contractor shall submit working drawings, shop drawings and material specifications for the approval of the Engineer and the utility in accordance with the requirements of Section 01 33 00 – Submittal Procedures.
- B. Working Drawings:
 - 1. One-line diagram representing the power distribution for the temporary system.
 - 2. Location plan indicating the major distribution equipment.
 - 3. Manufacturer’s catalog cuts for the products proposed for use.
 - 4. Panel loading, voltage drop, short circuit, and other calculations, as required.
 - 5. Security lighting layout.
 - 6. Short circuit and Arc-Flash Studies.
- C. Generation system submittals shall include, to the extent applicable, the following:
 - 1. Specifications, equipment data sheets and catalog cuts of the system components, including noise levels and controls,
 - 2. Power systems and device wiring diagrams,
 - 3. Dimensional information and equipment and grounding plan drawings,
 - 4. Descriptions of field-testing methods and procedures with test reports.
- D. The Contractor shall submit to the Engineer for approval generator sizing calculations for all sites.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. The temporary electrical equipment shall be delivered, stored, and handled in accordance with these Specifications and the manufacturer’s recommendations.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cables and Wires shall be manufactured by:

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CONTRACT KENS-EAST-2

1. Southwire,
 2. Okonite Company,
 3. Or Approved equal.
- B. Enclosures shall be rated NEMA 4X, as manufactured by:
1. Hoffman (nVent),
 2. Adalet,
 3. Or Approved equal.
- C. Meter pans and all appurtenances shall comply with Con Edison requirements.
- D. Circuit Breakers shall be the required voltage, phase as shown on the Drawings. Circuit breakers shall be equipped with lockable handles, as manufactured by:
1. Square D,
 2. Eaton, Cutler/Hammer,
 3. Or Approved equal.
- E. Disconnect Switches shall be fused type with current limiting fuses. Disconnect switches shall be equipped with padlocking features, as manufactured by:
1. Square D,
 2. Eaton,
 3. Or Approved equal.
- F. The Generators shall be as manufactured by:
1. Caterpillar,
 2. Cummins-Onan,
 3. Or Approved equal.
- G. All equipment shall be approved by the Engineer and as required by Con Edison.
- 2.02 MATERIALS / EQUIPMENT
- A. Electrical Service Connection
1. The Contractor shall provide a service entrance and distribution center at the service point. Service entrance and distribution equipment shall be in accordance with the following:
 - a. Enclosures shall be rated NEMA 3R.
 - b. Meter pans shall be suitable for revenue meters furnished by the utility.
 - c. Circuit breakers shall be thermal magnetic type. Circuit breakers shall be equipped with lockable handles.

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- d. Disconnect switches shall be fused type with current limiting fuses. Disconnect switches shall be equipped with padlocking features.
 - e. All equipment shall be approved by the Utility.
2. The Contractor shall also provide the following other equipment at the service point:
- a. Eight (8) foot high, steel chain link fence with gate shall enclose the service entrance and distribution center. The fence shall be arranged so to permit a minimum clearance distance of 6 feet between the fence and the equipment.
 - b. The fence shall include baked enamel, 14 by 10-inch caution signs. The signs shall read, “DANGER - HIGH VOLTAGE - KEEP – OUT”. The signs shall be bolted to the fence on each side of the fence and on the main gate.
 - c. A 4/0 AWG ground grid consisting of four ground rods, one at each corner, shall be provided. Maximum ground resistance shall be 10 ohms. Grounding shall be in accordance with Article 2.04 and Section 26 05 27 – Grounding.
- B. Raceways and Wiring
- 1. All conductors shall be 600 volts, enclosed in properly sized raceways or be routed aurally using Type AC, MC, or TC cable.
 - 2. Conductors shall be provided for all devices, suitably sized for the intended purpose. Conductors installed in raceways shall be single conductor type THHN/THWN or equal to be approved by the Engineer and the utility. Armored cable, Type AC, metal-clad cable, Type MC or power and control tray cable, Type TC shall also be permitted.
 - 3. Raceways where used shall be suitably sized for the conductors. Raceways shall be rigid metallic type.
 - 4. Aerially routed cables shall be messenger supported from solid wood poles or other recognized means. Messenger shall be high strength galvanized steel.
 - 5. Poles shall have a class suitable for the installation in accordance with the National Electrical Safety Code and the utility and shall be thirty (30) feet length minimum. Poles shall be guyed at angle or corner runs and when eccentrically loaded.
- C. Lighting Fixtures and Devices
- 1. Receptacles (GFCI type) shall be grounded type, 120-volt, 20 amperes suitable for hand tools such as drills, hammers, and grinders.
 - 2. General lighting lamps shall be LED and have a minimum of 100 watts installed in suitable lamp holders. Security lighting lamps shall be LED

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CONTRACT KENS-EAST-2

equivalent to 400-watt LED installed within a floodlight, weatherproof type fixture suitable to illuminate the intended area. Provide photocell control with manual override for the security lighting.

3. Site lighting all-in-one type shall be Solar fixtures and manufactured by Solar Lighting International, model Stealth 80-21 or approved equal. Fixtures include batteries, sensors, adjustable Lumens and programable controls.
4. Switches, breakers, and miscellaneous equipment shall be suitable for the intended purpose, with voltage, current and short circuit interrupting ratings as required for the circuits.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Grounding

1. The temporary systems shall be grounded in accordance with the requirements of Section 26 05 27 – Grounding.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

- A. Temporary wiring systems shall be installed without interfering with the work of other contractors.
- B. The ground grid cable shall be installed in loop fashion completely around and outside the service point fence. The fence and distribution equipment shall be connected to the grid at a minimum of two locations.
- C. The temporary general lighting system shall be installed progressively in structures as the designated areas are enclosed or as lighting becomes necessary because of partial enclosure. Lamps shall be installed to provide an even distribution of illumination over the work areas.
- D. Receptacles shall be installed in such a manner so as to reach any point in the work areas with an extension cord not to exceed 40 feet in length.
- E. Site and Security lighting shall be installed on 20ft poles to illuminate the staging and parking areas.
- F. Aerial conductors shall be installed at a minimum height of 18 feet above finished grade. When conductors cannot be routed at the proper height or where it will

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CONTRACT KENS-EAST-2

interfere with plant operations or construction activities, conductors shall be provided in rigid steel conduit and installed underground.

3.03 FIELD TESTING / QUALITY CONTROL

A. Operation

1. The Contractor shall keep the temporary power and lighting system alive each working day from 6:00 A.M. to 6:00 P.M., from Monday to Friday inclusive for the duration of the Contract. This requirement includes provision of one electrician available on-call at all times for incidental modifications of the temporary electrical system as directed by the Engineer or to maintain the electrical equipment and power distribution systems at the site. Areas of the Work designated by the Engineer as requiring the use of the temporary electrical system to function outside of the above hours shall be energized continuously or as directed by the Engineer. These areas include but may not be limited to security lighting and the Engineer's trailer complex.
2. The Contractor requiring the use of the temporary electrical facilities before 6:00 A.M. or after 6:00 P.M., from Monday through Friday or at any time on Saturdays, Sundays, or holidays, shall bear the cost of energizing and/or de-energizing the system.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Maintenance

1. The temporary electrical system shall be maintained and repaired until it is no longer required by the contractor.
2. Lamps, fuses, and other equipment shall be repaired and/or replaced, as required.

B. Removal

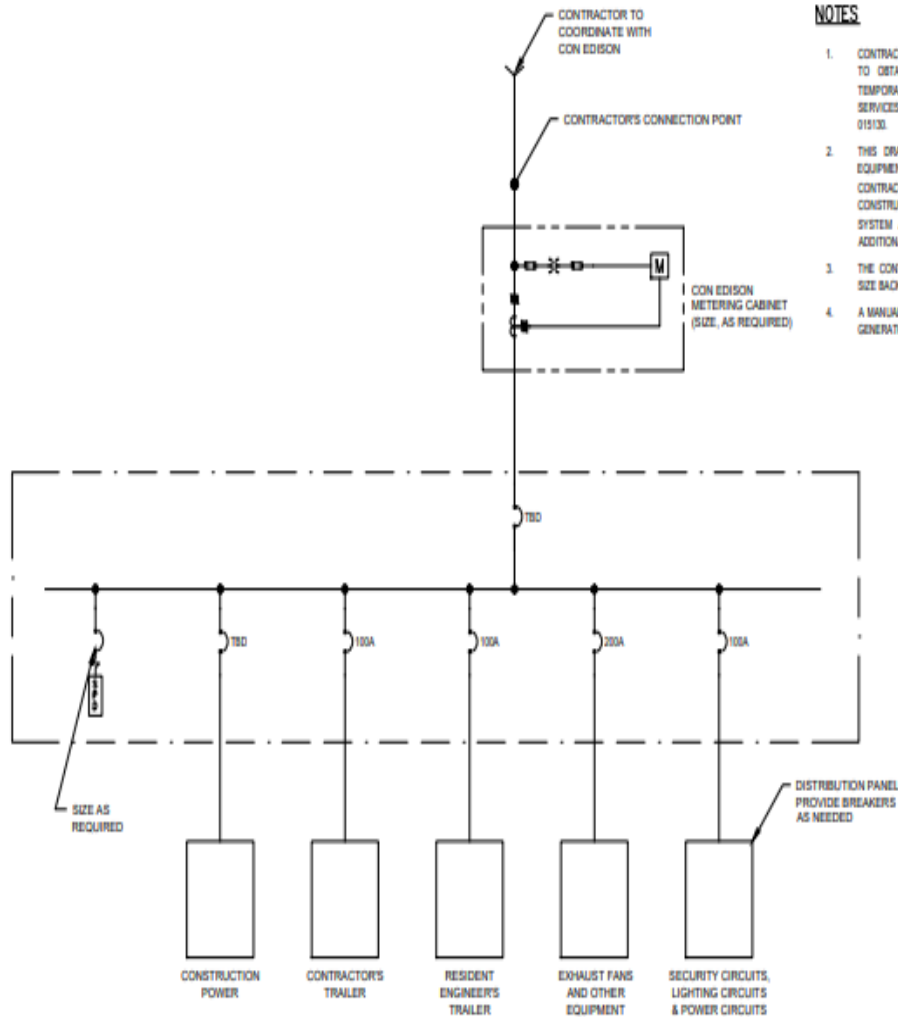
1. At the conclusion of the Work, when directed by the Engineer, the temporary system shall be either removed by the Contractor in its entirety or handed over to the City. The ground surfaces and structures disturbed by the Work shall be restored to their original condition.

END OF SECTION

SECTION 01 51 30 – TEMPORARY ELECTRICAL SYSTEM
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**SECTION 01 51 30 – TEMPORARY ELECTRICAL SYSTEM
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TEMPORARY ELECTRICAL SYSTEM ARRANGEMENT



NOTES

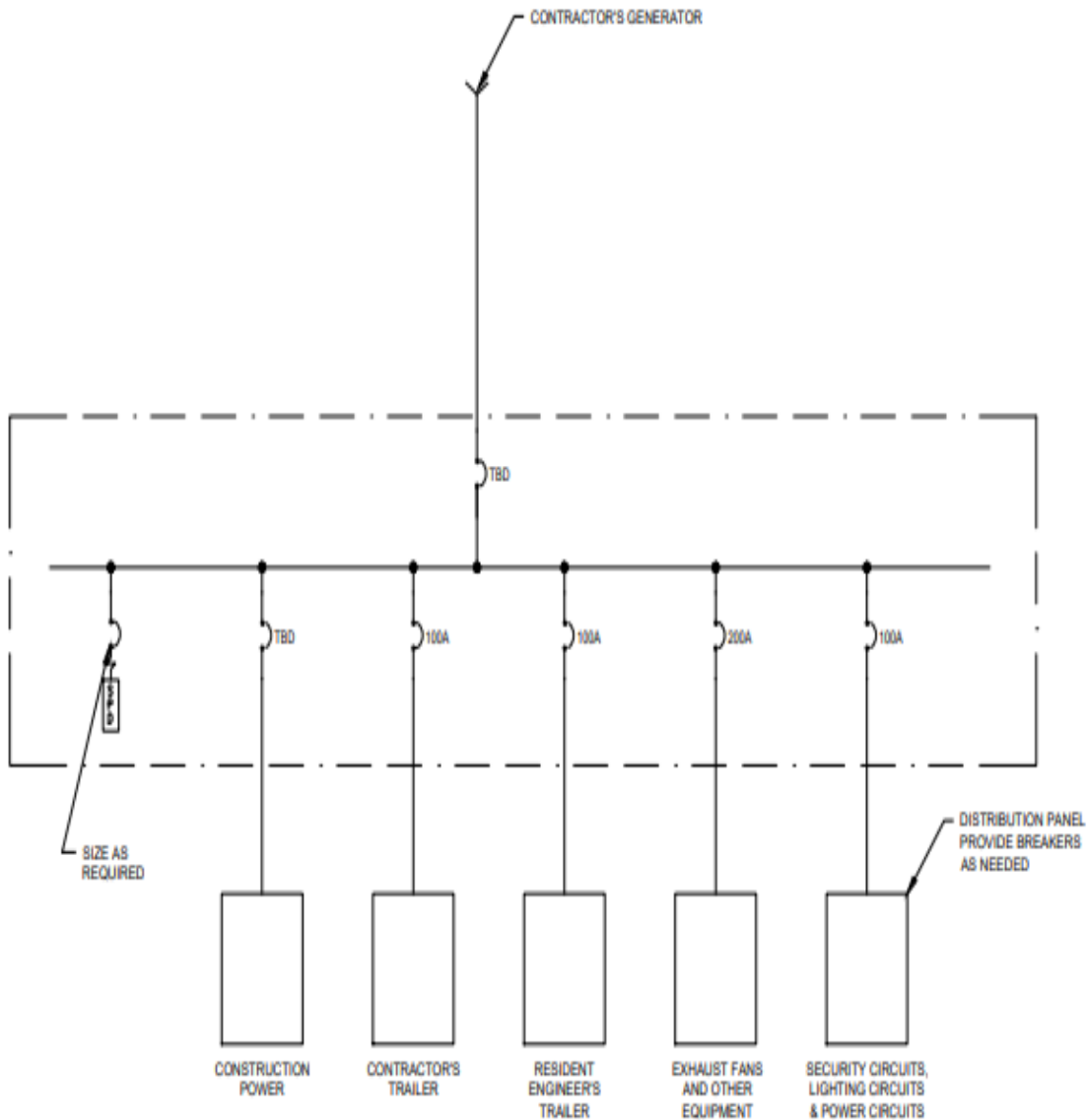
1. CONTRACTOR SHALL COORDINATE DIRECTLY WITH CON EDISON TO OBTAIN TEMPORARY POWER FOR CONSTRUCTION. THIS TEMPORARY SERVICE SHALL BE SEPARATE FROM EXISTING SITE SERVICES OR PROPOSED SITE SERVICES. SEE SPECIFICATION 015130.
2. THIS DRAWING INCLUDES TYPICAL ELECTRICAL DISTRIBUTION EQUIPMENT REQUIRED FOR TEMPORARY CONSTRUCTION POWER. CONTRACTOR SHALL BE RESPONSIBLE FOR EVALUATING THE CONSTRUCTION LOAD, DESIGNING THE TEMPORARY DISTRIBUTION SYSTEM AND PROVIDING THE REQUIRED CIRCUITS WITH NO ADDITIONAL COST TO THE CITY.
3. THE CONTRACTOR SHALL FURNISH AND INSTALL AN ADEQUATE SIZE BACKUP GENERATOR IN CASE OF UTILITY FAILURE.
4. A MANUAL TRANSFER SWITCH SHALL BE INSTALLED FOR BACKUP GENERATOR.

SKETCH 1

**SECTION 01 51 30 – TEMPORARY ELECTRICAL SYSTEM
CONTRACT KENS-EAST-2**

NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL AN ADEQUATE SIZE BACKUP GENERATOR IN CASE OF UTILITY FAILURE.
2. A MANUAL TRANSFER SWITCH SHALL BE INSTALLED FOR BACKUP GENERATOR.



SKETCH 2

**SECTION 01 52 10 – TEMPORARY FIELD OFFICE TRAILERS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Field Office Trailers
- B. Security Systems
- C. Office Furniture
- D. Kitchen
- E. Bathroom Items
- F. Attachments
 - 1. Table 1 – Office Furniture
 - 2. Table 2 – Kitchen Items

G. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 51 11 – Temporary Water and Sanitary Services
- B. Section 01 51 30 – Temporary Electrical System
- C. Section 01 52 40 – Field Office Equipment and Supplies
- D. Section 01 74 20 – Construction Waste Management
- E. Section 01 14 00 – Work Restrictions

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. Engineer's Field Office Trailers:
 - 1. The Contractor shall furnish, install and maintain four Engineer's Field Office Trailers stacked in a two-by-two manner (minimum total area = 5760 square feet) at the Kensico site. Each Engineer's Field Office Trailer shall be approximately 60 feet long x 24 feet wide. The Engineer's Trailer shall be located in the area designated in in the Contract Documents and approved by the Engineer prior to the installation.
 - 2. The Engineer's Trailer shall be ready for occupancy and use within 180 consecutive calendar days of the issuance of Notice to Proceed for the Contract. The Contractor must submit and receive approval from the Engineer if the Engineer's Field Office Trailers cannot be installed within 180 days.
 - 3. All equipment and furnishings shall be new and operational.
 - 4. The Contractor shall furnish, install, and maintain the Interim Engineer's Trailers at the Kensico Site. The Interim Engineer's Trailers shall be installed and ready for occupancy within 60 consecutive calendar days of the issuance of Notice to Proceed for the Contract.
 - 5. The Interim Engineer's Trailers at Kensico shall consist of two (2) adjacent trailers arranged in the double-wide configuration. Each trailer shall be

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approximately 56 feet long x 12 feet wide to provide 56 feet long x 24 feet wide Interim Engineer's Trailers and located as directed by the Engineer. The Interim Engineer's Trailers shall be in good condition but may be rented or may have been used on prior projects. The Contractor shall move all Contract-provided furnishings, equipment and supplies from the Interim Engineer's Trailers to the Engineer's Field Office Trailers when these trailers are ready for occupancy.

B. Contractor's Field Office:

1. The Contractor shall furnish and maintain a field office at the Kensico site as shown on the Drawings in accordance with the requirements of the General Conditions, Article titled "Temporary Structures". Field offices shall be located in the areas designated in the Contract Documents or as directed by the Engineer.
2. The Contractor's field office and other personnel facility shall present a clean and neat exterior appearance and shall be in a state of good repair. Temporary construction facilities, which, in the opinion of the Engineer, require exterior painting or maintenance, shall be repaired or replaced at the Engineer's direction.

C. Services for Interim Engineer's Trailers

- a. The Interim Engineer's trailer at Kensico shall be powered by diesel generators appropriately sized for the trailer loads. The Contractor shall be responsible for obtaining all permits, furnishing, installing and maintain the diesel generators including all refueling services. Generators shall meet the established noise and emissions codes.
- b. The Interim Engineer's Trailers at Kensico shall be provided with bottled water for potable water and two chemical toilets for sanitary service. No public water nor public sewer connection is required for the Interim Engineer's Trailers.

D. Services for Engineer's Field Office Trailers

1. Electrical Service:
 - a. The Contractor shall provide sufficient capacity in the temporary electrical system to furnish ample power for the Engineer's Trailers.
 - b. Electrical service shall be sized properly for the Engineer's Office Trailers. The electrical installation shall conform to the Town of Mount Pleasant Electrical Code and the requirements of the Electrical Division, Department of Buildings.
2. Plumbing:

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- a. The Contractor shall include all water supply, drainage, and piping required for a complete operating installation.
- b. All fixtures that require potable water supply shall be properly connected to the Engineer's Trailers water system.
- c. All necessary soil, waste, vent, and drainage piping shall be provided and connected to the Engineer's Trailers sanitary system
- d. All water pipes shall be frost proofed with heat trace and insulation to prevent freezing. The plumbing work shall be maintained and shall be repaired when and as directed by the Engineer and as required and kept in perfect condition during the performance of the Work.

E. Land for Contractor's Use During Construction

1. The Contractor shall confine its construction activities to the Site as shown on the Drawings. Limited space will be made available on the Site for construction staging and field offices for the Contractor. Space must be used by the Contractor, as required in the Contract Documents or as directed by the Engineer.
2. The Contractor may require additional space for construction staging beyond the limited space available at the site. As such, the Contractor shall provide for space off-site at no additional cost to the City.
3. The Contractor may be required to move its field office during construction in order to sequence the Work. All such moving costs shall be included in the lump sum price bid for the Contract.
4. The City reserves the option to require the Contractor to vacate any part of the land assigned for Contractor's use, including the Contractor's field office area, within sixty (60) days after notice by the City.
5. The Contractor's field office shall present a clean and neat exterior appearance and shall be in a state of good repair. Temporary construction facilities, which, in the opinion of the Engineer, require exterior painting or maintenance, shall be repaired or replaced at the Engineer's direction.
6. Following the completion of the Contract, or as directed by the Engineer, the Contractor shall remove its plant, shanties, trailers, materials, equipment, etc., from the site and restore the site to its original condition, satisfactory to the Engineer.

1.06 QUALITY ASSURANCE

- A. Not Used

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1.07 SUBMITTALS

A. Submit for approval the following information:

1. Interim Engineer's Trailers
 - a. Exterior site plans showing location
 - b. Interior floor plans showing space allocation and layout
 - c. Foundation design calculations shall be provided detailing anchorage requirements to resist overturn due to wind loads and seismic loads. Such calculations shall be signed and sealed by a Professional Engineer licensed in the State of New York.
2. Engineer's Field Office Trailers
 - a. Description of Engineer's Field Office Trailer, including a listing of the office space (in square feet) by room.
 - b. Plan drawing of the Engineer's Field Office Trailer, drawn to scale, indicating the Contractor's designed layout of all specified furniture and equipment.
 - c. Plan drawing of the Engineer's Field Office Trailer HVAC system indicating the HVAC design incorporates appropriate ventilation for heating and cooling distribution and the ventilation system is not obstructed by enclosed office spaces or cubicle walls.
 - d. Contractor shall provide interior design of Resident Engineer's Field Office suitable for accommodating twenty-five (25) full-time individuals while performing construction management and inspection duties.
 - e. Documentation for utility coordination for the connections for necessary power, plumbing, and utilities.
 - f. Data sheets for all products to be furnished under this Section.
 - g. Calculations to confirm that the design of the field office trailers was based on consideration of appropriate loads and is in conformance with all applicable codes. Such calculations shall be signed and sealed by a professional engineer licensed in New York State.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

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1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Engineer's Field Office Trailer shall be as manufactured by:

1. Williams Scotsman, Inc., Baltimore, MD;
2. Design Space International, Bala-Cynwyd, PA;
3. Nadler Modular Structures, Spring Valley, NY;
4. Or approved equal.

- B. Office Furniture shall be as manufactured by:

1. Hon Co., Newark, NJ;
2. Cole Business Furniture Co., New York, NY;
3. Or approved equal.

- C. Ceiling mounted exhaust fan shall be manufactured by:

1. Nutone Corp., Cincinnati, OH;
2. Broan Co., Racine, WI;
3. Or approved equal.

- D. Office Chairs shall be manufactured by:

1. Nightingale, Mississauga, Ontario, Canada;
2. Herman Miller, Zeeland, MI;
3. Steelcase, Grand Rapids, MI;
4. Exemplis, Chicago, IL.
5. Or approved equal.

- E. Water Filter shall be manufactured by:

1. Aqua-Pure, Davisburg, MI;
2. Or approved equal.

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2.02 MATERIALS / EQUIPMENT

A. Engineer's Field Office Trailers:

1. The Engineer's Field Office Trailers shall be office type, new, pre-fabricated structure or a new mobile trailer.
 - a. Provide a minimum of 5,760 square feet (SF)
 - b. Field Office Trailer shall be designed for two levels (stacked trailers) due to on-site space constraints.
 - c. Field Office Trailer shall be designed to maximize the entry of natural sunlight through south facing windows. Offices and other enclosed spaces shall be placed on north facing walls when possible.
2. Materials
 - a. Exterior metal fully insulated walls and roof with a minimum of R-25 insulation.
 - b. Interior walls insulated with R-11 insulation for sound attenuation.
 - c. Ceiling height shall be 8 feet.
 - d. Completely weatherproofed and insulated.
 - e. Floor systems designed for 40 psf. in addition to dead load.
 - f. Roof system designed for 35 psf in addition to dead load.
 - g. Exterior doors fully insulated (whole-unit U-factor less than 0.32, greater than R-3.0) metal type with, aluminum thresholds, heavy-duty closers and vandal-proof locksets with keys meeting building code requirements.
 - h. Low VOC Paints and sealants and floor coverings
 - i. Exterior walls and roof finished with a high SRI material, minimum reflectivity of 0.65.
 - j. Interior doors solid wood with lock sets.
 - k. High-Performance Windows with a whole-unit U-factor less than 0.32 (greater than R-3.0)
 - l. Windows provided with adjustable blinds, operable sashes, screens, storm sashes and all hardware such as that required for security.
 - m. Underside of trailers completely sealed and insulated with minimum of R-19 insulation.

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- n. Resilient floor coverings with a minimum 20% recycled material content.
 - o. Passive solar window awnings on South-facing and West-facing windows.
 - p. Wooden decks, stairs and ADA ramps shall be constructed of pressure treated lumber with galvanized nails/screws.
3. HVAC
- a. Ducted system with ducts concealed above the finish ceiling.
 - b. Sized to maintain the temperature in each room at 70 degrees Fahrenheit (F) when the outside temperature is 0 degrees F and 75 degrees F when the outside temperature is 100 degrees F.
 - c. Ventilation fans to adequately distribute heating and cooling without obstruction from enclosed office spaces or cubicle walls.
 - d. Wall mounted heat/cool programmable thermostat.
 - e. Provide 40-gallon hot water heater.
 - f. Toilet rooms have a switchable ceiling mounted exhaust fan.
 - 1) The fan shall be an 8-inch fan.
 - g. Fire suppression system for all rooms.
4. Electrical
- a. The Electrical system shall have capacity for all loads and be an armored cable system.
 - b. General interior lighting shall be light-emitting diodes with occupant or sensors.
 - c. Emergency lights with battery backup and illuminated exit signs provided as required by code.
 - d. Receptacles provided as required by code.
 - e. Trailer and electrical system to be grounded.
 - f. Work shall be in accordance with Section 01 51 30 – Temporary Electrical System.
5. Plumbing
- a. Plumbing work is to include all water supply, drainage and piping required for a complete system. Work shall be in accordance with Section 01 51 11 – Temporary Water and Sanitary Services.

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- b. All soil, waste, vent and drainage piping shall be provided and connected to the sewer system.
 - c. Toilets to be low flush (1.28 gpf) or dual flush (1.6 gpf/0.8 gpf.)
 - d. Urinals to be low flush (0.5 gpf) or waterless
 - e. Shower Stalls shall be included in each of the male and female bathrooms, as specified herein and indicated on the Contract Drawings.
 - f. Showers and sinks to be provided with hot and cold water.
 - g. Water lines to be installed on the interior to prevent freezing and be concealed wherever possible.
 - h. Two (2) exterior water faucets shall be installed at each trailer location.
 - i. Pipes subject to freezing shall be heat traced and insulated.
6. Room Areas: The room descriptions are solely for the purposes of indicating the intended use for the Engineer’s Field Office Trailers, and are not a binding use for the DEP.
- | | | |
|----|-------------------------------------|-------------------------|
| a. | Small Conference Room | Approx. 11’ x 18’ |
| b. | Large Conference Room | Approx. 13’ x 28’ |
| c. | Six (6) small offices | Approx. 8’ x 11’(each) |
| d. | Twelve (12) cubicle spaces | Approx. 6’ x 6’ (each) |
| e. | Clerical Area/receptionist | Approx. 12’ x 20’ |
| f. | Two (2) ADA compliant bathrooms | Approx. 11’ x 27’(each) |
| g. | with shower stalls | |
| h. | Toilet Room (2 nd Floor) | Approx. 8’x 11’ |
| i. | Kitchen/Lunch | Approx. 11’ x 24’ |
| j. | IT Closet | Approx. 5’ x 11’ |

B. Security Systems

- 1. The Engineer’s Field Office Trailer shall be provided with approved UL listed Commercial Fire and Intrusion alarm systems. The alarm systems shall be capable of connecting via the telephone service in each Engineer’s Trailer to an approved central monitoring station so that continuous monitoring will be in effect.

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- a. Fire Alarm System. Fire alarm system components shall include at a minimum, smoke detectors, horn/strobe devices, and pull stations at points of egress. Location and spacing of all initiating devices and notification appliances shall meet NFPA 72 requirements or as recommended by the vendor of the commercial system. The fire alarm system shall be wired directly to a central control panel located in the Engineer's Field Office Trailer. Upon activation of the fire system, sirens with a steady tone will sound the fire alert. All sirens will automatically shut down and re-arm after fifteen minutes.
- b. Fire Extinguishers. Engineer's Trailers shall be furnished with UL listed portable fire extinguishers rated 2A 10BC (10 lb. Dry Chemical ABC) with wall bracket and shall be located per OSHA 29 CFR 1910.157. Include fire classifications sign and 3-Way Fire Extinguisher Sign above each extinguisher location.
- c. Intrusion Alarm System. Intrusion system shall include at minimum, monitoring at each opening (doors and windows). If windows/doors are left open when initiating the intrusion system, it shall show alarm condition. Upon activation of the intrusion system, sirens with a modulating tone will sound an alert. All sirens will automatically shut down and re-arm after ten minutes. A remote tamper proof turn off switch shall be installed on the outside of the trailer at a location designated by the Engineer so that the intrusion system can be shut down before entering the Engineer's Trailer. The remote turn off switch shall not affect the fire alarm system; turn off switches for these systems shall be located as directed by the Engineer. The intrusion system shall be connected to a central control panel located in the Engineer's Trailers.
- d. Control Equipment
 - 1) All wiring shall be to be current standards being used in the alarm industry and, where possible, all wires shall be hidden.
 - 2) All contacts shall be recessed and moisture proof.
 - 3) No radioactive materials will be permitted in this fire alarm sensor.
 - 4) An 8-ohm siren will be provided. The siren will be installed in a tamper proof steel siren box located on the exterior of each Engineer's Trailer at least 10 feet above the top of the trailer roof.

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- a) The external siren shall be of 30-watt capacity with two separate and distinct alarm signals for both warble and continuous tone selections so as to differentiate between fire and burglar alarm. It shall be Ademco Model No. 715 "Blaster" electronic siren in tamper proof cabinet or approved equal. There shall be an amber strobe light attached on or adjacent to the siren box, wired so that it is activated when the siren is activated.
- b) The outside wiring shall be installed in protective seal conduit.
- 5) Control panel shall be provided and installed in the Engineer's Field Office Trailer. The control panel shall be equipped with at least two channels – first for fire and second for intrusion. The control panel shall also have DC batteries that will supply back-up power in the event that AC power is interrupted. Each channel of the control panel will be wired directly to a digital communicator. The control panel shall have one delay entrance exit channel. The control panel and system shall be a 12-volt system.
- 6) The digital communicator shall be provided furnished and installed adjacent to the control panel in the Engineer's Field Office Trailer. It shall be of a type that will notify the approved central station of the specific alarm condition (fire and intrusion). The digital communicator will also inform the approved central monitoring station of low power on the system. The Contractor shall arrange through the telephone company for the necessary interconnect equipment so that the digital communicator may be connected to the telephone service at the Engineer's Field Office Trailer. The connection of the telephone company shall have line seizure so that the outgoing signal from the digital communicator cannot be interrupted. The current standards used by approved central station regarding "call back to verify" alarm conditions shall be employed.
- 7) The Contractor shall provide and install a complete security system as outlined above. All costs, including

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connection to the telephone company, central station monitoring, and repair and maintenance charges shall be borne by the Contractor.

e. Exterior Lighting

- 1) The Contractor shall install a minimum of four (4) external floodlights to illuminate the area of the Engineer's Trailer and surrounding walkways at the Kensico site. They shall be activated by a photoelectric unit with a backup timer.

f. Water Coolers

- 1) Water Coolers for drinking water are to be provided in a common area on each floor of the Engineer's Field Office. Water cooler services is to be arranged for delivery of water cooler bottles.

C. Office Furniture

1. All furnishings and equipment shall be provided new and unused. All furnished equipment shall be periodically provided with consumable ancillary supplies such as: toner, cartridges, paper and with maintenance / repair and servicing contracts for the entire duration of the Contract. The maintenance response time shall be not more than 24 hours from the time of notification.
2. Office furniture must comply with "Mayoral Directive No.1-91 Procurement and Ergonomic Standards for Video Display Terminals and Ancillary Furniture and Equipment" dated January 25, 1991.
3. Furnish and install office furniture as shown in Table 1, attached, and as directed by the Engineer.

D. Kitchen

1. The kitchen shall be provided with items as shown in Table 2, attached.
2. Under Counter Water Filter with Test/Odor Cartridge
3. The filter shall conform with and be listed under NSF Standard 42 (Class II).
 - a. The filter shall be changed as directed by the manufacturer and a tracking mechanism must be incorporated to ensure the filter is changed as soon it reaches the end of useful life.

E. Bathrooms

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1. The bathrooms shall be properly ventilated and shall be equipped with the following
 - a. For the 1st Floor of the Engineer’s Field Office Trailer – Two Bathrooms, one for male and one for female.
 - b. For the 2nd Floor of the Engineer’s Field Office Trailer – One Unisex Bathroom

Item (in each bathroom, 1 st floor)	Quantity
Flush toilet	2
Urinal (male only)	1
Shower stall with hot and cold running water	1
Sink with hot and cold running water	2
Mirror	2
Medicine cabinet	1
Waste can with lid	1
Item (in bathroom, 2 nd floor)	Quantity
Flush toilet	1
Sink with hot and cold running water	1
Mirror	1
Medicine cabinet	1
Waste can with lid	1

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 INSTALLATION

- A. General

1. The Contractor shall, as specified and approved in accordance with the requirements of all appropriate laws, ordinances, and regulations, furnish, install, equip, maintain, and service the Engineer’s Field Office Trailer.

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2. The Contractor shall obtain and pay for all permits.
 3. The Contractor shall be fully responsible for providing and securing all necessary permits and approvals associated with potable water and sewage services for the Engineer's Field Office Trailer as well as the Contractor's Field Offices as described in this section.
 4. The Engineer's Field Office Trailer shall be complete with electrical and plumbing hook-ups to be available during the construction period for the exclusive use of the Engineer. The trailers shall be installed at the locations as shown on the Drawings and as approved by the Engineer. The Contractor shall install, make operable and ready for use all built-in movable equipment including, but not limited to fire alarm system, new telephone system, computer system, security system, and portable bi-directional communicator.
 5. Concrete block foundation walls shall be constructed as directed. The walls and footings shall completely enclose the bottom of each trailer. A wooden platform with stairs and handrails shall be provided adjacent to each entranceway. Stairways to the second story of two-story trailers shall be provided. The site of the trailer shall be graded as directed by the Engineer.
 6. The Engineer's Field Office Trailer shall be equipped with heating ventilation and air conditioning, potable water and sanitary connections, steel security mesh protection for each window, exterior security lighting, steps with railing to the trailer door and a security alarm to detect intrusion at each exterior window and door. The Contractor shall be responsible for all costs associated with providing these features and services.
 7. All exterior items not factory painted shall be painted by the Contractor as directed by the Engineer.
- B. Office Space for the Engineer's Field Office Trailer
1. The floor space as stated herein and shall be a weatherproof and thermally insulated structure, and have separate and adequate means for easy and safe entry and egress. It shall have a sufficient number of windows to permit convenient use for engineering office work, as is appropriate, in normal daylight without the use of artificial light. The office shall be partitioned and furnished as specified herein. Install a fire, intrusion, and panic alarm system.
- C. Electrical Installations:
1. The trailer and electrical system therein shall be properly grounded by the Contractor. The Contractor shall provide extended electrical service as

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required to service all equipment in the trailer and as indicated above. All electrical energy costs for the offices will be borne by the Contractor.

D. Heating and Air Conditioning Installations:

1. The Contractor shall place in operation and maintain the heating and air conditioning units. The system shall be maintained and repaired and kept in good operating condition during the performance of the Work. The HVAC system shall be serviced for maintenance a minimum of two (2) times per year.

E. Contractor's Field Office

1. Trailers utilized by the Contractor shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Engineer, require exterior painting or maintenance will not be allowed on the site.
2. The Contractor's Field Trailer shall be equipped with heating ventilation and air conditioning, suitable fluorescent lighting, potable water and sanitary connections, steel security mesh protection for each window, exterior security lighting, steps with railing to the trailer door and a security alarm to detect intrusion at each exterior window and door. The Contractor shall be responsible for all costs associated with providing these services.
3. The Contractor shall obtain 120/208 volt electrical service for the trailer and necessary outdoor lighting from a panelboard on-site to be identified by the Engineer.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Engineer's Field Office Trailer

1. The finishing of floors and the painting of exterior and interior surfaces of the field offices shall be as approved by the Engineer.
2. Keep the offices in first class condition during the occupancy by the Engineer and until the completion of all work under the Contract. Promptly replace any damaged or defective parts, including appliances, fixtures, computers and equipment.

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3. Janitor Service: Provide full, daily janitorial services for all the offices, including, but not limited to, sweeping, mopping, vacuuming, dusting and garbage removal. The office floors shall be swept daily, and washed at least once per week. The bathroom shall be swept and mopped daily and the water closet, sink and shower shall be cleaned and disinfected daily. Furnish, replace and replenish electric light bulbs and fluorescent tubes, toilet paper, cloth and paper towels, soap, and all other items required to maintain the offices in clean and perfect condition. Windows shall be washed at least once every month. Hang, remove, and store window screens, storm windows, and screen and storm doors when ordered. All maintenance work shall be performed during normal working hours.
 4. Furnish fuel and provide service for the heating, cooling and hot water systems, as required, to provide the specified heat, cooling and hot water.
 5. Provide for the satisfactory disposal of sanitary and other wastes.
 6. Keep the access roads, parking areas, and walks about the field office buildings free and clear of snow and ice.
- B. Trailer Removal
1. The Engineer's Field Office Trailer shall remain property of the City at the end of the Contract.

END OF SECTION

**SECTION 01 52 10 – TEMPORARY FIELD OFFICE TRAILERS
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TABLE 1
OFFICE FURNITURE

Description	Quantity
Book cases, 41 inches high by 36 inches wide by 13 inches deep	Four (4)
55-gallon trash bin	One (1)
55-gallon paper recycling bin	One (1)
55-gallon metal/plastic recycling bin	One (1)
Dry chemical fire extinguishers, UL listed 1A-10BC	Five (5)
Office desks Table Top Width: 60-inches Table Top Depth: 30-inches Drawers: One (1) box drawer, One (1) deep file drawer, One (1) center drawer and locks. Under Table Top: Width: 20 – 24 inches Depth at knee Minimum: 15 inches Depth at toe minimum: 23.5 inches Height to top of keyboard support surface: Adjustability includes 23 – 28 inches Display surface height: Allow viewing angle of 5-30 degrees to center screen	25
Office Chairs with upholstered swivel type chair with arms, adjustable tilt back, and with casters. Following manufacturers or approved equal: Nightingale Herman Miller Steelcase Exemplis	25
Conference Tables and Chairs: Table for seating of 12 Chairs Table for seating of 6	One (1) 18 One (1)
Folding tables, 60 inches by 30 inches	Three (3)
Five-drawer vertical file cabinet, legal size with lock	25
Five-drawer vertical fireproof file cabinet, legal size with lock	5
Water Cooler	Two (2)

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TABLE 2
 KITCHEN ITEMS

Description	Quantity
Wood kitchen cabinets with Formica counter tops	15 linear feet
Electric bottle-less water filtration system with hot and cold outlets Model: Aqua-Pure AP - 200, with the Aqua-Pure AP 217 taste/odor cartridge or approved equal	One (1)
Microwave oven, 1.75 cubic feet	One (1)
Automatic drip coffee maker (ten cup)	One (1)
Refrigerator, at least 25 cubic feet	One (1)
Overhead kitchen cabinets	10 linear feet
Toaster Oven	One (1)
Tables, 60 inches long by 30 inches wide	One (1)

SECTION 01 52 40 – FIELD OFFICE EQUIPMENT AND SUPPLIES
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish and install field office equipment and supplies, complete and operational.

1. The Contractor shall also provide servicing of the Engineer's field office.

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Not Used

SECTION 01 52 40 – FIELD OFFICE EQUIPMENT AND SUPPLIES
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1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

- 1. Action Submittals:

- a. Data sheets for all office equipment, supplies and services to be provided under this Section including but not limited to the following:

- 1) Network
 - 2) Printers and Copying Machines
 - 3) Telephones and Facsimile Machines
 - 4) Internet Service

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Combination Copy, Printer, and Scanner Machine: Provide the latest model copy machine from the following brands that meets the requirements specified herein:

- 1. Work Center 7835 as manufactured by Xerox® Corp.
 - 2. Or approved equal.

- B. Facsimile Machine:

- 1. Laser Fax, Model KX-FL511 as manufactured by Panasonic Corp.
 - 2. Or approved equal.

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2.02 MATERIALS / EQUIPMENT

- A. Provide all furnishings and equipment specified herein new and unused.
- B. All equipment furnished under this Section shall be provided with, at a minimum, the following consumable and ancillary supplies for duration of the Contract:
 - 1. Toner cartridges.
 - 2. Paper.
 - 3. Maintenance / repair service contracts.
 - a. The Contractor shall provide a service and repair contract via the local representative of the equipment dealer or manufacturer.
 - b. The service contract shall be for on-call, on-site service during normal business hours.
 - c. The maintenance response time shall be not more than 24 hours from the time of notification.
- C. Provide the following office equipment:
 - 1. The Contractor shall install a LAN System:
 - a. All cable, conduit, and equipment (installed) necessary to provide a LAN interface from each computer station and the printer.
 - b. Cable and conduit routing shall be non-invasive and as approved by the Engineer.
 - c. Provide managed Ethernet switch with sufficient ports for the office equipment specified herein. Power over Ethernet is acceptable for wireless access points and other devices.
 - d. Provide a sufficient number of 802.3 at Wi-Fi access points to provide the following minimum level of service to the entirety of the field office:
 - 1) 1300Mbps at 5 GHz
 - 2) 450Mbps at 2.4GHz
 - e. The Contractor shall be responsible for providing all appurtenances necessary to connect the managed Ethernet switch to the internet service provider, including underground installation of internet service.
 - f. Provide cable or fiber optic internet service of 100 MBps speed minimum. Satellite internet service providers are not acceptable.
 - g. Provide interim internet service for Interim Engineer's Trailer. Contractor to submit proposed interim service for Engineer's approval.

SECTION 01 52 40 – FIELD OFFICE EQUIPMENT AND SUPPLIES
CONTRACT KENS-EAST-2

2. Combination Copy, Scanner, and Printer Machines: The Contractor shall provide two (2) combination copy, scanner, and printer machines.
 - a. Machines shall be automatic feed type, compatible with the computers.
 - b. Machines shall operate off the LAN with 10/100 Ethernet Connectivity at a minimum.
 - c. Machines shall be capable of printing 8½-in. by 11-in., 8½-in. by 14, and 11-in. by 17-in. sheets.
 - d. Machines shall be capable of printing black and white and color at a resolution up to 1200 x 2400 dpi.
 - e. Machines shall also have color and black and white scanning capability.
 - f. Furnish all cable, conduit, and equipment necessary to provide a LAN interface from the managed Ethernet switch to the machines.
 - g. Cable and conduit routing shall be non-invasive and as approved by the Engineer.
 - h. The machine shall be designed to produce 110,000 copies per month and shall be dust resistant.
 - i. Copy function shall be capable of automatically feeding 8½-in. by 11-in., 8½-in. by 14-in., and 11-in. by 17-in. originals.
 - j. Machine shall be capable of and copying onto plain bond paper sheets at variable magnification from 50% to 200%.
 - k. The machine shall have an automatic feed tray, a staple function, and an automatic copy sorter.
 - l. The paper tray for each size paper shall hold at least 144 sheets.
 - m. Machine shall be capable of scanning to TIFF and text searchable PDF. Machine shall have scan to e-mail function.
 - n. The Contractor shall obtain and pay for a service and repair contract with a local representative of the copy machine dealer or manufacturer for on-call daily on-Site service.
 - o. The Contractor shall furnish powders, cartridges, chemicals, or other materials required for proper operation of the copy machine and paper supply.
3. Telephone Service:
 - a. Provide quantity nineteen (19) VoIP Telephones.
 - b. Each telephone shall be a full feature push button telephone set with multiple lines and all equipment necessary for its operation.

SECTION 01 52 40 – FIELD OFFICE EQUIPMENT AND SUPPLIES
CONTRACT KENS-EAST-2

- c. All telephones will be connected to a central switchboard having a minimum of ten independent touch-tone phone service lines.
 - d. The phones and phone service shall be furnished and installed by the Contractor.
 - e. Make arrangements and bear all costs for the installation of cables and for supplying telephone service during the Contract period.
 - f. The telephone lines shall be separate from the facsimile line specified herein.
4. Facsimile Machine:
- a. Provide one (1) facsimile machine to be installed on an independent touch-tone VoIP service line.
 - b. Provide a service contract and all necessary supplies (toner, paper, etc.) for the system for the duration of the Contract.

D. Office Supplies:

- 1. The Contractor shall furnish all office supplies required by the Engineer and his staff during the course of construction.
- 2. Items shall include but not be limited to note pads, pens, pencils, paper clips, rubber bands, labels, manila folders, envelopes, erasers, hanging folders for filing cabinets, ink pads, etc. and all ancillary supplies necessary to operate the facsimile and copy machine.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Engineer's field office shall be completely equipped with office equipment and supplies required under this Section and ready for operations within sixty (60) ccds after the issuance of the Notice to Commence Work and, thereafter, shall be continuously available for the use of the Engineer for the duration of the Work.

3.02 IMPLEMENTATION

- A. Maintenance of Equipment and Services:
 - 1. Maintain and repair all office equipment and furnishings in first class condition for continuous operation.
 - 2. Telephone, Facsimile, and Internet service:

SECTION 01 52 40 – FIELD OFFICE EQUIPMENT AND SUPPLIES
CONTRACT KENS-EAST-2

- a. Provide telephone and fax service, including all calling charges for the Engineer's field offices, for the duration of the Contract.
- b. Provide internet service (cable or fiber optic – satellite is not acceptable) in order to adequately service the offices.
- c. Provide separate lines for telephone service, alarm monitoring, and facsimile systems.
- d. Install all telephone cables required for supplying telephone service.
- e. The Contractor shall pay the costs for installation of the telephone cables and for supplying and maintaining telephone, alarm monitoring, facsimile, and internet service.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Removal of Equipment:

1. At the completion of all Work and as directed by the Engineer, the Contractor shall remove and dispose supplied equipment which shall become the property of the Contractor.
2. The Contractor shall have all services disconnected and capped to the satisfaction of the Engineer.

END OF SECTION

**SECTION 01 52 50 – TEMPORARY GUARD BOOTHS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Guard Booths
- B. Guard Booth Installation
- C. Disposition of Guard Booths and Equipment
- D. The following index of this Section is presented for convenience:

E. Article	Title	Section Page
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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

SECTION 01 52 50 – TEMPORARY GUARD BOOTHS
CONTRACT KENS-EAST-2

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

A. Guard Booths

1. The Contractor shall provide and maintain security guard booths at Work sites as directed by the Engineer. The Contractor shall not order the equipment until approved by the Engineer.
2. The guard booths shall be completely equipped and ready for the Engineer's use.
 - a. The Contractor shall provide a licensed electrical contractor to provide and maintain electrical power supply.
 - b. The Contractor shall obtain and pay for all permits.
3. Security guard booths shall be 4 feet long and 4 feet wide, overall. These shall meet the following minimum requirements:
 - a. The exterior of the guard booth shall be given an approved prime coat of paint followed by one coat of approved exterior enamel. The enamel finish coat shall be DuPont Lacquer, or an approved equal, color to be furnished upon award of Contract.
 - b. The underside of the guard booth shall be blocked or skirted as necessary to prevent debris from accumulating underneath.
 - c. All windows and doors shall have aluminum screens. All windows that are not fixed shall be covered on the exterior with an expanded metal screen covering the full window area. The Plexiglas shall be secured by means of carriage bolts through the wall with nuts fastened from the interior.
 - d. Interior shall be finished in 1/4-inch plywood. Plywood shall be finished in natural color, with two (2) coats of varnish or lacquer.
 - e. The heating system shall consist of thermostatically controlled built-in electrical baseboard heaters capable of maintaining 70 degrees F temperature in all rooms even with exterior air temperature being 0 degrees F.
 - f. The air conditioning system shall be capable of maintaining a temperature of 75 degrees F in all rooms when the exterior air temperature reaches 95 degrees F. All air conditioning units shall have Energy Efficiency Rating (ERR) in excess of 9.9. EER rating = Capacity (in BTU) / Power (in W)

SECTION 01 52 50 – TEMPORARY GUARD BOOTHS
CONTRACT KENS-EAST-2

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Submit for prior approval the following information:

1. Plan drawing of the temporary guard booth, drawn to scale, indicating the Contractor's designed layout of all specified furniture and equipment.
2. Data sheets for all products to be furnished under this Section.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not used.

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

3.02 IMPLEMENTATION

- A. Guard Booth Installation

1. Installed locations of the guard booths shall be as directed by the Engineer.
 - a. Concrete block foundation walls shall be constructed as directed. The walls shall completely enclose the bottom of the Guard booths.
2. All exterior items not factory painted shall be painted by the Contractor as directed by the Engineer.

SECTION 01 52 50 – TEMPORARY GUARD BOOTHS
CONTRACT KENS-EAST-2

B. Services for Guard Booths

1. Electrical Service

- a. The Contractor shall contract with a licensed electrical contractor to provide sufficient capacity in the temporary lighting and power system to furnish ample power for each guard booth.
- b. Electric service shall be 120/220 volts, 3 phase, 60 hertz and of adequate capacity for all needs. Electrical service and all associated electrical needs shall be provided by the Contractor. The electrical installation shall conform to the requirements of the City of New York Electrical Code and the Bureau of Electrical Control. The Contractor shall pay all costs of supplying energy and maintaining service.

2. Telephone Service

- a. The Contractor shall pay all costs for supplying telephone service for calls within New York City as well as business calls outside the City limits.
- b. Telephone service for the guard booths shall be brought from the nearest existing telephone manhole. The Contractor shall make the arrangements for service with the local telephone company approved by the Engineer and shall conform to the telephone company's requirements.
- c. Telephone service for the security guard booths shall include one line for the telephone.

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Disposition of Guard Booths and Equipment

1. At the completion of all Work, all guard booths shall become the property of the Contractor.
2. At the completion of all Work, all moveable equipment purchased under this Contract shall be relocated to a location within a 50-mile radius to be determined by the Engineer.

B. Following the completion of the Contract or as indicated on the Contract Documents or directed by the Engineer, the Contractor shall remove his field

SECTION 01 52 50 – TEMPORARY GUARD BOOTHS
CONTRACT KENS-EAST-2

offices, materials, equipment, etc., from the allocated site and restore the site to its original condition, satisfactory to the Engineer.

END OF SECTION

SECTION 01 52 50 – TEMPORARY GUARD BOOTHS
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

**SECTION 01 55 00 – VEHICULAR ACCESS AND PARKING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Maintenance of Traffic
2. Site Access
3. Truck Routes
4. Construction Management Parking Area
5. Contractor Employees' Parking Area

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

SECTION 01 55 00 – VEHICULAR ACCESS AND PARKING
CONTRACT KENS-EAST-2

1.03 RELATED SECTIONS

- A. Section 01 14 00 – Work Restrictions
- B. Section 01 55 26 – Traffic Control

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

A. Maintenance of Traffic

1. The Contractor shall be responsible for maintenance and control of traffic in and out of the Site(s) and at all points of vehicular ingress and egress affected by the Work.
2. All maintenance and protection of traffic shall be done in accordance with Section 01 55 26 – Traffic Control, this Contract, the latest traffic stipulations by New York State Department of Transportation (NYSDOT), and local traffic regulations.
3. Construction-related vehicles and activities shall not impede or otherwise adversely affect the flow of regular traffic traveling on the roads leading to and adjacent to the Work location(s).
4. Construction-related vehicles and activities shall be understood as including vehicles operated and activities undertaken by the Contractor (including its employees, Subcontractors and visitors). Regular traffic shall be understood as referring to all vehicles other than construction-related vehicles.
5. The Contractor shall ensure that construction-related trucks entering the Work area do not queue on or along public roads. Queuing areas for all trucks entering or exiting the Site(s) shall be limited to the areas of disturbance. Compliance with the restriction against the queuing of trucks on or along public roads shall be understood to be a material provision of this Contract.
6. The Contractor shall perform the Work required in this Contract in accordance with applicable traffic and safety rules, regulations, ordinances, and permit conditions.
7. Modifications to existing streets and traffic patterns shall be approved by and in accordance with the requirements of the appropriate approving body which will include one or more of the following: Town of Mount Pleasant, NY, Westchester County or the New York State Department of Transportation (NYSDOT). The Contractor shall be responsible for obtaining and paying for this approval whenever the construction operations require modifications to the existing streets or traffic patterns. Traffic safety

SECTION 01 55 00 – VEHICULAR ACCESS AND PARKING
CONTRACT KENS-EAST-2

devices shall be placed as per the Manual of Uniform Traffic Control Devices (MUTCD).

8. When equipment delivered under this Contract is transported as an "oversized load", the Contractor shall maintain traffic in accordance with the requirements of the various Federal, State and City agencies having jurisdiction.
9. During the progress of the Work, the Contractor shall provide all temporary construction roads and walkways as required, and shall make ample provisions to prevent interference with the continued maintenance of vehicular traffic on roadways. Any roadways damaged by the Contractor or his/her Subcontractors or Materialmen shall be restored to their original condition upon notification by the Engineer that such repairs are required. Such restoration of the roadway shall be at the Contractor's expense. Temporary walkways shall be removed, at the Contractor's expense, prior to acceptance of the Contract.

B. Site Access

1. Access to the Site(s) shall be at locations designated by the Engineer and is subject to change during the progress of the Project.
2. Until the completion of all Work under this Contract, the Contractor shall, as directed, keep the access roads and all sidewalks adjacent to the Site free and clear of snow at all times.
3. The Contractor shall ensure that its employees, Subcontractors and suppliers are fully advised to enter and exit the Site using the specified Site entrances.
4. The Contractor shall maintain all access roads in good condition to make the means of access safe by day and night.
5. The Contractor shall provide traffic control signage and flag persons as required to ensure access to the Site for the use of all Subcontractors, suppliers and other traffic required for the expeditious completion of the Work in accordance with Section 01 55 26 – Traffic Control.

C. Truck Routes

1. During the progress of construction, trucks entering or leaving the Site shall utilize DEP-directed or approved truck routes. The Contractor shall ensure that its crew members, and its Subcontractors and materialmen and their crew members are fully advised of the designated and directed or approved routes.
2. Notwithstanding the foregoing or any other Contract provision, the Contractor understands and expressly consents that the DEP has the right and authority at all times, in the discretion of the Commissioner and/or the Engineer, to require and/or direct alterations, revisions and/or amendments

SECTION 01 55 00 – VEHICULAR ACCESS AND PARKING
CONTRACT KENS-EAST-2

in or to trucking and transportation plans, procedures and any related protocols. The Contractor further agrees that such right and authority includes the right to designate, alter revise and/or amend any such plans procedures and/or protocols including (without limitation of any kind) the truck and tractor-trailer routes to be utilized by the Contractor and all subcontractors and Materialmen to and from Site(s), and including usage of local streets, and interstate, federal, state and/or local highways. No such designation, alteration, revision or amendment shall be deemed a Contract change entitling the Contractor to claim additional compensation.

D. Construction Management Parking Area

1. The parking area shall comply with the Site parking restrictions established by the Engineer and shall accommodate the Construction Management staff and visitors to the Construction Management Office.

E. Contractor Employees' Parking Area

1. There is limited land available for within the Project Site for the Contractor to use for parking and other necessary job uses. The Contractor's personnel shall comply with the Site parking restrictions established by the Engineer.
2. The Contractor shall comply with all parking restrictions as stated in Section 01 14 00 – Work Restrictions.
3. The Contractor Employees Parking Area(s) shall be adequately sized, and shall be provided for and maintained by the Contractor at its sole expense. Contractor agrees that the City shall have no obligation to assist in obtaining nor to make available publicly-owned property for such purposes. It is a contractual requirement that the Contractor implement and enforce this policy, and that the Contractor take any necessary or appropriate actions to ensure compliance with such parking policy by its and its Subcontractors' employees.
4. The Contractor shall issue parking badges or stickers to such employees for their personal vehicles, in such form and with such associated documentation as the Engineer may approve, require, or modify.
5. The parking badges or stickers shall be displayed in a prominent location upon each employee's vehicle, as may be approved, required, or modified by the Engineer.
6. Should the Contractor require additional land for parking, it shall provide and pay for such space off-site. All costs associated with such arrangements shall be borne by the Contractor.
7. The Contractor Employees Parking Area(s) shall be of a size and situated in location(s) acceptable to the Engineer, and unless otherwise authorized by the Engineer.

SECTION 01 55 00 – VEHICULAR ACCESS AND PARKING
CONTRACT KENS-EAST-2

8. The Contractor shall be responsible for the safe and efficient movement of employees between the Contractor Employees Parking Area, the Construction Management Parking area, and the off-site parking areas.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 IMPLEMENTATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

SECTION 01 55 00 – VEHICULAR ACCESS AND PARKING
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- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

SECTION 01 55 26 – TRAFFIC CONTROL
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Under this Section, the Contractor shall maintain and/or redirect both vehicular and pedestrian traffic and protect the public from all damage to person and property, within the limits of and for the duration of the Contract. Traffic shall be maintained over a smooth traveled way, as approved by the Engineer, which shall be so marked by signs, delineation and/or other methods that a person who has no knowledge of conditions can ride, drive or walk over all or any portion of the highway under construction where traffic is to be maintained.
- B. The Contractor is placed on notice that the maintenance and protection of traffic during construction is considered as important and necessary as an item of Work as is the actual construction itself. The Contractor shall at all times conduct the operation in a manner to ensure the safety of motorists, pedestrians and employees.
- C. All Work performed and materials furnished under this provision shall be in strict conformity with the Contract Drawings, the Specifications, the final approved Maintenance and Protection of Traffic (MPT) Plan and Schedule of Operations, and subsequent modifications or amendments thereto approved by the Engineer and agencies and departments having jurisdiction. If, in the opinion of the Engineer, maintenance and protection of traffic is not adequate, the Town may order the Work to be done by others and deduct the actual cost thereof from payments to the Contractor.
- D. The Contractor shall, prior to bidding, thoroughly familiarize himself or herself with the ordinances, rules, and regulations of the Town of Mount Pleasant, NY. The Contractor is referred to the U.S. Federal Highway Administration Manual of Uniform Traffic Control Devices (MUTCD) and the New York State Department of Transportation (NYSDOT) Supplement to the MUTCD, which shall govern wherever applicable. NYSDOT Standard Sheets for Work Zone Traffic Control shall apply to all work of this Section. The Contractor shall, prior to commencement of work, obtain copies of all said requirements, a copy of which shall be given to the Engineer.
- E. As required, the Contractor shall provide all traffic control devices necessary to protect traffic at designated work zones. Traffic control devices specified herein include temporary signs, timber curbs, timber barricades, plastic barrels, temporary chain link fence, and temporary pavement markings. Maintenance and protection of traffic shall remain in place until all proposed work is complete and fully operational in accordance with the Contract Documents.
- F. Unless otherwise specified in these Contract Documents, the Contractor shall be responsible for the maintenance of the entire pavement, drainage, potable water and sewage facilities, and other street elements, both old and new, after the effective date of starting any field work and ending on the date of Final Acceptance.

SECTION 01 55 26 – TRAFFIC CONTROL
CONTRACT KENS-EAST-2

G. In addition to the Work shown in the Contract Documents, the Contractor shall comply with the New York State Department of Transportation Standard Specifications.

H. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 56 00 – Temporary Barriers and Enclosures
- B. Section 31 25 10 – Dust, Soil Erosion and Sediment Control

1.04 REFERENCES

- A. U.S. Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD)
- B. New York State Department of Transportation (NYSDOT) Supplement to the MUTCD for Streets and Highways

SECTION 01 55 26 – TRAFFIC CONTROL
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- C. NYSDOT US Customary Standard Sheets
 - D. NYSDOT Standard Specifications
 - E. NYSDOT Work Zone Traffic Control Manual.
 - F. NYSDOT Highway Design Manual, Chapter 16 - Work Zone Traffic Control
- 1.05 DESCRIPTION
- A. Maintenance of Traffic
 1. During working hours, the Contractor shall be responsible for maintenance and control of traffic in and out of the Site at all points of vehicular ingress and egress and shall provide flaggers to warn vehicles on Town streets of vehicles approaching from the Site. Flaggers shall be properly attired, equipped and trained according to the NYSDOT regulations.
 2. Modifications to existing Town streets and traffic patterns shall be approved by the Town of Mount Pleasant. The Contractor shall be responsible for obtaining and paying for this approval whenever the Contractor's construction operations require modifications to the existing streets or traffic patterns. Traffic safety device placement should be in compliance with the MUTCD, NYSDOT Supplement to the MUTCD, and NYSDOT Standard Sheets for Work Zone Traffic Control.
 3. When equipment delivered under this Contract is transported as an "oversized load", the Contractor shall maintain traffic in accordance with the requirements of the local municipalities.
 4. During the progress of the Work, the Contractor shall provide all temporary construction roads and walkways, as required, and shall make ample provisions to prevent interference with the continued maintenance of vehicular traffic on roadways and shall indemnify and save harmless the Town and the Engineer from any expense whatsoever due to the Contractor's operations over said roadways. Any roadways damaged by the Contractor or Subcontractors or materialmen shall be restored to their original condition upon notification by the Engineer that such repairs are required. Such restoration of the roadway shall be at the Contractor's expense. Temporary walkways shall be removed, at the Contractor's expense, prior to Final Acceptance of this Contract.
 5. The Contractor shall provide the minimum lane width at the various work zones as specified in NYSDOT Highway Design Manual (Chapter 16 - Work Zone Traffic Control), NYSDOT Standard Sheets for Work Zone Traffic Control, or as directed by the Engineer. Vehicular traffic at driveways to adjacent properties shall be maintained at all times, other than at the time of construction, and shall provide temporary steel road plates at all times. Temporary traffic detours shall be implemented according to the approved MPT Plan or as directed by the Engineer.

SECTION 01 55 26 – TRAFFIC CONTROL
CONTRACT KENS-EAST-2

1.06 QUALITY ASSURANCE

A. Standards

1. The Contractor shall comply with the MUTCD, the NYSDOT Supplement to the MUTCD, the NYSDOT Standard Sheets for Work Zone Traffic Control, NYSDOT Highway Design Manual (Chapter 16 - Work Zone Traffic Control), NYSDOT Standard Specifications, and all applicable Federal, State and Municipal codes including revisions to date of Contract.

B. Requirements of Regulatory Agencies

1. Any lane closures required within Contract limits must be approved by the NYSDOT Surface Transportation Controller (STC). The contractor is responsible to forward requests through the Engineer to the STC for lane closure approvals. These requests must be submitted to the STC at the email address: STC-R08@dot.state.ny.us, a minimum of seven (7) days in advance of scheduled closures. Due to possible traffic control conflicts, approval may or may not be granted for the date(s) requested. Any additional costs, delays or remobilizations associated with the approval process shall be included in the bid price for basic work zone traffic control. During holiday periods, the Contractor will not be allowed to perform any work that could be disruptive to traffic, including but not limited to lane closures. The State reserves the right to preclude lane closures during periods of inclement weather, wet or icy pavement, reduced visibility, traffic accidents or any other emergencies. The State may alter any lane closures if traffic conditions or other unforeseen circumstances arise that could adversely affect the traffic flow.

C. Permits

1. The Contractor shall obtain and pay for all necessary permits required by the NYSDOT. Such permits shall be maintained in effect for the entire duration of the Contract. Should the Contract time be extended, the Contractor shall obtain all necessary additional permits.
2. The Contractor shall also comply with the requirements specified in Section 01 41 00 – Regulatory Requirements.

D. Qualifications of Manufacturers

1. Products used in the Work of this Section shall be produced by manufacturers regularly engaged in the manufacturing, installing and servicing of similar items with a history of successful production acceptable to the Engineer as specified herein and in accordance with the applicable parts of the Contract Documents.

E. After Hour Work

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1. If at any time, the Contractor is required by NYSDOT or deems it necessary to work outside the Normal Project Working Hours, he or she shall obtain all necessary permits and shall notify DEP in advance.

1.07 SUBMITTALS

A. General

1. The Contractor shall submit Shop Drawings as specified herein, including the MPT Plan and Schedule of Operations for the Maintenance and Protection of Traffic.
2. If not included within the MPT the Contractor shall submit a list of certified flaggers identifying the training for each as required by the NYSDOT standards.

B. MPT Plan and Schedule of Operations

1. The Contractor, as the Work progresses, shall prepare and submit to the Engineer and any agencies and departments under which responsibility of roadways fall, an MPT Plan and Schedule of Operations for the Maintenance and Protection of Traffic, showing in complete detail the methods, sequences, procedures and devices proposed for installation. Before the Contractor shall in any way or manner restrict or interfere with the normal flow of traffic, he or she shall first secure written approval from the agencies and departments having jurisdiction of its proposed plan. The MPT Plan and Schedule of Operations shall be prepared, signed and sealed by a Professional Engineer licensed in the State of New York.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. General

1. All temporary signs, temporary concrete barriers, fencing, delineators, barricades, lighting and other warnings and guiding devices shall be as approved by the Engineer, agencies and departments having jurisdiction,

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and except as otherwise specified, will remain the property of the Contractor.

B. Temporary Signs

1. All materials and the details of fabrication, erection, location, relocation, and assembly shall be per the approved MPT Plan and in accordance with the applicable rules and regulations of the MUTCD and the NYSDOT Supplement to the MUTCD where applicable and approved by the Engineer.
2. All signs and barricades shall conform to the MUTCD and NYSDOT Supplement to the MUTCD.
3. All materials for the Temporary Traffic Signals shall conform to the latest specifications and drawings on file with the NYSDOT. The Contractor or an approved Subcontractor must perform this Work.

C. Type III Breakaway Barricade

1. The Contractor shall furnish and install Type III Breakaway Barricade units as necessary or required by the Engineer.
2. Type III Breakaway Barricades shall comply with NYSDOT Standard Sheet 619-02 “Type III Construction Barricades”.
3. If the Contractor elects to substitute any material not listed in this Specification, he or she shall submit evidence acceptable to the NYSDOT that the proposed material is not frangible.
4. If the Contractor elects to use an alternate design, he or she shall submit Shop Drawings in accordance with Section 01 43 20 – Approval of Product Manufacturers.

D. Channelizing Devices:

1. The Work shall include the furnishing and installing of channelizing devices - traffic cones or drums. The drums shall be in accordance with NYSDOT Standard Specification §729-01 Drums. The standard cones, tall cones and extra tall cones shall be in accordance with NYSDOT Standard Specification §729-02 Cones.

E. Temporary Construction Fencing:

1. All materials shall be in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

F. Temporary Pavement Marking Tape

1. As required, the Contractor shall provide, install and remove temporary paste-on pavement markings.

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2. Pavement markings tape shall be 4-inch wide white “Flex-O-Line” as manufactured by FOL Tape, Fenton, MO., “Scotch Lane” as manufactured by 3M Company, St. Paul, MN, or approved equal.

G. Precast Concrete Median Barrier (Jersey Barrier):

1. The Contractor shall furnish and install precast concrete barriers as necessary or required by the Engineer. All materials shall be in accordance with NYSDOT Standard Specification §704-05 Precast Concrete Barrier.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Verification of Conditions

1. The Contractor shall examine the areas and conditions under which work of this Section will be installed and correct conditions detrimental to proper and timely completion of the Work. He or she shall not proceed until all unsatisfactory conditions have been corrected.

3.02 ERECTION

- A. General Construction Details

1. Construction work shall be conducted in such a manner as to provide minimum interference of normal pedestrian or vehicular traffic. In some cases, it will be necessary to block walks and driveways. Prior to blocking or obstructing walks and/or driveways, the Contractor shall provide sufficient notice (48 hours) to a responsible person in each residence or commercial establishment.
2. The Contractor shall not close or obstruct any portion of a street, road or private way without first obtaining permits from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he or she shall make such repairs or provide such temporary ways or guards as shall be acceptable to the Engineer and to the proper authorities.
3. The Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefore, shall maintain streets, roads, private ways, and walks not closed passable and safe.
4. Where streets or portions of streets, now in use, are included for paving or repaving work under this Contract, the Contractor shall be responsible for

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the maintenance of such streets or portions of streets, prior to the performance of said paving or repaving work. The maintenance of such streets shall include any repairs, as directed, including the filling of potholes, that may be necessary due to usage of the streets by traffic, and shall start from the date of written notice to commence work or actual start of work, whichever is earlier.

5. The Contractor shall notify the Police and Fire Departments in writing, with a copy to the Engineer, at least 24 hours in advance of a proposed closure of a street or roadway. He shall cooperate with the Police Department in the establishment of alternate routes and shall provide adequate detour signs, plainly marked and well lighted, in order to minimize confusion.
6. The Contractor is required to submit to the Engineer, and appropriate agencies and departments responsible for the roadway involved, a plan and schedule of his method of operations on any detour. If the Contractor proposes any modifications, amendments or changes in location for detours as called for, or proposes new detours, such changes and additions to the maintenance of traffic must be brought to the immediate attention of the Engineer and responsible agencies and departments involved.
7. The Contractor shall furnish, erect and maintain at closures, intersections and at all other locations, where required, all necessary standard or approved barricades, suitable and sufficient lights, torches, approved reflectors, danger signals, warning and closure signs, directional detour signs and whatever additional measures the Engineer may deem necessary for proper control of traffic and for the safety of all concerned, all in accordance with the rules and regulations of the NYSDOT. He or she shall indicate by day and by night the impassable and dangerous conditions existing on or adjacent to the site of the work. He or she shall provide a sufficient number of watchmen and take all necessary and legal precautions for the protection of the work and for the safety of the public, as required by the Contract. All barricades, danger signals, warning signs and obstructions shall be illuminated at night and all lights shall be kept burning from sunset until sunrise.
8. Barricades shall be placed parallel to, adjacent to and on both sides of excavations for curbs and sidewalks. Each line shall have a clear space of not more than twenty-five (25) feet between barricades. Barricades shall be Type III Breakaway Barricades. Each barricade shall have at least one (1) solar powered flash-type warning device with battery backup affixed thereon, as approved by the Engineer.
9. The Contractor shall furnish material, labor and equipment at any time, day or night, to immediately repair, remedy and prevent washouts, formation of holes, ruts and depressions, sunken trenches and the destruction or sinking of temporary pavements, both when the work is under way, and when the work is temporarily suspended for any period of time. Special attention shall

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- be given to maintenance of a satisfactory travel way over weekends, holidays and nights.
10. In the case of traffic being diverted from the accustomed traveled way, onto the road shoulder or onto an area not immediately affected by the actual construction work, occasioned by the location of the trench, excavation, materials or equipment, the shoulder or areas outside of the project so affected, shall be restored to a condition equal or better than the original condition. This shall apply equally as well to those pavements or any detours or a designated area, over which traffic was routed.
 11. The Contractor shall keep the travel way free of foreign objects such as rocks, timber and other items that may fall from transporting vehicles. Spillage of material carried by or dropped from the under-carriage of any carrying vehicle resulting from the Contractor's hauling operations along or across any public travel way, shall be removed immediately and such travel way, both within and outside of the Contract limits, shall be kept free of such spillage by the Contractor. Existing pavement and shoulder surfaces along or across any public travel way shall be cleaned at a minimum of once per week with a mechanical street sweeper. This shall include all truck routes to and from the project site. The Engineer shall approve all cleaning equipment prior to use. Cleaning shall continue until adequate cleaning results as determined by the Engineer.
 12. Whenever dusty conditions resulting from the Contractor's operations occur, they shall be corrected by sweeping the area to remove excess materials and by spraying the area with water to control any dust in accordance with Section 31 25 10 – Dust, Soil Erosion and Sedimentation Control.
 13. Whenever it becomes necessary to maintain and limit traffic to one lane, the Contractor shall provide adequate traffic controls on the section of highway or roadway on which vehicle operation is maintained. He or she shall employ a sufficient number of competent flagmen and/or temporary traffic lights operating continuously during the time traffic is so maintained. In the event the length of the one-lane operation is extremely short and conditions are favorable to safe operation, the Engineer may, in writing, authorize the Contractor to dispense flagmen or traffic control signals.
 14. The Contractor shall also provide a sufficient number of competent flagmen in areas where traffic is congested, particularly where construction equipment is operating.
 15. The Contractor shall provide an adequate travel way as specified and devote particular attention to all drainage facilities, keeping them fully operative at all times.
 16. The Contractor shall furnish and erect temporary fencing around all unattended excavations. Lighted barricades and warning signs shall also be

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used around the perimeter and at a significant distance away from the excavation in each traffic flow direction (whether vehicular or pedestrian) so as to warn vehicles or pedestrians of the existence of the excavation.

- a. Temporary wire fences shall be furnished and installed at the site by the Contractor and shall completely enclose all excavations, steep embankments and other potentially hazardous locations as soon as such a condition is apparent and as ordered by the Engineer. This fence is in addition to any provision that the Contractor would normally follow to safeguard such Work operations as specified in Section 01 56 00 – Temporary Barriers and Enclosures, and in no way reduces the Contractor's obligations as required by the Contract Documents.
 - b. Excavation for basins, inlets, manholes, seepage basins, pipe connections, sewers and other miscellaneous structures shall be protected by installing a five (5) foot high, 2" x 4" mesh, #14 gauge, welded-wire fabric fence around the periphery. Stay wires shall be 2" apart; line wires 4" apart. Wire fabric shall be securely attached to approved posts which are driven into the ground. Maximum post spacing shall be eight (8) feet. The said excavation shall be further protected by the use of barricades.
 - c. The Contractor shall furnish, erect, relocate, maintain and remove all temporary fencing required under this Section.
 - d. The Contractor will be permitted to remove such portions of the fencing as may be required for his operations during working hours, providing that the public is continuously safeguarded by other satisfactory means during these operations. In all such cases the fence must be restored at the end of each workday.
 - e. The fence and warning devices shall be maintained in good repair throughout the duration of the work and shall be removed upon completion of the work.
17. Decking, in general, shall consist of heavy, adequately sized, steel plates completely covering excavations where pedestrians and vehicular traffic make this decking operation necessary.
18. The Contractor shall construct and maintain at all times, where called for or as directed, temporary bridges or bridging across pipe trenches, excavations, obstructions and newly-laid pavements, to provide adequate ingress and egress for pedestrian and vehicular traffic to and from private driveways, business and commercial establishments or for main street intersections and heavily traveled crossings. The Contractor will be required, after the installation of all pipes and necessary appurtenances thereto, to immediately backfill and compact all trenches to existing grade, to permit the resumption of traffic without delay.

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19. Steel plates shall be provided over all excavations in front of driveways and excavations over which pedestrian or vehicular traffic is to be maintained. Plates shall be of a thickness sufficient for the loads to be carried and shall have not less than two (2) feet of bearing on either side of an excavation. Width of plates for vehicular traffic shall not be less than ten (10) feet, and for pedestrian traffic not less than four (4) feet. Plates for pedestrian traffic shall be equipped and approved, dismountable handrails on both sides, for the full lengths of plates. The Contractor shall be responsible for the adequacy of all plates.
 20. During all phases of construction, provisions shall be made for access for all emergency vehicles, such as firefighting equipment, police vehicles, ambulances, etc.
 21. The Contractor shall furnish and maintain, as required and as directed by the Engineer, reflectorized signs for the information of the motorist, and to adequately and legally post the highway under construction as to its status.
 22. The Town shall have the right to open to vehicular traffic those areas adjacent to the structures upon which Work has been completed before the final acceptance of all Work. The Contractor shall carry on the remaining Work so as not to interfere with or endanger such vehicular traffic and shall make no claim for damages on account thereof.
 23. At the conclusion of the Work, all temporary facilities shall be removed and the area restored to pre-work conditions or better, unless otherwise specified. The Contractor shall, when ordered, remove existing street signs; store, protect and keep them clean. Where necessary to remove such signs, the Contractor shall prepare a location plan prior to removal. He shall replace signs so removed in their original location or as directed, as promptly as possible. Signs not to be replaced shall be cleaned and delivered to the Engineer as directed by him.
 24. Signs or markers lost or damaged because the Contractor failed to properly install or maintain shall be replaced at the Contractor's expense.
 25. The Contractor shall maintain route marker signs during construction. Should relocation be necessary at various stages of construction, they shall be placed in locations visible to traffic, as directed.
- B. Temporary Signs
1. The Work shall consist of the fabrication, furnishing, installation, erection, assembly and maintenance of warning, detour, regulatory, guide and directional signs required to properly stage the Work and maintain traffic and shall include the furnishing and incorporation of sign supports and posts; the furnishing and installation of all fastening devices and miscellaneous appurtenances; and the relocation, removal and disposal of signs or sign assemblies.

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C. Type III Breakaway Barricades

1. All methods shall comply with NYSDOT U.S. Customary Standard Sheet 619-02, and NYSDOT Standard Specification §729-08 Type III Construction Barricades.
2. Barricades, at all times shall be maintained in a condition satisfactory to the Engineer. Maintenance shall consist of the replacement of all damaged or worn out components; repainting, as required or directed; replacement of reflectorizing materials; and general rehabilitation to keep barricades in good condition during the life of the Contract.
3. Lighting of barricades shall be by solar-powered flashing units with battery backup.
4. At the completion of the Work or when directed by the Engineer, barricades shall be removed and disposed of away from the work site.

D. Channelizing Devices

1. Furnishing and installing traffic cones or drums will be for the purpose of traffic lane delineation during construction. Cones are used most commonly for Short Duration/Short Term maintenance & Utility work. Cones used at night shall be retro-reflectorized. Drums are most commonly used where they will remain in place for a prolonged work period (e.g. Long Term Stationary Operations, > 3 Days). Cone Spacing in the Work Area shall be a maximum of 40 feet.
2. At the completion of the Work or when directed by the Engineer, the channelizing devices shall be removed and disposed of away from the work site.

E. Temporary Construction Fencing

1. All methods shall be in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

F. Temporary Pavement Marking Type

1. Application shall be as recommended by the manufacture or as directed by the Engineer.

G. Precast Concrete Median Barrier (Jersey Barrier)

1. All methods shall be in accordance with the NYSDOT Standard Specification 704-05 Precast Concrete Barrier, and NYSDOT Standard Sheet 619-01 Temporary Concrete Barrier.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

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3.05 ADJUSTING / PROTECTION / CLEANUP

 A. Not Used

END OF SECTION

SECTION 01 55 26 – TRAFFIC CONTROL
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NO TEXT ON THIS PAGE

SECTION 01 56 00 – TEMPORARY BARRIERS AND ENCLOSURES
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

Maintenance and Protection of Traffic (MPT) devices

Fencing

Protection of Work, Personnel, and Materials

Tree and plant protection

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1.02 PAYMENT

No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

Section 01 55 26 – Traffic Control

Section 31 10 10 – Site Clearing

1.04 REFERENCES

New York State Department of Transportation (NYSDOT) Standard Specifications, Section 607

New York State Department of Transportation (NYSDOT) Standard Specifications, Section 619

OSHA Standards 29 CFR 1926

1.05 DESCRIPTION

MPT Devices

1. Roads, Parking Areas and Sidewalks

- a. The Contractor shall provide, erect, and maintain as necessary for the Work, all MPT devices as necessary and in accordance with Section 01 55 26 – Traffic Control. These devices shall include, but not be limited to temporary concrete barriers, timber curb, Type III barricades, barrels, construction signs, warning signs, wide angle reflectors, temporary striping and warning lights along all roads, parking areas and sidewalks that are accessible to the public or City personnel and in such other areas of the Site as needed for the safety of all persons at the Site(s).
- b. Sufficient barricades shall be erected to keep vehicles from being driven on or into Work under construction.

2. Excavations

- a. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property.
- b. The Contractor shall, at its own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workers. Bridges provided for access during construction shall be removed when no longer required.
- c. The length or size of excavation will be controlled by the particular surrounding conditions but shall always be

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confined to the limits prescribed by the City and Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the City and Engineer may require special construction procedures such as limiting the length of the open trench, prohibiting stacking excavated material in the street, and requiring that the trench shall not remain open overnight.

- d. The Contractor shall take precautions to prevent injury to the public or City personnel due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public or City personnel shall be well lit from sunset to sunrise.
3. The Contractor's responsibility for the maintenance of barricades, signs and lights shall continue throughout the duration of the Work. The Contractor shall provide and maintain other warning signs and barricades in other Work areas as may be required for the safety of all those employed in the Work, operating personnel, or those visiting the Site.

Fencing

4. Temporary Construction Gates and Fencing
 - a. As required or directed by the Engineer, the Contractor shall furnish and erect new temporary chain link fence, gates and all necessary incidentals in accordance with NYSDOT Standard Specifications, Section 607.
5. Safety Fencing
 - a. The Contractor shall provide and erect, when required or directed by the Engineer, temporary project safety fencing at the Work Site(s).
 - b. The safety fencing shall be a high visibility, orange colored, high-density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10-foot centers.
6. Fencing shall be maintained by the Contractor for the duration of the Contract. Upon Final Acceptance of the Work, fencing shall become the property of the Contractor and shall be removed from the Site(s), unless otherwise directed by the Engineer.

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7. Maintenance shall include, but not be limited to, graffiti removal, repair of cracks and breaks in the fencing, and re-painting of the fencing as directed by the Engineer.

Protection of Work, Personnel and Materials

8. Until permanent walls, railings, stairs, hatches, etc., are in place, the Contractor shall be responsible for the installation and maintenance of temporary barricades and temporary railings around openings, stairwells, on temporary or permanent stairs, around the perimeter of elevated floors, landings, permanent ramps, etc. The installation shall be in accordance with the requirements of OSHA Standards 29 CFR 1926 and the codes and regulations of authorities having jurisdiction.
9. During the progress of the Work and up to the date of Substantial Completion, the Contractor shall be solely responsible for the care and protection of all Work, personnel, and materials covered by the Contract.
10. In order to prevent damage, injury or loss, actions taken by the Contractor shall include, but not be limited to, the following:
 - a. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not interfere with the progress of the Work or the work of any Other Contractor or utility service company.
 - b. Provide suitable storage facilities for all materials which are subject to injury by exposure to weather, theft or breakage.
 - c. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.
 - d. Clean up frequently all refuse, rubbish, scrap materials, and debris caused by the Contractor's operations, to the end that at all times the Site(s) shall present a safe, orderly and workmanlike appearance.
11. The Contractor shall protect the existing work and material from damage by its workers and shall be responsible for repairing any such damage at no additional cost to the City.

Tree and Plant Protection

12. Protect existing trees, shrubs, and plants on or adjacent to the Site, shown or designated to remain in place, against

SECTION 01 56 00 – TEMPORARY BARRIERS AND ENCLOSURES
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unnecessary cutting, breaking, damage, or skinning of trunk, branches, bark, and roots.

13. Do not store materials or equipment or park construction equipment and vehicles within foliage drip lines.
14. In areas subject to traffic, provide temporary fencing or temporary barricades to protect trees and plants.
15. Open fires are not allowed onsite.
16. Within the limits of the Work, water, trees, and plants that are to remain must be protected to maintain their health during construction operations.
17. Cover exposed roots with burlap and keep such burlap continuously wet. Cover exposed roots with earth as soon as possible. Protect root systems from mechanical damage and damage by erosion, flooding, runoff, and noxious materials in solution.
18. If branches or trunks are damaged, prune branches immediately and protect cut or damaged areas with emulsified asphalt compounded specifically for horticultural use, in a manner acceptable to the Engineer.
19. When directed by the Engineer, remove and dispose of at location away from the Site(s) damaged trees and plants that die or suffer permanent injury, and replace each damaged tree or plant with specimen of equal or better species and quality.
20. Other applicable methods of tree protection shall be as required by Section 31 10 10 – Site Clearing.

1.06 QUALITY ASSURANCE

Not Used

1.07 SUBMITTALS

Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

Not Used

SECTION 01 56 00 – TEMPORARY BARRIERS AND ENCLOSURES
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PART 2 PRODUCTS

2.01 MANUFACTURERS

Not Used

2.02 MATERIALS / EQUIPMENT

Temporary Construction Fencing

1. All materials shall comply with NYSDOT Standard Specifications, Section 607.

2.03 FABRICATION / ASSEMBLING / FINISHES

Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

Not Used

3.02 ERECTION

Temporary Construction Fencing

1. All methods shall comply with New York State Department of Transportation (NYSDOT) Standard Specifications, Section 619.
2. Field Testing / Quality Control

Not Used

3.03 STARTUP / DEMONSTRATION

Not Used

3.04 ADJUSTING / PROTECTION / CLEANUP

Not Used

END OF SECTION

**SECTION 01 57 00 – TEMPORARY CONTROLS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. General Requirements
2. Prohibited construction procedures
3. Noise Control
4. Dust Control
5. Pest and Rodent Control
6. Pollution Control
7. Care during Welding
8. Notification of Non-Compliance
9. Storm Water Runoff Control
10. Site Security

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 14 00 – Work Restrictions
- B. Section 01 33 00 – Submittal Procedures
- C. Section 01 35 55 – Site Security Procedures
- D. Section 01 57 16 – Temporary Pest Control
- E. Section 31 25 10 – Dust, Soil Erosion and Sediment Control

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. General Requirements
 - 1. The Contractor shall furnish all labor, materials, equipment and incidentals required to ensure adequate environmental protection including implementation of all erosion and sediment control measures as directed by the Engineer and specified herein.
 - 2. In the performance of the Contract, the Contractor shall comply with all applicable federal, State and local laws and regulations concerning environmental protection, restoration and erosion and sediment control.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Submit Shop Drawings as specified in Section 01 33 00 – Submittal Procedures.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Prohibited Construction Procedures
 - 1. The following construction procedures are prohibited:
 - a. Dumping or wasting of spoil material into any stream corridor, any surface waters or at unspecified locations adjacent to the Work area or at locations not approved by the Engineer.
 - b. Indiscriminate, arbitrary or capricious operation of equipment in any stream corridor or surface waters.
 - c. Dumping of silt-laden water directly into any stream corridor or surface waters without provision for treatment as noted herein.

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- d. Damaging vegetation adjacent to or outside of access roads or limited right-of-way for the Work. All construction operations must be confined within the Contractor's Work limits as shown and/or specified.
- e. Disposal of trees, bush and other debris into any stream corridor, any wetlands or at unspecified locations.
- f. Open burning of materials.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Cover and Liner Fabric for Stockpiles

- 1. Cover and liner fabric for stockpiles shall be as specified under Section 31 25 10 – Dust, Soil Erosion and Sediment Control.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 IMPLEMENTATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Noise Control

- 1. Noise control shall be in accordance with Section 01 14 00 – Work Restrictions

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2. The Contractor's vehicles and equipment shall be operated and maintained so as to minimize noise to the greatest degree practicable. Noise levels shall conform to the latest regulatory standards and in no case will noise levels be permitted which interfere with the work of the on-site personnel.
3. All construction equipment powered by an internal combustion engine shall be equipped with a properly maintained muffler.
4. Air powered equipment shall be fitted with pneumatic exhaust silencers.

B. Dust Control

1. The Contractor shall be responsible for controlling objectionable dust caused by his operation of vehicles and equipment, clearing or for any reason whatsoever. The Contractor shall conduct all operations and maintain the area of activity to minimize creation and dispersion of dust.
2. The Contractor shall apply water to keep dust in the air to a minimum. The use of calcium chloride for dust control shall not be permitted.
3. Dust control for construction activities at all work areas shall be as follows:
 - a. Non-paved roadways and parking areas, which are used for construction traffic, shall be sprayed at least every other hour with water during the hours of construction unless otherwise approved by the City.
 - b. Contractor shall regrade unpaved roadways and parking areas once a week to the satisfaction of the Resident Engineer.
 - c. All other construction areas shall be hosed down twice a day with water during the hours of construction, or as deemed necessary by the Engineer
 - d. The Contractor shall erect runoff barriers or other means to ensure that runoff generated from dust control activities does not enter any waterways.
4. The Contractor shall comply with the requirements of Section 31 25 10 – Dust, Soil Erosion and Sediment Control.

C. Pest and Rodent Control

1. Provide rodent and pest control as necessary to prevent infestation of construction or storage area.
2. Employ methods and use materials which will not adversely affect conditions at the Site or on adjoining properties.
3. All chemicals shall be approved by the Engineer prior to their use and shall be safe for use in drinking water environment.
4. The Contractor shall comply with the requirements of Section 01 57 16 – Temporary Pest Control.

D. Pollution Control

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1. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.
 2. Provide equipment and personnel to perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids.
 3. All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, or reactant of other classification, must show approval of the EPA and other recognized certifying agencies. Use of all such chemicals and disposal of residues shall be in strict conformance with regulatory requirements.
 4. The Contractor's equipment used during construction shall conform to all current Federal, State, and local laws and regulations.
- E. Care during Welding
1. Provide protection of workers from welding arcs during the construction by providing adequate welding protection including face shields, gloves, and respirator or dusk mask where required.
- F. Notification of Non-Compliance
1. The Engineer will notify the Contractor in writing of any non-compliance with the provisions of this Section and the action to be taken. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or its authorized representative at the Site of the Work, shall be deemed sufficient for the purpose.
 2. If the Contractor fails or refuses to comply promptly, an order stopping all or part of the Work may be issued by the City until satisfactory corrective action has been taken.
 3. No part of the time lost due to any such stop work orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor, unless it is later determined that the Contractor was in compliance with the provisions of this Section.
 4. The Contractor shall be responsible for its Subcontractors' compliance with the provisions of this Section.
- G. Stormwater Runoff Control
1. Prevent discharge of sediment to and erosion from the Site(s) to surface waters, drainage routes, public streets and rights-of-way, and private property, including dewatering operations.
 2. Prevent trash, demolition waste and construction debris from contaminating storm water runoff.
 3. Provide berms, dikes, and other acceptable methods of directing storm water around work areas to drainage routes.

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4. Storm water runoff controls shall be inspected daily. Problems and deficiencies shall be brought to the attention of the Engineer and corrected promptly.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Site Security

1. The Contractor shall comply with the requirements of Section 01 35 55 – Site Security Procedures.

- B. Stockpiling of Materials

1. Stockpiling of excavated materials shall be handled in accordance with Section 31 25 10 – Dust, Soil Erosion and Sediment Control.

END OF SECTION

**SECTION 01 57 16 – TEMPORARY PEST CONTROL
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Pest Control Service
2. Regulatory Requirements
3. Material Requirements
4. Packaging
5. Safe Operation

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A.** No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Section 01 35 27 – Environmental, Health and Safety Requirements

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. Pest Control Service:

1. The Contractor shall provide the services of a certified, licensed and insured pest control service for the purpose of exterminating and controlling pests at the Project Site whenever construction work is ongoing at the Site(s) until the date demobilization is complete at the Site(s).
2. The Contractor shall provide rodent control as follows.
 - a. The rodent (i.e., rat) traps shall be effective and adequate in number placed within the site perimeter and at locations directed by the Resident Engineer. Each trap shall be checked monthly to ensure that they are properly baited and in proper working condition. All traps shall be rebaited monthly as required.
3. The Contractor shall provide mosquito control during the summer months as follows.
 - a. The Contractor shall provide an extermination schedule prior to commencing spraying based on the recommendation of the pest control service and/or the chemical manufacturer.
 - b. The Contractor shall identify and eliminate standing water as soon as possible. Where the standing water is not a part of the Contract Work or is not under the control of the Contractor, the standing water shall be reported to the Resident Engineer. To the extent possible pools of standing water shall be removed rather than applying insecticide to any pools of standing water to control the breeding of mosquitoes.
4. The Contractor shall furnish all labor, equipment, and materials necessary to implement a Rodent and Insect Control Program.
 - a. On and around the Resident Engineer's field office, parking lot, guard booth, and portosans.
5. All Work shall be performed by an exterminator licensed in the State of New York and shall comply with all requirements of New York State Department of Health for rodent and insect control. The exterminator shall only use products approved by the U.S. Environmental Protection Agency (EPA) for rodent and insect control.

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6. The Contractor shall perform one full round of rodent and insect control on and around the areas specified in this Section once every two months from October through May and once every month from June through September.

B. Regulatory Requirements

1. The Contractor and the pest control service shall comply with all Federal, State, City and local ordinances, codes and regulations regarding the following:
 - a. Performing the pest control service.
 - b. Utilizing only the pesticides recommended by the manufacturer for the purpose intended and which will not create a hazard to health or property.
 - c. Cleaning up and disposing of all pesticides and pests.
2. The Contractor shall comply with all requirements of New York City Local Law 37 (LL 37) of 2005, including, but not limited to:
 - a. The prohibition of certain pesticide products for use on New York City property;
 - b. The requirement for notices at least 24 hours prior to pesticide applications; and
 - c. Reporting and recordkeeping requirements.

3. The Contractor shall secure all applicable federal, state, and local permits to complete the work, including a permit from DEP’s Ecotoxicologist, at least 10 calendar days prior to performing any chemical application, and shall provide all notifications required by such permits.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. The Contractor shall provide a Rodent and Insect Control Plan.
- B. The Contractor shall provide, as required by LL 37, detailed information regarding each pesticide application.
 1. The Contractor shall ensure that all records are provided to New York City using the NYC Department of Health and Mental Hygiene (DOHMH) Pesticide Use Reporting System (NYCPURS).
 - a. The Contractor shall confirm that the information regarding any prior month applications has been properly submitted through NYCPURS. A copy of such information shall be included in the monthly Contractor Environmental, Health and Safety (EHS) report

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in accordance with Section 01 35 27 – Environmental, Health and Safety Requirements.

2. The LL 37 required information, including any necessary prior notifications, shall be provided to DEP on the reporting forms established by the NYC DOHMH or approved equivalent.
 - a. This information shall be provided to DEP as part of the monthly Contractor EHS report in accordance with Section 01 35 27 – Environmental, Health and Safety Requirements.
 - b. By February 1 of each year, the Contractor shall provide a complete summary of all LL 37 required information for all pesticide applications at the project site for the entire prior year.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Pesticides shall be stored, handled, and used in accordance with the manufacturer's label and directions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Pesticides shall be approved commercially available products that are currently registered by the United States Environmental Protection Agency and the New York State Department of Environmental Conservation. Pesticides shall also have all required labels indicated that they are approved for the intended use.

1. Pesticides prohibited by LL 37 may not be utilized.

- B. Pesticides shall be mixed and used in strict conformance with the instructions on the label or supplemental labels.

- C. Packaging:

1. Pesticides shall be delivered and securely stored, until used, in the manufacturer's standard containers that have legible labels affixed in accordance with the provisions of the Federal, State, City and local pesticides laws, rules and regulations in effect at the time of delivery.

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2. Pesticides that do not meet these packaging requirements, at any time, will be rejected by the Resident Engineer and shall be removed from the site immediately.
3. The Resident Engineer shall reject any pesticides that have become wet, caked or otherwise unfit for use.
4. The basis of acceptance shall be original, sealed, and properly labeled pesticide containers.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Before performing any pest control work, the technician shall report to the Resident Engineer 24 hours prior to announce his presence and to ascertain if there are any special areas which need to be addressed.

3.02 IMPLEMENTATION

- A. Safe Operation

1. The pest control service shall exercise caution in the application of pesticides and other operations in order not to endanger or injure on-site personnel or the public. Rates and methods of application shall be in accordance with the manufacturer's instructions on the pesticide label.
2. All pesticides shall be delivered in original containers or packaging or in service containers properly labeled as required by law. All pesticides shall be secured at all times against unauthorized access.
3. Residual pesticides and containers shall be disposed off-site in accordance with the label instructions and applicable Federal, State, City and local regulations.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

SECTION 01 57 16 – TEMPORARY PEST CONTROL
CONTRACT KENS-EAST-2

END OF SECTION

**SECTION 01 58 13 – TEMPORARY PROJECT SIGNAGE
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Attachments: The following figures are attached to this Section:

1. Figure 1 – Project Information Panel Layout (For Projects with Street Frontage of 60 Feet or Greater)
2. Figure 2 – Project Information Panel Layout (For Projects with Street Frontage of Less than 60 Feet)

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Not Used

SECTION 01 58 13 – TEMPORARY PROJECT SIGNAGE
CONTRACT KENS-EAST-2

1.04 REFERENCES

- A. Not Used.

1.05 DESCRIPTION

- A. The Contractor shall procure and erect a project information panel at the Project Site identifying the Project. The panel shall be erected within twenty-one (21) days from the date the Contractor is ordered to Commence Work and shall be in accordance with this Section.
- B. Permission from the local municipality having jurisdiction shall be obtained before installation of the Project information panel.
- C. Names of individuals on the Project information panel(s) shall be updated by the Contractor when these names change, at the direction of the Engineer,.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Submit the following for approval prior to fabrication of the project information panel:
 - 1. Detailed sketch showing all lettering, dimensions and colors
 - 2. Detailed bill of materials indicating materials of construction for all project sign components.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The project information panel shall be manufactured by one of the following:
 - 1. Mineola Signs, Mineola, New York; <http://mineolasigns.com/>
 - 2. Or approved equal

2.02 MATERIALS / EQUIPMENT

- A. Project Information Panel

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1. The Project information panel shall include the following requirements shown on Figure 1 or Figure 2 attached to this Section. The Engineer will provide project specific information.
 - a. For construction sites with a street frontage of 60 feet or greater, the sign dimensions shall be in accordance with Figure 1. For construction sites with a street frontage less than 60 feet, the sign dimensions shall be in accordance with Figure 2.
 - b. For projects that are not funded through the New York State Revolving Fund, the information and lettering shown below the sample rendering in Figures 1 and 2 should be removed and the rendering extended to fill that space.
2. Project information panels shall include the following information:
 - a. A rendering, elevation drawing, site plan, or zoning diagram of the building exterior that does not contain logos or commercially recognizable symbols;
 - b. A title line stating “Work in Progress:” and specifying the nature of the project;
 - c. Anticipated Project completion date;
 - d. Website address to contact for Project information;
 - e. The corporate name and telephone number of the Contractor;
 - f. The name(s) of government official(s) shall be incorporated into the panel in accordance with Figures 1 and 2.
3. The Project information panel shall be constructed of 3/4-inch thick plywood panel of the following quality or equal as approved by the Engineer:
 - a. High density overlaid exterior type fir plywood panels, 5 ply, B-B grade or better.
 - b. Each plywood panel shall be resin impregnated on both sides.
4. The content shall be written in the Calibri font or similar Sans Serif font style, with letters a minimum of 1 inch (25 mm) high, as measured by the upper case character. Such letters shall be white, on a blue background, with such blue color of a shade matching Pantone 296, or RGB 15, 43, 84, or CMYK 100, 88, 38, 35.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. Location: The Project information panel shall be located in a prominent position as determined by the Engineer.

B. Panel Supports: Adequate supports for the Project information panel, including the positioning and alignment of the sign, as determined by the Engineer, shall be provided by the Contractor.

C. Maintenance: The Project information panel shall be maintained by the Contractor in good condition at all times for the duration of the Contract.

D. Removal of Project information panel from Project Site: The Contractor shall remove the Project information panel and supports from the Site when ordered by the Engineer.

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

SECTION 01 58 13 – TEMPORARY PROJECT SIGNAGE
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FIGURE 1
PROJECT INFORMATION PANEL LAYOUT

(For Project Sites with Street Frontage of 60 Feet or Greater)



Note: As directed by the Engineer, the wording below the rendering shall be deleted if the project is not funded under the NYS Revolving Loan Fund and the rendering shall be extended to fill in that space.

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FIGURE 2

PROJECT INFORMATION PANEL LAYOUT

(For Project Sites with Street Frontage of Less Than 60 Feet)



Note: As directed by the Engineer, the wording below the rendering shall be deleted if the project is not funded under the NYS Revolving Loan Fund and the rendering shall be extended to fill in that space.

**SECTION 01 61 50 – GENERAL PRODUCT REQUIREMENTS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Equipment and appurtenances
- B. Delayed approvals
- C. Accessories included
- D. Contractor’s working equipment
- E. Excessive loadings
- F. Welding
- G. Sole plates
- H. Grouting
- I. Operating instructions
- J. Damage during tests and instruction periods
- K. Work may be rejected at any time
- L. Requirements for electrical work and electrical equipment
- M. Service of manufacturer’s engineer
- N. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 26 05 91 – Low Voltage Electric Motors
- B. Section 26 05 92 – Medium Voltage Electric Motors

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. Equipment and appurtenances. Equipment and appurtenances shall be designed in conformity with ASME, ASTM, and IEEE standards, as applicable, and shall be of rugged construction and of sufficient strength to withstand all stresses that may occur during fabrication, testing, transportation, installation and all conditions of operation. Adequate stays, braces and anchors shall be provided. All bearings and moving parts shall be adequately protected against wear by bushings or other approved means and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers and the like shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.
 1. Machinery parts shall conform exactly to the dimensions shown on the Shop Drawings. There shall be no more fitting or adjusting in setting up a machine than is necessary in assembling high-grade apparatus of standard design. The equivalent parts of identical machines shall be made interchangeable.
 2. All equipment components shall comply with American standards, except where written permission is granted by the Engineer to deviate from such standards. Such standards shall include in part or in whole, but shall not be limited by, the standards, codes, specifications, or tentative specifications adapted and published by technical societies, organizations and bodies specified in the Contract. Thread components made to metric, Whitworth or other foreign standards are unacceptable.
 3. All grease lubricating fittings on equipment shall be button head type and samples thereof shall be submitted for approval.

SECTION 01 61 50 – GENERAL PRODUCT REQUIREMENTS
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4. All machinery and equipment shall be safeguarded in conformity with the safety codes of the ANSI, OSHA and related New York State Codes.
5. All petroleum bulk storage tank installations shall be installed in accordance with the requirements of the Environmental Protection Agency, New York State Department of Environmental Conservation, and all other Agencies Having Jurisdiction (AHJ). The Contractor, at its own expense, shall obtain a facility registration certificate and all permits required. In addition, the Contractor shall submit a certified statement that the installation is in compliance with all regulations.
6. All electric motors shall be designed to conform to IEEE standards and to Section 26 05 91 – Low Voltage Electric Motors and Section 26 05 92 – Medium Voltage Electric Motors. Characteristics of electrical energy and source of supply are given in these Sections. Electric energy supplies at the site of the work is subject to commercial loads and operating variations. The voltage given in the Contract Documents is subject to correction for facility bus conditions and feeder drop. Adequate and proper provisions must be made so that all apparatus furnished hereunder will operate normally under such conditions.
7. Galvanized cast iron junction boxes or equivalent provisions for threaded conduit connections shall be furnished, unless otherwise specified or approved.
8. Equipment comprising several electrically operated devices shall be furnished completely wired and shall have all electrical appliances, conduit and connections that are integral parts thereof. Such connections shall terminate in a junction box of ample size.
9. Limit switches and other mechanically actuated switches shall be enclosed in cast metal boxes and be installed in the proper locations ready for rigid conduit connections. Switches shall be complete with all supports, stops, cams, arms, tripping and operating members which shall be adjustable where required for proper functioning. A complete statement of the scheme of control sequence and timing of operations required shall be submitted for approval. The electrical parts of mechanically actuated switches shall be encased as specified and be fully protected from shock and strain under all operating conditions. The manufacturer shall guarantee, for the service required, the electrical units and parts used in the assembly.
10. Electrical equipment shall be supplied only by manufacturers who maintain service facilities and spare parts stocks so that service and spare parts are capable of being furnished to a DEP specified location within a maximum time period of 48 hours. Service and stock shall be adequate for the equipment supplied, and evidence of such capability shall be presented when the equipment is submitted for approval.

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11. Equipment manufactured outside continental U.S.A. shall be supplied only by manufacturers who maintain acceptable service facilities and spare parts stocks within the continental U.S.A. Service and stock shall be adequate for the equipment supplied and evidence of such facilities shall be presented when the name of the manufacturer is submitted for approval.
- B. Delayed approvals. The time spent in approving working drawings, samples, equipment or other data which does not conform in every respect with the Contract Documents will not be considered as the basis for a claim for an extension of the Contract time.
- C. Accessories included. The Contractor shall furnish, install and protect all necessary guides, track rails, bearing plates, anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified. Anchor bolts shall be made of ample size and strength for the purpose intended.
1. Suitable templates and working drawings for installation shall be furnished.
 2. The Contractor shall furnish with each piece of equipment one complete set of suitably marked special tools and appliances which may be needed to adjust, operate, maintain or repair the equipment. It shall submit, for approval by the Engineer, a complete list of the special tools and appliances to be furnished. Such tools and appliances shall be furnished in approved painted steel cases properly labeled and equipped with commercial grade cylinder locks and duplicate keys.
 3. All spare parts shall be furnished as specified in the Contract. The Contractor shall furnish and install all specific equipment complete with all appurtenances, enclosures, means for connecting to power supply, and supporting structures necessary for standard operation of the equipment.
- D. Contractor's working equipment. The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character.
- E. Excessive loadings. Floor slabs shall not be subjected to excessive concentrated loads and in no case shall maximum safe loads be exceeded.
- F. Welding. All structural welding and gas cutting shall conform to the requirements of the American Welding Society (AWS), American Society of Mechanical Engineers (ASME), . All welding of pipe, fittings and pipeline equipment shall be performed by qualified welders as specified by the latest requirements of the ASME and AWS codes and their supplements, as applicable.
1. Welders shall be certified in compliance with Section IX Welding Qualifications of the ASME Boiler and Pressure Vessel Code or AWS D1.1 through D1.6, as applicable and as approved by the Engineer, and shall be qualified by an independent testing laboratory approved by the City.

SECTION 01 61 50 – GENERAL PRODUCT REQUIREMENTS
CONTRACT KENS-EAST-2

- G. Sole plates. All equipment mounted to concrete without cast iron or fabricated steel equipment bases shall be provided with a sole plate approved by the Engineer.
- H. Grouting. The Contractor shall, at its own expense, furnish all materials and labor for, and shall properly bed in epoxy grout each piece of equipment or its supporting base resting on masonry foundations.
1. The epoxy grout shall be pre-measured, fast curing, high strength, non-shrink, have good adhesion to concrete and steel, and resist degradation by oil, solvents and acids. All epoxy grouting material and installation procedures shall be approved by the manufacturer of the equipment being grouted and the Engineer.
 2. The storage, surface preparation, forming, mixing, and placing of the grout shall be as recommended by the grout manufacturer.
 3. Flowability of the material shall provide self-leveling for ease of placement.
 4. Epoxy grout shall completely fill the space between the equipment or base and the foundation and it shall generally average one inch in thickness. Leveling wedges shall not be removed and jacking bolts shall not be backed off before final set of grout. Voids left by wedges shall be pointed. Exposed surfaces of epoxy grout shall be finished to the satisfaction of the Engineer. Final alignment of the equipment shall be checked in the presence of the Engineer.
- I. Operating instructions. The Contractor, through qualified individuals, shall adequately instruct designated employees of the City in the operation, maintenance and care of all equipment installed hereunder.
- J. Damage during tests and instruction periods. The Contractor shall be fully responsible for the proper operation of equipment during test and instruction periods and it shall neither have nor make any claim for damage which may occur to equipment prior to the time when the City formally takes over the operation thereof.
- K. Work may be rejected at any time. If at any time an inspection, test or analysis of work reveals faulty design, inferior or defective materials, poor workmanship, improper installation, excessive wear or non-conformity with the requirements of the Contract Documents, such work will be rejected and shall be replaced with satisfactory work at the Contractor's expense.
1. Electrical appliances which have been subjected to damage by water shall be thoroughly dried out and put through a special dielectric test as directed by the Engineer, or shall be replaced by the Contractor, all at its own expense.
- L. Requirements for electrical work and electrical equipment. Electrical work and electrical equipment shall be installed under the supervision of the Engineer and shall be subject to approval, inspection and test by the Engineer and by the local AHJ.

SECTION 01 61 50 – GENERAL PRODUCT REQUIREMENTS
CONTRACT KENS-EAST-2

1. The Contractor shall file with the local AHJ an application for a certificate of electrical inspection and shall pay all filing and inspection fees, as required by the local AHJ.
2. For service equipment rated 1000 KVA and larger, drawings shall be submitted by the Contractor for approval as required by the local AHJ. The Contractor shall pay the filing fees required for each submittal.
3. The Contractor shall submit for the approval of the Engineer and as required by the AHJ, complete Shop Drawings covering electrical equipment furnished under this Contract.
 - a. Where submissions are required to be made by a Professional Engineer the Contractor shall secure these services at no additional cost to the City.
 - b. Drawings shall include dimensioned outlines showing provision for and locations of conduit connections, detailed wiring diagrams, schematic wiring diagrams, installation layouts, material schedules, test data and supplementary descriptive data.
 - c. Drawings shall be submitted to the Engineer for review before they are submitted to the AHJ.
 - d. Upon receipt of approval or comments from the AHJ, the Contractor will return drawings to the Engineer with the disposition noted.
4. After full completion of its Work, the Contractor shall notify the local AHJ, requesting a final inspection to be made.

M. Service of manufacturer's engineer. The prices bid for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent, from the company manufacturing the equipment, who shall assist the Contractor, when required, to install, adjust and test the equipment in conformity with the Contract Documents. After the equipment is placed in permanent operation by the City, such engineer or superintendent shall make all adjustments and tests required by the Engineer to prove that such equipment is in proper and satisfactory operating condition.

1.06 QUALITY ASSURANCE

A. Not Used

1.07 SUBMITTALS

A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

SECTION 01 61 50 – GENERAL PRODUCT REQUIREMENTS
CONTRACT KENS-EAST-2

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 IMPLEMENTATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

SECTION 01 61 50 – GENERAL PRODUCT REQUIREMENTS
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

**SECTION 01 65 00 – PRODUCT DELIVERY REQUIREMENTS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Delivery of products
2. Handling of products
3. Inspection of items
4. Supporting heavy loads

B. The following index of this Section is presented for convenience:

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3.05	Adjusting / Protection / Cleanup.....	5

1.02 PAYMENT

- A.** No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A.** Section 01 66 00 – Protection of Materials & Equipment

SECTION 01 65 00 – PRODUCT DELIVERY REQUIREMENTS
CONTRACT KENS-EAST-2

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

A. General Requirements

1. The Contractor shall make all arrangements for transportation, delivery and handling of materials and equipment required for installation and completion of the Work.
2. Storage space at the Site is limited; the Contract Documents indicate the staging and available storage areas. Coordinate with the Engineer as to whether on-site storage will be permitted. Any off-site storage locations or facilities are to be inspected and approved by the Engineer prior to storing items.
 - a. When storage of materials and equipment is off-site, deliveries to the Site shall be scheduled to coincide with installation of the items. Protection, handling, and storage of materials shall be performed as per Section 01 66 00 – Protection of Materials & Equipment.
 - b. If necessary to move stored materials and equipment during construction, the Contractor shall move materials and equipment at no additional cost to the City.
3. Unless otherwise specified, the City’s docking facilities or hoisting equipment at or near the Project Site will not be available for the Contractor's use.
4. Transport and handle products in accordance with manufacturers’ instructions and in compliance with all federal, State, and local laws.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Products

1. The Contractor shall arrange deliveries of products in accordance with construction schedules and with ample time to facilitate inspection prior to installation.
2. The Contractor shall coordinate deliveries to avoid conflict with the Work and conditions at the Site and to accommodate the following:
 - a. Limitations of storage space
 - b. Availability of equipment and personnel for handling products

SECTION 01 65 00 – PRODUCT DELIVERY REQUIREMENTS
CONTRACT KENS-EAST-2

3. Materials and equipment shall not be delivered to the Site until related Shop Drawings, including the manufacturer's recommended storage instructions, have been approved by the Engineer.
 4. Materials and equipment shall not be delivered to the Site until required storage facilities have been provided. Storage facilities and protection for products shall be as specified in Section 01 66 00 – Protection of Materials & Equipment.
 5. Products shall be delivered to the Site in the manufacturer's original, unopened, labeled containers. The Engineer shall be informed of all deliveries of all materials and equipment.
 6. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.
 7. Immediately on delivery, the Contractor shall inspect shipments to ensure:
 - a. Product complies with requirements of Contract Documents and approved Submittals.
 - b. Quantities are correct.
 - c. Containers and packages are intact, and labels are legible.
 - d. Products are properly protected and undamaged.
- B. Handling of Products
1. The Contractor shall provide equipment and personnel necessary to handle products in a manner that prevents soiling or damage to products or packaging.
 2. The Contractor shall provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.
 3. The Contractor shall handle products in a manner that prevents bending or overstressing.
 4. Heavy components shall be lifted only at designated lifting points.
 5. Materials and equipment shall be handled in a safe manner at all times and as recommended by manufacturer or supplier so that no damage will occur to them. Do not drop, roll or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.
- C. Inspection of Items
1. The Contractor shall inspect all items including all boxes, crates and packages containing materials and equipment for damage that may have occurred during shipment prior to their removal from the truck or other manner of conveyance. Any damage shall be reported immediately to the Engineer.

SECTION 01 65 00 – PRODUCT DELIVERY REQUIREMENTS
CONTRACT KENS-EAST-2

2. The Contractor shall then carefully remove the materials and equipment from the truck or trucks on which they were shipped. The materials and equipment shall then be transported to the place of installation at the Site. The Contractor shall be liable for loss or damage to the materials and equipment that may occur while being unloaded, transported, stored or installed.
3. All materials and equipment that arrives at the Site during Normal Project Working Hours shall be unloaded as soon as practicable.

D. Supporting Heavy Loads

1. In all cases where heavy loads or demolition may temporarily affect existing slabs, the Contractor shall confirm the slab's load sustaining ability. Whenever heavy loads are to be stored or temporarily imposed on slabs, or whenever the structures may be impacted by demolition, the Contractor shall submit for approval by the Engineer a plan of procedure prepared by a licensed professional engineer, indicating a structural analysis of the slabs and methods of distributing loads, and providing auxiliary support so that slabs and beams are not loaded in excess of their design loadings.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

SECTION 01 65 00 – PRODUCT DELIVERY REQUIREMENTS
CONTRACT KENS-EAST-2

- 3.02 IMPLEMENTATION
 - A. Not Used
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

SECTION 01 65 00 – PRODUCT DELIVERY REQUIREMENTS
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

**SECTION 01 66 00 – PROTECTION OF MATERIALS & EQUIPMENT
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Handling and storage of products
2. Protection of materials and equipment

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A.** No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A.** Section 01 65 00 – Product Delivery Requirements

1.04 REFERENCES

- A.** Not Used

SECTION 01 66 00 – PROTECTION OF MATERIALS & EQUIPMENT
CONTRACT KENS-EAST-2

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

A. Storage of Products

1. Transport, store and handle products in accordance with manufacturer's methods and instructions and as required in Section 01 65 00 – Product Delivery Requirements.
2. Handle and lift products only at designated lift points and by methods to avoid soiling, disfigurement, bending, overstressing and damage.
3. Store products on shelves, in bins, or in neat groups of like items, with seals and labels intact and legible, and in a manner to provide access for maintenance and inspection.
4. Store loose granular materials on clean, solid, flat surfaces and prevent mixing with foreign matter. Store fabricated products supported above the ground on skids or blocking. Provide erosion control and surface drainage to prevent erosion and ponding of water as per the contract documents or directed by the Engineer.
5. Cover products subject to discoloration or deterioration with impervious sheet covering and protect products from soiling and staining.
6. Store and protect products that are subject to damage by the elements in weather-tight or climate-controlled enclosures, and according to manufacturer's instructions. Maintain temperature, ventilation, and humidity within ranges stated in manufacturer's instructions.
7. Attach applicable manufacturer's storage service instructions labeled "STORAGE SERVICE INSTRUCTIONS ENCLOSED" to exterior of each stored product.
8. Inspect, maintain and service stored products on a regularly scheduled basis, consistent with manufacturer's instructions.
9. Record inspection, maintenance and services performed and keep log available for review by the City and Engineer.

B. Protection of Materials and Equipment

SECTION 01 66 00 – PROTECTION OF MATERIALS & EQUIPMENT
CONTRACT KENS-EAST-2

1. The Contractor shall make every effort to minimize extended storage periods of materials and equipment at the Site by judiciously scheduling deliveries to coincide with construction needs.
2. Unless otherwise specified, storage of any mechanical or electrical equipment or other ultraviolet or weather sensitive items out of doors at any time is prohibited regardless of the protection furnished. Storage of mechanical and electrical equipment within structures at the Site will not be permitted unless the structures are enclosed. A structure shall be considered to be enclosed when it is roofed and has protection of doorways, windows and other opening closures.
3. All mechanical and electrical equipment shall be coated, wrapped and otherwise protected from snow, rain, drippings of any sort, dust, mud, condensed water vapor, etc., during shipment, storage, and installation and until placed in service.
4. All storage areas for motors shall be heated. Space heaters shall be supplied, as required, in all enclosures being utilized for storage of motors. Motors equipped with space heaters shall be properly wired and the heaters activated while the motors are in storage.
5. Should storage of mechanical and electrical equipment become necessary before it can be stored at the Site, the Contractor shall provide storage in a weatherproof warehouse.
6. Materials may be stored out of doors if supported above ground surface on wood runners and protected with approved, effective and durable covers.
7. All storage and protection of materials and equipment at the Site shall be subject to the approval of the Engineer.
8. Prior to installation of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by a long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective, and shall be removed and replaced at the Contractor's expense.
9. When stored materials and equipment are moved from the storage location to the Site, the Contractor shall move or cause to be moved the items without additional compensation.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

SECTION 01 66 00 – PROTECTION OF MATERIALS & EQUIPMENT
CONTRACT KENS-EAST-2

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION/IMPLEMENTATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 01 71 30 – PROTECTION AND RESTORATION OF STRUCTURES
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified or otherwise required to complete the protection and restoration of all structures installed at or near the site of construction.
- B. The following index of this Section is presented for convenience:

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3.04	Startup / Demonstration	7
3.05	Adjusting / Protection / Cleanup.....	7

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 56 00 – Temporary Barriers and Enclosures

1.04 REFERENCES

- A. Not Used

SECTION 01 71 30 – PROTECTION AND RESTORATION OF STRUCTURES
CONTRACT KENS-EAST-2

1.05 DESCRIPTION

A. General Contractor Responsibilities

1. The Contractor shall execute the Work to prevent damage or injury to the existing DEP structures and occupants thereof, which might result from Work or other causes, and so as not to interfere with the use, and free and safe passage to and from DEP structures and site Work.
2. The Contractor shall erect and maintain barriers, lights, fences, and other required protective devices in accordance with Section 01 56 00 – Temporary Barriers and Enclosures, OSHA, Town of Mount Pleasant Building Code and NYSDOT.
3. The Contractor shall be responsible for taking all precautions, providing all programs, and taking all actions necessary to protect the Work and all public and private property and facilities from damage, injury, loss or vandalism.
4. In order to prevent damage, injury or loss, the Contractor's actions shall include, but not be limited to, the following:
 - a. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not interfere with the progress of the Work or the plant operations, utility services, or the work of any Other Contractor.
 - b. Provide suitable storage facilities for all materials which are subject to injury by exposure to weather, theft, breakage, or otherwise.
 - c. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the work.
 - d. Clean up frequently all refuse, rubbish, scrap materials, and debris caused by its operations, to the end that at all times the Site of the Work shall present a safe, orderly and workmanlike appearance.
 - e. Provide barricades and guard rails around openings, for scaffolding, for temporary stairs and ramps, around excavations, elevated walkways and other hazardous areas.
5. The Contractor shall assume full responsibility for the preservation of all public and private property or facility on or adjacent to the site. If any direct or indirect damage is done by, or on account of, any act, omission, neglect or misconduct in the execution of the Work by the Contractor, it shall be restored by the Contractor, at his or her expense, to a condition equal to that existing before the damage was done. The Contractor shall, at its expense, provide suitable drainage and erect such temporary structures as are necessary to protect the Work or materials from damage. The suspension of the Work or the granting of an extension of time from any cause whatever, shall not relieve the Contractor of the responsibility for the Work and materials.

SECTION 01 71 30 – PROTECTION AND RESTORATION OF STRUCTURES
CONTRACT KENS-EAST-2

6. Whenever any notice is required to be given by the City or the Contractor to any adjacent or adjoining landowner or other party before commencement of any Work, such notice shall be given by the Contractor within the time limitations required for such notices.
 7. All structures and appurtenances shall be adequately supported and safeguarded against all damage or injury in performance of Work under this Contract. The Contractor will be held responsible for any such damage or injury resulting from his operations and shall repair such damage immediately and to the satisfaction of the Engineer.
 8. The Contractor shall ascertain the location of underground pipe lines, conduits and other subsurface structures in those locations where the operation of his heavy construction equipment might damage such structures. The Contractor shall either avoid such locations or provide the necessary safeguards and repair any damage quickly at his own expense.
 9. The Contractor shall comply promptly with such safety regulations as may be prescribed by the Engineer or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by, or unsafe practices on the part of his employees. In the event of the Contractor's failure to comply, the Engineer may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the Engineer to direct the correction of unsafe conditions or practices shall not relieve the Contractor of his responsibility hereunder.
 10. Prior to commencement of Work in the vicinity of property adjacent to the work site, the Contractor, at his own expense, shall take such surveys as may be necessary to establish the existing condition of the property.
- B. Protection of Existing Structures and Utilities
1. The term existing utilities shall be deemed to refer to both publicly-owned and privately-owned utilities such as, but not limited to electric power and lighting, telephone, water, gas, storm drains, process lines, sewers and all appurtenant structures.
 2. Where existing utilities and structures are indicated on the Contract Drawings, it shall be understood that all of the existing utilities and structures affecting the Work may not be shown and that the locations of those shown are approximate only. It shall be the responsibility of the Contractor to ascertain the actual extent and exact location of existing utilities and structures. In every instance, the Contractor shall notify the proper authority having jurisdiction and obtain all necessary directions and approvals before performing any work in the vicinity of existing utilities.
 3. The Work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Temporary connections shall be provided, as required, to ensure no interruption of

SECTION 01 71 30 – PROTECTION AND RESTORATION OF STRUCTURES
CONTRACT KENS-EAST-2

existing services. Any damage resulting from the Work of this Contract shall be promptly repaired by the Contractor at his own expense in a manner approved by the Engineer and further subject to the requirements of any authority having jurisdiction. Where it is required by the authority having jurisdiction that they perform their own repairs or have them done by others, the Contractor shall be responsible for all costs thereof.

4. Where excavations by the Contractor require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction Work, such support and protection shall be provided by the Contractor. All such Work shall be performed in a manner satisfactory to the Engineer and the respective authority having jurisdiction over such Work. In the event the Contractor fails to provide proper support or protection to any existing utility, the Engineer may, at his discretion, have the respective authority to provide such support or protection as may be necessary to ensure the safety of such utility, and the costs of such measures shall be paid by the Contractor.
5. During the progress of the Work, the Contractor shall protect from injury any existing utilities or services within the Work area until, if required, they have been re-routed, disconnected or capped off. Protection and re-routing shall conform to standards established by the utilities, agencies and governing codes.

C. Underground Structures

1. Underground structures are defined to include, but not be limited to, all sewer, water, gas, and other piping, and manholes, chambers, electrical and signal conduits, tunnels and other existing subsurface infrastructure located within or adjacent to the Work area.
2. Underground structures known to the Engineer are shown for the assistance of the Contractor in accordance with the best information available, but is not guaranteed to be correct or complete.
3. The Contractor shall explore ahead of the trenching and excavation Work and shall uncover all obstructing underground structures sufficiently to determine their location, to prevent damage to them and to prevent interruption to the services which such structures provide. If the Contractor damages an underground structure, s/he shall quickly restore it to original condition at his or her own expense.
4. Necessary changes in the location of the Work may be made by the Engineer, to avoid unanticipated underground structures.
5. If the Contractor discovers utility facilities not identified in the Contract Documents or in a position different from that shown in the Contract Documents, s/he shall immediately notify the Engineer and the owner of the utility facility, in writing.

SECTION 01 71 30 – PROTECTION AND RESTORATION OF STRUCTURES
CONTRACT KENS-EAST-2

- D. Surface Structures:
1. Surface structures are defined as all existing buildings, structures and other facilities above the ground surface. Included with such structures are their foundations or any extension below the surface.
 2. Surface structures include, but are not limited to, buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks and all other facilities that are visible above the ground surface.
- E. Protection of Underground and Surface Structures
1. The Contractor shall sustain in their places and protect from direct or indirect injury all underground and surface structures located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure. Before proceeding with the Work of sustaining and supporting such structure, the Contractor shall satisfy the Engineer that the methods and procedures to be used have been approved by the owner of the structure.
 2. The Contractor shall be responsible for all damage and expense for direct or indirect injury caused to any structure by the Work. The Contractor shall repair immediately all damage caused by the Work, to the satisfaction of the owner of the damaged structure.
 3. The fact that any structure or facility is not shown on the Contract Drawings shall not relieve the Contractor of the responsibility of protecting and preserving the structure or facility.
 4. All other existing surface facilities, including but not limited to, guard rails, posts, guard cables signs, poles, markers, and curbs which are temporarily removed to facilitate installation of the Work shall be replaced and restored to their original condition at the Contractor's expense once the protective and relocation work is no longer needed.
- F. Restoration of Pavements
1. Restoration of pavements, sidewalks, and curbs shall be made in conformity with the requirements of the NYS Department of Transportation Standard Specifications, latest edition and the Contract Documents.
- G. Coordination and Relocation of Street Utilities
1. Coordination and relocation of street utilities with utility companies shall be done in conformance with the Contract Documents and all applicable laws and regulations.
- 1.06 QUALITY ASSURANCE
- A. Requirements of Regulatory Agencies
1. The Contractor shall comply with NYS Industrial Code Rule 753

SECTION 01 71 30 – PROTECTION AND RESTORATION OF STRUCTURES
CONTRACT KENS-EAST-2

2. The City shall not be liable for any costs incurred by the Contractors as a result of the compliance, non-compliance, or improper compliance of any regulations.
3. The City shall not be liable for any costs incurred by the Contractors for the support, protection and maintenance of underground facilities owned by franchised operators of such facilities.

1.07 SUBMITTALS

- A. For any existing structure that is to be relocated or restored, the Contractor shall submit for approval a relocation plan including plan and profile with information related to the existing and final condition of the structure with fittings, appurtenances, thrust blocks, restraints and any applicable supports, signed and sealed by a Professional Engineer licensed and registered in the State of New York.
- B. During the progress of Work, the Contractor shall keep an up-to-date set of the Protection and Restoration Drawings showing field and working drawings modifications. Immediately upon completion of Work, the Contractor shall provide As-built Drawings showing the actual Work performed under this Section as specified in the Contract Documents. Restoration Drawings shall include all necessary plans, sections and details, with all reference dimensions and elevations required for complete As-built Drawings of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

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- PART 3 EXECUTION
 - 3.01 EXAMINATION / PREPARATION
 - A. Not Used
 - 3.02 INSTALLATION
 - A. Not Used
 - 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
 - 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
 - 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

SECTION 01 71 30 – PROTECTION AND RESTORATION OF STRUCTURES
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NO TEXT ON THIS PAGE

**SECTION 01 71 50 – GENERAL CONSTRUCTION REQUIREMENTS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Seismic requirements
2. General mechanical requirements
3. Diagrammatic drawings
4. Ratings approximate
5. Schematic wiring diagrams
6. Electrical supply characteristics
7. Special electrical equipment requirements
8. Uniform finishes
9. Temporary support structures

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. Seismic Requirements

1. The Contractor is advised that all proposed structures, non-building structures, and architectural, mechanical and non-structural electrical components and systems, including associated equipment and appurtenances furnished and installed on this project shall be subject to the requirements of the most current New York State Code in conjunction with the most current seismic provisions of the International Building Code (IBC) and referenced ASCE /SEI 7-10 for earthquake loadings. In designing and detailing non-building, architectural, mechanical and electrical non-structural components and systems required to be furnished as performance type submissions, seismic forces and subsequent details shall be developed in accordance with the New York State Code and the applicable chapters in ASCE 7-10 to the extent that the most stringent provisions are utilized in developing the design earthquake forces. The Contractor shall refer to the structural notes on the Structural Drawings for site, structure and non-building systems specific seismic design criteria. All calculations, seismic certifications and construction details performed and developed as part of the requirements of performance type submissions shall be prepared and sealed by a Professional Engineer (PE) licensed to practice in the State of New York.
2. Shop drawings shall indicate that the equipment, equipment pads, piping, piping hangers and supports and all anchors required for a complete installation are capable of withstanding the seismic loadings.

- B. General Mechanical Requirements

1. Where piping and ducts run in areas which have hung ceilings, such piping and ducts shall be installed in the hung ceilings.
2. The Contract Drawings are in part diagrammatic and show the general arrangement of the equipment, ducts and piping included in the Contract and the approximate size and locations of the equipment. The Contractor shall follow these Drawings in laying out the Work and shall familiarize

SECTION 01 71 50 – GENERAL CONSTRUCTION REQUIREMENTS
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itself with all conditions affecting the Work and the spaces in which it will be installed.

3. Connections to existing piping shall be made to permit ready disconnection of equipment with minimum disturbance of adjoining piping and equipment. The Contractor shall be responsible for the exact alignment of all piping with the associated equipment and under no circumstances will pipe springing be allowed.
4. The locations of utilities, equipment, piping, gates, outlets and similar underground systems as shown on the Contract Drawings are approximate only, and the exact locations shall be approved by the Engineer during construction. The Contractor shall obtain in the field all information of the actual Work and final locations required for the placing of this Work. In case of interferences with other work or erroneous location with respect to utilities, equipment or structures, the Contractor shall furnish all labor, materials and equipment, at no additional costs to the City, to complete the Work in an approved and acceptable manner.
5. The Contractor shall take necessary field measurements to determine clearances and required sizes of equipment. The Contractor shall verify all pertinent data and dimensions. Dimensions and elevations of existing structures, equipment and piping shown on the Contract Drawings are not necessarily correct and should be considered approximate only as they are based on as-built information from past contracts. Field checking of such dimensions and elevations is necessary before submitting shop drawings for approval.
6. Until the date of Substantial Completion (or use and occupancy in accordance with Article 16 of the Standard Construction Contract), equipment shall be protected from water drippings or splashings at all times during shipment, storage and construction, by covering with waterproof material, effectively arranged. The Engineer will be the sole judge of whether equipment which has been subjected to damage by water shall be replaced or dried out. Equipment that is to be dried out shall be subject to confirmation of insulation integrity by dielectric testing. Equipment replacement or drying-out shall be at the Contractor's expense.

C. Diagrammatic Drawings

1. Various pipelines are shown on the Contract Drawings in diagram form. Where such pipelines are shown in diagram form, they shall be arranged clear of other pipelines, equipment and walking areas, and shall be accessible for maintenance. Such pipelines shall be fitted and installed in a neat and workmanlike manner in accordance with approved shop drawings. An adequate number of unions shall be provided in main pipe and branch pipe runs to facilitate dismantling or removal of pipeline sections without disturbing adjacent branch or connecting lines.

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2. The final locations of valves, fittings and other such appurtenances included as a part of diagramed pipelines shall be as shown on approved shop drawings or as determined in the field by the Engineer.
3. Diagramed pipelines shall be furnished, fabricated, erected and otherwise installed to lines, elevations, locations and dimensions as shown, specified or required for a complete installation. The Contractor shall verify all dimensions shown on the Contract Drawings and shall take such field dimensions as may be necessary to properly show on shop drawings and install all diagramed pipelines.
4. In the vicinity of overhead roll-up doors and truck ways all pipe, conduit and appurtenances shall be installed a minimum of 14'-0" above the finished grade or floor elevation, and a minimum of 8'-0" above the finished grade or floor elevation in all walking areas.
5. Electrical conduits and wiring shown on the Contract Drawings are in part diagrammatic to show the general arrangement and routing of conduits and wiring and the approximate size and location of devices included in the Contract. The Contractor shall follow the intent of these drawings in laying out the Work and shall verify the spaces allocated in which the Work will be installed.

D. Ratings Approximate

1. The ratings of the motors and devices shown on the Contract Drawings and Specifications are approximate only and indicate the probable power requirements to the extent they can be determined in advance of the purchase of devices. The ratings of the devices furnished may be either increased or decreased accordingly.
2. The Contractor shall verify the exact rating of each device before performing the Work required under his Contract and modify the size of conduit, wiring and control equipment accordingly.

E. Schematic Wiring Diagrams

1. Equipment furnished under the various Specifications will require interconnecting wiring. The Contractor's shop drawings, furnished in accordance with the Specifications, shall include comprehensive schematic diagrams showing wiring of each individual piece of equipment and all interconnecting wiring. Shop drawings shall be submitted for approval of the Engineer prior to commencement of Work.

F. Electrical Supply Characteristics

1. The characteristics of the Electrical Systems available or to be provided for the operation of all electrical equipment are shown in the Contract Documents.

G. Special Electrical Equipment Requirements

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1. All electrical equipment and devices manufactured and furnished under this Contract shall be of type that have been in satisfactory operation for not less than three years. Whenever similar devices or appliances are furnished, they shall be of one manufacturer and interchangeable within their ratings. If this is not feasible, the Contractor shall submit a statement for each manufacturer supplying devices, certifying that it:
 - a. recommends the use of the device or devices for the specific function to be performed; and
 - b. fully guarantees the satisfactory operation of the device or devices in conjunction with the other elements of the equipment.
2. Whenever standard devices or devices of a named manufacturer do not exactly fulfill the specified conditions, they shall be modified or special devices shall be furnished. All electrical devices furnished under the Contract shall be housed in metal enclosures with provisions for threaded conduit connections. The enclosures shall be designed to protect all electrical parts from local conditions.
3. Float switches, limit switches and other mechanically actuated electrical devices shall consist of an approved electrical system housed in rugged metal enclosures. They shall be adjustable without disturbing conduit connections. The switch actuating mechanism shall be mechanically and structurally correct for the required service and shall not subject the electrical parts to unnecessary stress or mechanical shock. Operating shafts shall be bushed and stuffed in dust tight cases.
4. The Contractor shall, unless otherwise directed, furnish and assemble all special lamps, indicating lamps, annunciator lamps and pilot lamps with all accessories.
5. Electrical equipment shall have a power factor of not less than 85% under rated load conditions. Electrical equipment with a power factor less than 85% shall be corrected to at least 85% under rated load conditions. Installed power factor corrective devices shall be switched with utilization equipment.
6. Wire terminals on manufactured assemblies such as switchboards, bench boards, control panels, alarm boards, and motor control equipment shall consist of cup terminals, pronged washers, compression type solderless connectors or pressure type terminals furnished on devices.
7. All control and indication wires within motor control centers and other panels and cabinets shall be terminated on terminal blocks provided with marking strips for wire designation. The manufacturer shall identify all wires on the marking strips. All field wires will be terminated and identified by the Contractor.

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8. Provision shall be made for wire and cables installed at the plant site to be terminated by the Contractor with approved solderless copper alloy lugs. Lugs may be of the compression type, clamp type or screw type with internal pressure bar, or may be pressure tool applied solderless connectors. Pressure tool applied solderless connectors for wires 250 MCM or larger shall have long barrels to allow double indentation.
9. The Contractor shall consult with the manufacturer or its representative to ensure that the electrical items will have a shelf life of at least ten (10) years. Polychlorinated biphenyls (PCBs) shall not be used in any equipment on this project. Manufacturers shall have maintenance facilities in the New York City metropolitan area.
 - a. Nameplates and warning signs shall be provided. Nameplates shall be 1/16 inch thick laminated plastic, white with a black core for black engraved lettering, and shall have beveled edges. They shall be provided for all controls on all power control panels and cabinets, lighting cabinets and operating devices, marked and positioned on the front panel as approved by the Engineer. Mounting shall be by stainless steel screws through predrilled nameplate holes, one at each end of the plate. The Contractor shall provide, as required or as directed, all warning signs required for the safe operation of the equipment. Such warning signs shall be of substantial material, porcelain enameled, of suitable thickness and as approved by the Engineer. All components within electrical control panels, switchgear and assemblies shall be identified with engraved stainless steel tags rigidly mounted at or near the respective device.

H. Uniform Finishes

1. A uniform finish shall be used for all hardware, metallic nameplates and similar exposed metal parts used on any equipment or group of equipment and, as far as possible, the same finish shall be used for all such equipment items.

I. Temporary Support Structures

1. The Contract Documents include suggested design and construction requirements for the temporary support structures. The Contractor may submit an alternate design of any temporary support structure for approval by the Engineer. The Engineer may accept or reject the alternate design if the structure is not considered temporary or if it may impose instability to the adjacent existing structure due to lateral and vertical movements. The alternate design of the temporary support shall be performed, signed and sealed by a Professional Engineer registered in the State of New York who is qualified to determine the extent of work necessary to satisfy the temporary support requirements.

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- 1.06 QUALITY ASSURANCE
 - A. Not Used
- 1.07 SUBMITTALS
 - A. Not Used
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Not Used
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
 - A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
 - A. Not Used

- PART 2 PRODUCTS
 - 2.01 MANUFACTURERS
 - A. Not Used
 - 2.02 MATERIALS / EQUIPMENT
 - A. Not Used
 - 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used
 - 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

- PART 3 EXECUTION
 - 3.01 EXAMINATION / PREPARATION
 - A. Not Used
 - 3.02 CHOOSE AN ITEM.
 - A. Not Used
 - 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
 - 3.04 STARTUP / DEMONSTRATION
 - A. Not Used

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3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 01 73 12 – MAINTENANCE OF OPERATIONS AND CONSTRUCTION
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PART 1 GENERAL

1.01 SUMMARY

- A. Maintenance of Site operations
- B. General criteria and restrictions
- C. Construction staging
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Section 01 11 00 – Summary of Work
- B. Section 01 14 00 – Work Restrictions
- C. Section 01 32 10 – Progress Scheduling
- D. Section 01 35 27 – Environmental Health and Safety Requirements
- E. Section 01 35 55 – Site Security Procedures
- F. Section 01 56 00 – Temporary Barriers and Enclosures
- G. Section 01 57 00 – Temporary Controls

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

A. Maintenance of Site Operations

- 1. The Contractor shall perform its work in a manner such that the DEP can keep the existing Site/facility in continuous dependable operation. Any temporary work that may be required to maintain the site/facility in operation shall be furnished by the Contractor at the direction of the Engineer at no additional cost to the City.
- 2. The Contractor shall keep the Engineer and designated representative of the facility/Site informed of any Work that may interfere with normal operations. The Engineer and the facility/site representative must receive a written request at least 15 days in advance of proposed work.
 - a. The CPM schedule maintained by the Contractor under Section 01 32 10 – Progress Scheduling shall not serve as prior notice. No work shall proceed prior to the written approval of DEP.
- 3. Unless otherwise permitted by the facility/Site representative, no existing valves or equipment shall be operated by the Contractor.
- 4. The employees of the Contractor or its Subcontractors may be prohibited from entering or using some areas of the Site/facility.

B. General Criteria and Restrictions

- 1. The following general criteria and restrictions shall apply to the Work except where otherwise noted in the Contract:

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- a. When the connection of a new pipeline to an existing structure or pipeline requires a shutdown of the existing structure or pipeline, the new pipeline except for the final connection shall be tested prior to proceeding with the shutdown. When the final connection is completed, the new pipeline shall be tested again in its entirety.
- b. The Contractor shall provide all pumps, piping, valves, etc., as necessary to dewater all conduits, channels, and pipes directly to a location approved by the Engineer.
- c. The Contractor shall provide all pumps, piping, valves, etc., as necessary, to remove unused chemicals from all pipes as described herein.
- d. The Contractor shall flush and clean all process channels, conduits, manholes, and tanks after they have been removed from service.
- e. Any modification to, relocation of, connection to or shutdown of an existing conduit, channel, pipe, etc. shall not be scheduled or occur prior to the Engineer's written approval. The Contractor is advised that the conduits and channels may contain accumulations of putrescible materials which will remain on the walls and inverts. These materials emit noxious, odorous and hazardous gases such as hydrogen sulfide and methane. The Contractor is advised to ventilate and test the air of all confined spaces prior to entry and comply with the requirements in accordance with Section 01 35 27.
- f. The Contractor is advised that existing valves, gates and other devices shall be considered as inoperable and subject to leaking. The Contractor shall be responsible for designing, furnishing, installing and removing all temporary devices, stop logs, plugs or bulkheads necessary to isolate or dewater pipes, channels or conduits to perform the Work.
- g. The Contractor shall install and maintain temporary drainage and containment, to the satisfaction of the Engineer, where the existing drainage and containment has been removed due to construction progress until the permanent replacement drainage and containment system has been installed.
- h. The Contractor shall coordinate its activities with the other contractors on the site so as to comply with the provisions of these specifications and their intent.

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2. The following general restrictions shall be applied to all equipment and appurtenant utility systems:
 - a. The restrictions provided herein serve to maintain the existing Site facilities in continuous operation and to coordinate with other construction activities at the Site in accordance with the requirements of the authorities having jurisdiction.
 - b. Work under this Contract shall be scheduled and conducted by the Contractor to adhere to the requirements specified herein. The Contractor shall execute work in coordination with other contracts as necessary. The Contractor shall not commence Work until criteria or restrictions are satisfied or removed as deemed by the Engineer.
 - c. Access shall be maintained to all equipment and appurtenant utility systems' work areas. Temporary access shall be provided as required by the Contractor and as approved by the Engineer. Site Operations personnel must have access to all areas which remain in operation. Existing fire suppression piping at / near Work Sites shall be operational at all times until replaced.
 - d. Storm Drainage: Storm drainage on the site shall be operational at all times. If necessary, the Contractor shall pump between manholes during the installation of new piping or underground utilities. Roof drainage shall be maintained at all times and no roof shall be permitted to accumulate standing water.
 - e. All site drainage flows shall not be interrupted.
 - f. Power, Light and Communication Systems: Electric power, lighting service, security camera systems and communications systems shall be maintained in uninterrupted operation in all areas that remain in operation. Individual units may be disconnected as required for replacement or relocation, as approved by the Engineer.
 - g. Sump Pumps and Sumps: All existing sumps shall be maintained in an operable condition with either existing pumps or temporary pumps. Interim piping, power and controls shall be provided as required.
 - h. Drainage Pipes and Conduits:
 - 1) Unless otherwise specified, the contents of all pipes, conduits, pits or other liquid containing structures shall be

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- transferred to a location approved by the Engineer using hoses, piping or pumps if hydraulic conditions so require them. The Contractor shall provide all pumps, piping and hoses required to complete the Work.
- 2) If a drain is not available on the pipe to be drained, then a wet tap shall be made using a tapping saddle and valve. No uncontrolled spillage of a pipe's contents shall be allowed, nor shall a pipe's contents be discharged to a sump.
 - 3) Any spillage shall be immediately washed down and the floor drains, sumps and sump pump discharge piping flushed out to prevent clogging and odors.
- i. Temporary Partitions and Enclosures: The Contractor shall provide temporary partitions and enclosures as required by the Contract Documents where necessary to maintain dust-free, heated and ventilated spaces in areas which are adjacent to his work and which must be kept operational by Site operations personnel.
3. The following requirements shall be adhered to in development of the circulation plan to be submitted in accordance with the provisions of this Section.
 - a. Construction-related vehicles and activities shall not impede or otherwise adversely affect the flow of regular traffic traveling on the roads leading to and adjacent to the Work location.
 - 1) Construction-related vehicles and activities shall be understood as including vehicles operated and activities undertaken by the Contractor (including the Contractor's employees, Subcontractors, and visitors). Regular traffic shall be understood as referring to all vehicles other than construction-related vehicles.
 - 2) Personal vehicles are prohibited on site.
 - b. Perform the Work required in this Contract in accordance with applicable traffic and safety rules, regulations, ordinances, and permit conditions.
 - c. The Contractor is responsible for safety in sections of roadway closed for roadwork. For temporary fall protection requirements, refer to Section 01 56 00 – Temporary Barriers and Enclosures.

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- d. Stockpiling of materials shall be in accordance with Section 01 57 00 – Temporary Controls.
 - e. Protect all open excavations per Section 01 56 00 – Temporary Barriers and Enclosures and, if required, cover open excavations with steel plates after working hours.
- 4. Any temporary work that may be needed to maintain the Site facilities in operation, and that is made necessary by the requirements of the Contract or by the Contractor’s activities, shall be provided by the Contractor as specified under the Contract Documents or at the direction of the Engineer at no additional cost to the City.
 - 5. The Contractor shall not remove any items from service without written permission from DEP. Upon receiving written approval from the City, the Contractor shall proceed with the Work and shall proceed continuously until the Work is completed, tested, and made ready for operation.
- C. Construction Staging
- 1. The Work included under this Contract, shall be performed in accordance with the Contract Documents and Section 01 14 00 – Work Restrictions. Further, the Contractor shall submit a comprehensive work schedule to the Engineer to demonstrate that it shall rigidly adhere to these requirements.
 - 2. Construction Access
 - a. The Contractor shall adhere to the general construction sequence as shown on the Contract Drawings and in accordance with Section 01 14 00 – Work Restrictions.
 - b. Upon start of Work, the construction entrance shall be located near the intersection of Aerator Road and Columbus Avenue, and which shall serve as the primary construction entrance to construct all staging areas and relocated Westlake Drive.
 - c. As relocation of Westlake Drive nears completion, the Contractor may transition to the existing Westlake Drive for all access to the site. Transition to construction access use of existing Westlake Drive must be approved by the Engineer.
 - d. Prior to complete transition to existing Westlake Drive for construction access, the Contractor shall have completed installation of the Temporary Operations Entrance adjacent to Shaft 18, including all roadwork, utilities, and security measures. The Temporary Operations Entrance shall be fully tested and functional,

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and approved by DEP prior to full-time use of existing Westlake Drive as the primary construction entrance by the Contractor.

3. Construction Staging and Coordination
 - a. The Contractor shall adhere to the available site locations shown on the Contract Drawings for staging and access. All areas intended to be used by the Contractor shall be approved in advance by the Engineer.
 - b. It is anticipated that the CRO-624 and the CRO-557 construction contracts will be on-going during this Contract and the future KEC Tunnels, Shafts, and Kensico Rock Excavation contract(s) will start while this Contract is on-going. Refer to Section 01 11 00 – Summary of Work. The Contractor shall develop a Site Staging Plan which takes into account the areas available and areas that are deemed off-limits to staging and material storage, per the Contract Drawings, and based on the expected contracts working in similar areas concurrently.
 - 1) LEC area allowable for driving through, however no staging of materials or equipment and no parking as shown on the Contract Drawings.
 - 2) The EOH Headquarters (aka Lab Building) area .
4. Construction Power
 - a. The Contractor shall obtain construction power for the entirety of this contract including power required to perform all construction activities, power to run the Contractor’s Field Office, power to run the Interim Engineer’s Field Office Trailers and power to run the Engineer’s Field Office Trailers.
 - b. All construction power connections shall meet required Electrical Code and be submitted to the Engineer for review and approval at least thirty (30) days prior to installation and connection.
 - c. Work regarding temporary power shall be in accordance with Section 01 51 30 – Temporary Electrical Systems

1.06 QUALITY ASSURANCE

- A. Not Used

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1.07 SUBMITTALS

- A. Circulation Plan: Before commencing any construction activity, a circulation plan shall be submitted for approval. Circulation plan shall be developed in accordance with the requirements of this Section. The Circulation Plan shall propose to maintain access at all times during the construction of the proposed improvements, and shall not provide any interference with the regular operation and maintenance of the site/facility or the flow of regular traffic in the vicinity of the site. The circulation plan shall include the Contractor’s coordination with other work occurring simultaneously on site. Notify the Engineer of any proposed changes to the Circulation Plan a minimum of one (1) week in advance. All changes must be approved prior to implementation. The Circulation Plan shall include, but not be limited to:
1. Construction vehicle access and exit points, including proposed maintenance and control of traffic
 2. One-way and Two-way vehicular traffic within the access road
 3. Stockpiling areas
 4. Storage areas
 5. Emergency exits
 6. Temporary construction signage to direct site traffic
 7. Temporary signage for vehicular speed limits as required by fence removal.
 8. Temporary signage for vehicular maximum weight limits as required by fence removal.
- B. Site Staging Plan
1. Contractor shall reference Contract drawings for recommended Site Staging Plan.
- C. Electrical Power and Site Security Plan:
1. Thirty (30) days prior to commencing any demolition and/or construction activity, an Electrical Power Plan shall be submitted for approval.
 2. Electrical Power Plan shall be developed in accordance with Section 01 14 00 – Work Restrictions and Contract drawings.
 3. The Electrical Power Plan shall propose to maintain continuous operation of the critical loads at all times during the demolition as well as the construction of the proposed improvements and shall not provide any

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interference with the regular operation and maintenance of the site/facility.
The Electrical Power Plan shall include, but not be limited to,

- a. Installation of concrete slab or canopy structure
- b. Installation of underground duct work
- c. Installation of Power and Instrument enclosure
- d. Connection of loads
- e. Protection of the installed equipment
- f. Site Security Plan

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

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- 3.02 IMPLEMENTATION
 - A. Not Used
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

**SECTION 01 73 17 – INSTALLATION OF EQUIPMENT
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to install equipment.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Not Used

SECTION 01 73 17 – INSTALLATION OF EQUIPMENT
CONTRACT KENS-EAST-2

1.05 DESCRIPTION

A. General:

1. This Section includes the following:
 - a. Concrete foundations, bases, dowels and anchor bolts.
 - b. Sleeves, recesses, openings, chases and related concrete installation items.
 - c. Supervision by manufacturers' representatives.
 - d. Workmanship.
 - e. Clearance and safeguards.
 - f. Alignment and leveling.
 - g. Cutting and patching.
 - h. Lubrication.
 - i. Maintenance of installed equipment.
 - j. Protection of installed equipment.
2. The Contractor shall have adequate resources on Site, including labor, materials, construction tools and equipment, to successfully perform the Work.
3. The Contractor shall be responsible for locating, aligning and leveling all equipment and shall employ a surveyor licensed in the State of New York to set all lines and levels of equipment to the accuracies specified in the Contract Documents.
4. Manufacturer's complete and official installation instructions, including permissible tolerances, shall be furnished in duplicate with each unit of equipment or set of identical units.
5. All equipment shall be installed in accordance with the approved shop drawings (including manufacturer's specifications, drawings, and tolerances) and under the direct supervision of the required manufacturer's representative. In no instance shall the directions of the manufacturer's representative contravene the Engineer's direction.
6. Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the approved shop drawings unless directed otherwise by the Engineer during installation.
7. As a condition precedent to the acceptance of equipment installed and operating, the Contractor shall provide the Engineer with written certification, obtained from each company manufacturing equipment for the Work that the equipment is installed and does operate in accordance with the Contract Documents and manufacturer's recommendations.

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- B. Concrete Foundations, Bases, Dowels and Anchor Bolts:
 - 1. The Contractor shall provide all reinforced concrete foundations, bases, dowels, and anchor bolts for all equipment and piping furnished under this Contract.
 - a. All reinforced concrete bases and supports shall be steel reinforced and dowelled to floor slabs. Where possible, dowels shall be in place before new floor slab concrete is placed.
 - 2. Where not explicitly stated in the Contract Documents, the Contractor shall utilize foundation bolt drawings or templates for the installation of equipment requiring concrete bases.
 - 3. Dowelling into existing work shall be provided under this Contract.
 - a. Anchor bolts penetrating into existing reinforced concrete work shall be drilled in place, shall be of the expansion type, and shall have sufficient length and configuration to resist the imposed loadings when installed in accordance with the Contract Documents, the manufacturer's recommendations, and as approved by the Engineer. Dowels and anchor bolts in existing concrete shall be installed using a bonding agent approved by the Engineer.
 - b. All concrete bases for equipment shall be treated with an approved sealer to prevent oil and grease from seeping into the concrete.
 - 4. Installation of reinforced concrete bases and the installation of dowels and anchor bolts into existing and new reinforced concrete work shall be in accordance with the Contract Documents and the manufacturer's recommendations, and shall be subject to the approval of the Engineer.
- C. Sleeves, Recesses, Openings, Chases and Related Concrete Installation Items:
 - 1. The Contractor shall make provisions as shown on the Contract Drawings, specified, and/or otherwise required for sleeves, recesses, openings, chases, and related items, for installation of the equipment and materials
 - 2. When the Contract requires the placing of conduits, saddles, boxes, cabinets, sleeves, inserts, foundation bolts, anchors and other similar work in floors or walls of buildings and structures, they shall be promptly installed in conformity with the Contract Documents. The Contractor shall arrange the work in strict conformity with the approved construction schedule and avoid interferences with the work of Other Contractors.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Not Used

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1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Concrete foundations for equipment shall be of approved design and shall be adequate in size, suitable for the equipment erected thereon, properly reinforced, and tied into floor slabs by means of reinforcing bars or dowels. Foundation bolts of ample size and strength shall be provided and properly positioned by means of suitable templates and secured during placement of concrete. Foundations shall be built and bolts installed in accordance with the manufacturers approved drawings.

B. Before mounting equipment on a foundation, the Contractor shall clean the top surface; if necessary, rough it with a star chisel and clean again; and clean out all foundation bolt sleeves.

1. The Contractor shall provide a sufficient number of shims about 2-in. wide and 4-in. long, and of a varying thickness from 1/8-in. to 1/2-in. A combination of these shims shall be placed next to each foundation bolt to bring the bottom of the bedplate or frame about 1/8 inch above the final setting. The equipment shall be lowered by changing the combination of shims. The Contractor shall use brass shim stock of various thicknesses, and continue to level the equipment a little at a time and in rotation until it is at the correct elevation in both directions.

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2. When the equipment is level, the Contractor shall tighten down on the foundation bolts a little at a time, in rotation, to make certain the equipment remains level and does not shift on the shims. A preliminary alignment check shall be made before grout is placed.
- C. Equipment shall be set, aligned and assembled in conformance with manufacturer's instructions. Runout tolerances by dial indicator method of alignment shall be plus or minus 0.002-in. or as directed by the manufacturer, whichever is more stringent.
- D. All blocking, wedges, shims, filling pieces, or other materials required for the proper support and leveling of equipment during installation shall be furnished by the Contractor. All temporary supports shall be removed, except the shims, which may be left in place with the approval of the Engineer. Any grinding necessary to bring parts to proper bearing after erection shall be done at the expense of the Contractor.
- E. Each piece of equipment or supporting base, bearing on concrete foundations, shall be bedded in grout. The Contractor shall provide a minimum of 1½-in. thick grouting under the entire base plate supporting each pump, motor drive unit, and other equipment. Grouting shall be as specified in the respective equipment specification section(s) and as approved by the Engineer.
- F. When motors are shipped separately from driven equipment, the motors shall be received, stored, have insulation resistance tested once a month, and the reports submitted to the Engineer. Space heaters shall be supplied in all enclosures being utilized for storage of motors. After driven equipment is set, the motors shall be set, mounted, shimmed, mill righted, coupled and connected complete.
- G. Moving parts shall be rotated a minimum of once weekly before and after installation to ensure proper lubrication and to avoid metal-to-metal welding and to prevent "flat-spotting" of bearings.
- H. Anchor and expansion bolts shall be furnished by the Contractor as specified and required by this Contract Documents.
- I. At threaded connections, a molybdenum disulfide anti-seize compound shall be applied to all threads in mechanical connections such as bolts, studs, cap screws, tubing, etc., unless otherwise indicated.

3.02 IMPLEMENTATION

- A. Workmanship:
 1. The following erection details are not intended to be all-inclusive, but only to cover some of the important practices. In all cases, only the best methods known to the trades are to be employed.
 2. Only those workers qualified in the handling, setting, alignment, leveling and adjustment of the type of equipment supplied shall be employed in the Work.

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3. An oil bath heater shall always be used to expand couplings, gears, etc. They shall not be forced or driven on equipment shafts, nor shall they be subjected to an open flame or torch.
4. Wedging shall not be permitted. Only the least number of flat shims are to be used in leveling equipment (shims are to be clean and free of slag). All shims, filling pieces, keys packing, red or white lead grout, or other materials necessary to properly align, level and secure apparatus in place shall be furnished by the Contractor. All parts intended to be plumb or level must be proven exactly so. Any grinding necessary to bring parts to proper bearing after erection shall be done at the expense of the Contractor.
5. Proper tools shall be used in the assembly of equipment and materials to prevent marring the surface of shafts, nuts, or other parts.
6. Connections requiring gaskets shall be tightened evenly all around to ensure uniform stress over the entire gasket area.
7. No equipment and materials shall be altered or repaired, and no burning or welding will be permitted on any parts having machined surfaces, except by written permission of the Engineer.
8. No rigging shall be done from any structure without the permission of the Engineer, and the Contractor shall be completely responsible for any damage to the structure due to its operations.
9. Only such equipment and materials that shall not damage the structure or equipment and materials shall be used on the Work.
10. The Contractor shall be responsible for the exact alignment of equipment with associated piping and, under no circumstances, will "pipe springing" be allowed.
11. Misaligned holes shall be reamed, as excessive driving of bolts or keys will not be permitted.
12. The Contractor shall furnish and install all necessary plugs in lubrication holes to prevent entry of foreign material.

B. Clearances and safeguards:

1. All devices, equipment, and systems furnished under this Contract shall be fabricated and installed so that the necessary and required clearances are provided for operation, maintenance, repair, and replacement. It is the Contractor's responsibility to review the Contract Drawings and ensure that the necessary and required clearances are available, and it is the Contractor's responsibility to notify the Engineer in the event that such clearances cannot be provided based on the Contract Documents.
2. The construction arrangement, assembly locations, and guarding of all equipment shall conform to the latest ANSI safety practices, the New York

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State Industrial Code, and all standards specified in the Contract Documents.

C. Alignment and leveling:

1. All couplings shall be aligned while the equipment is free from all external loads.
2. Both angular and parallel alignment shall be checked, and the degree of misalignment shall be recorded and submitted to the Engineer.
3. Dial indicators shall be used for the checking of angular and parallel alignment. During rotation of the held couplings in performance of this test, they shall be maintained in the same relative position, and the dial indicator readings shall be taken at the same place on the circumference of the coupling.
4. Misalignment shall not exceed the manufacturer's tolerances.

D. Cutting and patching:

1. Whenever it becomes necessary to cut existing work, the location and size of cut and method of cutting shall be as approved by the Engineer and adjacent work shall not be damaged. On completion of the cutting, all affected areas shall be restored satisfactorily by qualified workers.

E. Lubrication:

1. All lubrication shall be performed by the Contractor in accordance with the lubricant specifications and directions furnished by the manufacturer.
 - a. If required by the manufacturer's specifications and/or instructions, the Contractor shall provide lubrication of equipment while in storage, from delivery to installation.
2. The Contractor shall furnish required lubricants for the equipment until it is accepted.
3. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.

3.03 FIELD TESTING / QUALITY CONTROL

A. Supervision by Manufacturer's Representative: The Contractor shall provide the services of qualified technical representatives of the equipment manufacturers who shall adequately supervise, in person and on Site, the installation and testing of all equipment furnished under this Contract and instruct the Contractor's personnel and City operating personnel on maintenance and operation of its equipment.

1. The manufacturers' representatives shall devote, at a minimum, the entire amount of time specified under the relevant Specification sections for the

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equipment. Any additional time required to achieve successful installation and operation shall be at the expense of the Contractor.

2. The manufacturers' representatives shall sign in and out in a log for this purpose kept by the Engineer on every occasion they are on the Site and shall indicate time of arrival, departure, and the purpose of their visit.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. During the period between installation and Substantial Completion, the Contractor shall maintain all equipment in accordance with the equipment manufacturer's instructions as approved by the Engineer.

1. The Contractor shall also provide protection of installed equipment, as required, to prevent damage and remove protection devices/facilities, when no longer needed, prior to completion of work:

- a. Projections such as wall corners, jambs, sills and soffits of openings, shall be covered in areas used for traffic and for passage of products in subsequent work.

- b. Equipment for which shop finish paint is required shall be protected in the shop and during transportation and installation to prevent injury and abrasion. Such equipment shall be scheduled for installation when a building is considered enclosed and as late as possible in the construction schedule. However, maintenance of schedules may require the installation of such equipment in unheated areas and in areas where masonry work, concrete finishing, steel erection, painting, and other work will be in progress.

- 1) Shop finished Work shall be protected during and after installation by waterproof wrappings sealed to prevent condensation on surfaces. Wrappings shall be sufficient to protect surfaces from damage by drippings from masonry and painting work, and additional covering or sheathing shall be provided to protect equipment from contact damage that might result from work in progress in adjacent areas.

- 2) Prior to Substantial Completion (or use and occupancy in accordance with Article 16 of the Standard Construction Contract), wrappings and coverings shall be removed, equipment shall be cleaned and all scratches and abrasions shall be refinished.

END OF SECTION

**SECTION 01 74 17 – CLEANING AND SITE MAINTENANCE
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PART 1 GENERAL

1.01 SUMMARY

- A. Requirements of Regulatory Agencies
- B. Scheduling of Cleaning Operations
- C. Cleaning Materials
- D. Site Maintenance Requirements
- E. Snow and Ice Removal
- F. Disposal of Waste Materials
- G. Invasive Species Management
- H. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Section 13 34 23 – Temporary Police Booth
- B. Section 01 74 20 - Construction Waste Management
- C. Section 01 14 00 – Work Restrictions

1.04 REFERENCES

- A. New York Environmental Conservation Law, Chapter 285

1.05 DESCRIPTION

A. General Requirements

1. The Contractor shall collect and dispose of all debris and rubbish resulting from its Work. Cleaning shall be performed daily and trash removal shall be performed weekly, or more frequently, as directed by the Engineer, whenever the debris or rubbish interferes with the Work under the Contract, site operations or presents a fire hazard and as noted below.
2. The Contractor shall provide janitorial services including garbage collection, weekly cleaning, and routine service maintenance to HVAC and related equipment for the Contractor’s Field Office, Interim Engineers Field Office Trailers, Engineers Field Office Trailers, and the Temporary Police Booth
3. The contractor shall provide a portable restroom and weekly maintenance for the Temporary Police Booth in accordance with Section 13 34 23 – Temporary Police Booth
4. Cleaning Work shall conform to the requirements of Section 01 74 20 - Construction Waste Management.
5. All equipment shall be steam cleaned prior to entering reservoirs and tributary waterways in accordance with Section 01 14 00 – Work Restrictions to prevent the spread of invasive aquatic plants and animals.
6. The Contractor shall monitor the project area twice each year, once between June 15 and June 30 and once between August 21 and September 7, for the duration of construction and for one year after Substantial Completion to maintain the project site clear of any invasive species as specified in this section.

B. Requirements of Regulatory Agencies

1. In addition to the requirements specified herein, the Contractor shall maintain the cleanliness of the Work areas and surrounding premises within the Work limits so as to comply with federal, state, and local fire and safety laws, ordinances, codes and regulations.

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2. The Contractor shall comply with all federal, state and local anti-pollution laws, ordinances, codes and regulations when disposing of waste materials, debris, rubbish, snow and ice.
3. The Contractor shall follow all NYCDEP BWS protocols in invasive species management operations. The Contractor shall comply with the requirements of Chapter 285 of the Laws of 2000 (Sections 33-1004 and 33-1005 of the New York Environmental Conservation Law, known as the Neighborhood Notification Law), and shall perform any necessary posting and notice to the public.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Invasive Species Control Plan

1. In order to ensure prevention of invasive species the Contractor shall submit an Invasive Species Control Plan (ICSP). The plan shall include the following:
 - a. Construction Materials Inspection: Construction material, such as seed mixes, mulch topsoil, sand, gravel, crushed stone, and rock brought on the project site from an outside source shall be free of invasive plant material. The contractor shall provide documentation of such to the DEP prior to using such materials in streams or wetlands. Any imported soil shall meet the requirements of Section 31 23 23 – Fill or Section 32 90 05 – Soil Mixes.
 - b. If target invasive species are encountered within the project's area of disturbance, then appropriate treatment and removal methods shall be conducted.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. All chemicals shall be delivered and securely stored in the manufacturer's containers with legible labels affixed until used. No chemicals shall be used on City Land that do not meet these packaging requirements.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used.

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall maintain the project site clear of any invasive species as specified in this section for the duration of construction and for one year after Substantial Completion.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Cleaning Materials

1. The Contractor shall use only cleaning materials recommended by the manufacturer of surface to be cleaned.
2. Each type of cleaning material shall be used on only those surfaces recommended by the cleaning material manufacturer.
3. Use only cleaning materials which will not create hazards to health or damage property.

- B. All equipment, including tire treads and tracks, shall be broom-swept and/ or scraped of soil, debris, vegetation and seeds prior to being brought to or leaving the site to minimize introduction of noxious weeds.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Scheduling of Cleaning Operations

1. The Contractor shall schedule trash removal and cleaning operations as necessary and at intervals as directed by the Engineer.
 - a. So that dust, wash water or other contaminants generated during construction do not damage or mar painted or finished surfaces.
 - b. To prevent accumulation of dust, dirt, debris, rubbish and waste materials on or within the Work Site or on the premises surrounding the Work Site.

- B. Site Maintenance Requirements

1. The Contractor shall keep the Work and surrounding premises within Work limits, including its staging and storage areas, free of accumulations of dirt, dust, waste materials, debris and rubbish.
2. The Contractor shall keep dust generating areas wetted down.

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3. The Contractor shall provide suitable containers in sufficient quantity for storage of waste materials, debris and rubbish.
 4. The Contractor shall dispose of waste materials and surplus materials off site at a regulatory-approved disposal site at intervals as needed.
- C. Invasive Species Monitoring and Treatment
1. The Contractor shall monitor the project area twice per year, once between June 15 and June 30, and once between August 21 and September 7, for the duration of construction including the two-year plant establishment period, and for one year following substantial completion to identify any presence of the following exotic invasive species, or any other exotic invasive species requested by DEP,:
 - a. Shrubs: multiflora rose (*Rosa multiflora*); Japanese barberry (*Berberis thunbergii*); burning-bush (*Euonymus alatus*); Russian and autumn olive (*Eleagnus spp.*); exotic shrub honeysuckles (*Lonicera spp.*); exotic viburnums (*Viburnum spp.*); European alder (*Alnus glutinosa*); privet (*Ligustrum spp.*); buckthorns (*Rhamnus* and *Frangula spp.*); jetbead (*Rhodotypos scandens*);
 - b. Trees: Norway maple (*Acer platanoides*); tree-of-heaven (*Ailanthus altissima*); amur corktree (*Phellodendron amurense*); Japanese angelica tree (*Aralia alata*); princess tree (*Paulownia tomentosa*); white poplar (*Populus alba*); white mulberry (*Morus alba*);
 - c. Vines and herbs: Oriental bittersweet (*Celastrus orbiculatus*); black and pale swallow-wort (*Cynanchum louiseae* and *C. rossicum*); mile-a-minute vine (*Persicaria perfoliata*); porcelainberry (*Ampelopsis brevipedunculata*); hardy kiwi (*Actinidia arguta*); silver vine (*Actinidia polygama*); chocolate vine (*Akebia quinata*); common reed grass (*Phragmites australis*); Japanese knotweed (*Polygonum cuspidatum*); Japanese stiltgrass (*Microstegium vimineum*); Japanese and Chinese wisteria (*Wisteria floribunda* and *W. sinensis*); Japanese honeysuckle (*Lonicera japonica*); giant hogweed (*Heracleum mantegazzianum*); kudzu (*Pueraria montana*); mugwort (*Artemisia vulgaris*).
 2. Within 14 calendar days of each inspection, the Contractor shall provide a written report to DEP describing the inspection and the results, and shall make recommendations for treatment of any invasive species found. Recommendations requiring the use of herbicide will include the chemical name and formulation, application method and rate, and proposed timing of treatment. No treatment recommendations shall be implemented without written approval from DEP.

D.

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3.02 IMPLEMENTATION

A. Snow and Ice Removal

1. The Contractor shall remove snow and ice from the following areas:
 - a. The sidewalks and parking areas associated with the Intern Engineer's Field Office Trailer, the Engineer's Field Office Trailer, and the Contractor's Field Office.
 - b. All construction access roads or existing Kensico site roads used by the contractor including, but not exclusive to,
 - 1) Aerator Rd
 - 2) Existing Westlake Drive segment from Columbus Ave up to Aerator Rd intersection
 - 3) Con Edison tower access roads
 - 4) Electrical building parking lot and access road
 - 5) LEC perimeter road and back-of-building drive
 - 6) Any walkways which cannot be accessed by DEP's snow removal equipment due to construction activities.
 - 7) Any additional areas designated by the Engineer.
 - c. Snow and ice removal shall be before 7:00 AM whenever there is a snowfall storm and before 7:00 AM on the day following the termination of the snowfall storm.
 - d. When directed by the Engineer, the Contractor shall begin snow and/or ice removal immediately (within one (1) hour of the Engineer's directive to proceed).
 - e. The Contractor shall haul the removed snow and ice for disposal as per the applicable local rules.
 - f. Spreading of Salt and Sand
 - 1) The Contractor shall furnish all labor, tools, equipment, and materials necessary to provide the following services specifically requested and authorized in writing by the Engineer:
 - a) Spread calcium chloride over all areas of the Engineer's parking lot and spread sand on the steps and platforms at the entrances to the Engineer's field office.
 - b) Salt and sand shall be spread prior to a snowstorm.

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- c) Upon termination of a snowstorm, the Contractor shall remove all sand from the steps and platforms at the entrances to the Engineer's field office.
 - 2) Disposal of sand shall be the responsibility of the Contractor.
- B. Disposal of Waste Materials
 - 1. The Contractor shall not burn or bury rubbish and waste materials on the Site.
 - 2. The Contractor shall not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains or on the ground.
 - 3. The Contractor shall not discharge any wastes into waterways.
- C. Invasive Species Management
 - 1. If any invasive species are found according to Section 3.01C of this Specification, the Contractor shall treat all individuals to eradicate them from the site. In general, treatment shall be chemical, including cut stump, basal bark, stem injection, foliar spray, hack and squirt, or other chemical methods approved by DEP, although DEP in its sole discretion may approve non-chemical treatment methods, including cutting, digging, mowing, root cutting, pulling, flame weeding, brush-hogging, or other methods using hand tools or mechanized equipment, for certain species where such methods are, in the opinion of DEP, likely to be successful. All chemical treatment shall be performed by a NYSDEC-certified Commercial Pesticide Applicator or Pesticide Technician with a current, valid certification for the appropriate category for the work as specified by NYSDEC. Chemical treatment work may be performed by Pesticide Apprentices only with the prior written approval of DEP and when a Certified Applicator is on-site and monitoring the Apprentice.
 - 2. The Contractor shall secure all applicable federal, state, and local permits to complete the work, including the Request for Permission to Apply Pesticides for Maintenance of Rights-of-way on NYC aqueduct property and on NYC lands within the NYC watershed system, at least 10 calendar days prior to performing any chemical application, and shall provide all notifications required by such permits.
 - 3. The Contractor shall perform chemical treatment work in accordance with the product label, including any seasonal or temperature restrictions, and all applicable Laws.
 - 4. Chemical treatment work shall be performed with equipment no larger than backpack sprayers. High-pressure spray equipment shall not be used unless authorized in writing by DEP.

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5. Chemical treatment work shall not be performed during rain or when rain is forecast within restricted times as identified on the product label; on frozen ground; when wind speeds exceed ten miles per hour; or during other periods restricted on the product label.
6. The Contractor shall add indicator dye to the chemical solution to aid in distinguishing between treated and untreated areas.
7. The Contractor shall supply all water necessary for chemical treatment work, and shall not use water from surface waters on City Land unless authorized in writing by DEP and in accordance with all DEP requirements, including prior disinfection of all equipment that will come into contact with surface water.
8. The Contractor shall not wash out any chemical application equipment or chemical containers on City Land or in surface waters of any kind. The Contractor shall dispose of wash water in accordance with all applicable Laws and permits.
9. The Contractor shall not impact non-target species during chemical treatment.
10. Chemical treatment within 100 feet of reservoirs, wetlands or other surface waters may require NYSDEC Article 24 or local wetland permits, and must be accomplished using aquatic-approved chemical formulations.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Final Cleaning

1. At the completion of the Work, the Contractor shall remove all rubbish from and about the Site of the Work, and all temporary structures, construction signs, tools, scaffolding, materials, supplies and equipment which it or any of its Subcontractors may have used in the performance of the Work. Contractor shall broom clean paved surfaces and rake clean other surfaces of grounds.
2. The Contractor shall thoroughly clean all materials, equipment and structures in it Work areas so as to leave the Work in a clean and new appearing condition.
 - a. All marred surfaces shall be touched up to match adjacent surfaces;
 - b. Dirty filters and burned-out lights shall be replaced as required;

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- c. All glass surfaces shall be cleaned; and
 - d. Floors shall be cleaned and polished.
3. The Contractor shall remove spatter, grease, stains, fingerprints, dirt, dust, labels, tags, packing materials and other foreign items or substances from interior and exterior surfaces, equipment, signs and lettering in its Work areas.
4. The Contractor shall remove paint from and clean and restore all equipment and material nameplates, labels and other identification markings in its Work areas.

END OF SECTION

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NO TEXT ON THIS PAGE

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- B. Section 01 35 45 – Hazardous Materials Control
- C. Section 02 24 20 – Soil Sampling and Analysis
- D. Section 01 35 63 - Sustainability Certification Project Requirements

1.04 REFERENCES

- A. Diversion: To remove, or have removed, from the Site for recycling, reuse or salvage, material that might otherwise be sent to a landfill. Diversion does not include using the material as alternative daily cover at a landfill site, nor does it include burning, incinerating or thermally destroying waste.
- B. Electronic Waste as defined by:
 - 1. 40 CFR Parts 260 – 272;
 - 2. 6 NYCRR Part 370: Hazardous Waste Management System – General
 - 3. 6 NYCRR Part 371: Identification and Listing of Hazardous Waste;
 - 4. 6 NYCRR Part 372: Standards Applicable to Generators of Hazardous Waste;
 - 5. The Federal CRT Rule [Federal Register: July 28, 2006 (Volume 71, Number 145)];
 - 6. The Federal Circuit Board Rule [Federal Register: May 26, 1998 (Volume 63, Number 100)];
 - 7. Environmental Conservation Law Article 27 Title 26 – Electronic Equipment Recycling and Reuse.
- C. Hazardous Waste: Material shall be considered a hazardous waste when it exhibits any of the following: ignitability, corrosivity, reactivity, or toxicity for Volatile Organic Compounds (VOCs), semi-VOCs, metals, pesticides, or herbicides, as defined in 6 NYCRR Part 371 or 40 CFR Section 261. Under New York State (NYS) regulations, a material that contains 50 ppm or greater of PCBs is considered a hazardous waste. The Environmental Protection Agency (EPA) considers a material that contains 50 ppm or greater of PCBs to be a Toxic Substances Control Act (TSCA)-regulated waste. All hazardous waste shall be considered unsuitable, and shall be disposed of at an approved permitted hazardous waste landfill.
- D. Universal Waste as defined by:
 - 1. 40 CFR Part 273: Standards for Universal Waste Management;
 - 2. 6 NYCRR Subpart 374-3: Standards for Universal Waste;
 - 3. 6 NYCRR 373-3.10: Interim Status Standards for Owners and Operators of Hazardous Waste Facilities, Tank Systems;

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4. Use of Enforcement Discretion for Discarded Mercury-Containing Equipment, NYS DEC Commissioners Policy (CP-39);
5. Mercury Added Consumer Products Law (Chapter 145 Laws of New York 2004 and Chapter 676 Laws of New York 2005);
6. 49 CFR Part 172: Hazardous Materials Regulations.

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Regulatory Requirements: Contractor(s) shall meet all applicable federal, state, and local regulatory requirements as well as DEP EHS Policies and Procedures for the on-site management, transportation, and recycling or disposal of all construction waste materials generated during construction.

1.07 SUBMITTALS

- A. Construction Waste Management Plan: The Contractor shall be responsible for the development and implementation of the Construction Waste Management Plan (“Plan”) for the Project. Waste and recyclable materials shall be collected, sorted, and deposited in accordance with the approved Plan.

1. The Contractor shall prepare and submit the Plan for review and approval by the Engineer 30 days after receipt of Notice to Proceed and prior to the removal of any construction waste from the Project Site. The Plan shall be based on the construction waste recycling percentage goal (“percentage goal”) established via the Design Sustainability Program. The percentage goal of 95% end-of-Project rates of salvage/recycling of construction waste is detailed in the Construction Waste Estimate Report (“CWER”) generated by the Design Engineer and is included in the bid exhibit documents. The CWER dated 04/16/2021 is expressly excluded from and is not a part of this Contract and is available for information purposes only. Copies of this document have been provided on CD for reference.
2. The Plan shall contain the following:

Construction and Demolition Diversion: Estimate of the total proposed construction and demolition waste to be generated, and the percentage of this waste to be diverted from landfill (including types and quantities) during prosecution of the Work. Identify at least five materials (both structural and non-structural) targeted for diversion. Approximate a percentage of the overall Project waste that these materials represent. This diversion shall be developed based on the estimates included in the CWER. Percent diverted from landfill shall

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be calculated using the following formula:

$$\text{Diversion Percentage} = \frac{\text{Total Estimated Waste Diverted from Landfill}}{\text{Total Estimated Waste Produced by Project}} \times 100$$

The estimates shall be calculated by weight (tons). The list of construction waste materials shall be specific to the Project Site and may include, but not be limited to, the following materials:

- 1) Acoustical tile and panels
- 2) Aluminum
- 3) Asphalt
- 4) Bricks
- 5) Bronze
- 6) Cardboard
- 7) Carpet/carpet pads
- 8) Cast iron
- 9) Cement
- 10) Ceramic
- 11) Clean dimensional wood
- 12) Concrete
- 13) Concrete masonry units (CMU)
- 14) Copper wiring
- 15) Electronic waste
- 16) Electrical wires
- 17) EPDM rubber
- 18) Equipment
- 19) Extruded polystyrene
- 20) Fencing
- 21) FRP
- 22) Glass
- 23) Grout

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- 24) Gypsum
- 25) HDPE
- 26) HVAC/Ductwork
- 27) Land clearing debris
- 28) Lighting
- 29) Mercury containing light bulbs
- 30) Metals from rebar, sheetrock studs, framing, etc.
- 31) Paints, solvents, and other hazardous fluids
- 32) Piping
- 33) Plastics
- 34) Plumbing fixtures
- 35) Plywood
- 36) PVC
- 37) Recyclable office wastes such as paper and toner and ink cartridges
- 38) Roofing
- 39) Sprinklers
- 40) Steel
- 41) Stone
- 42) Stucco
- 43) Terracotta
- 44) Valves
- 45) Wood

Soil Diversion: Estimate of the total proposed excavated soil to be generated, and the percentage of this soil to be diverted from landfill via onsite and/or offsite reuse (including types and quantities) during prosecution of the Work. Soil diversion may be achieved through onsite or offsite reuse. Whenever possible, reuse of excess excavated soils on the Site should be prioritized over off-site reuse. Refer to 02 24 20 - Soil Sampling and Analysis for sampling and regulatory requirements. The estimates shall be calculated by weight (tons). Percentage of soil diverted from landfill shall be calculated

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using the following formula:

$$\begin{aligned} & \textit{Soil Diversion} \\ & = \frac{\textit{Total Estimated Soil Diverted from Landfill}}{\textit{Total Estimated Soil Produced by Project}} \times 100 \end{aligned}$$

Materials handling procedures. A description of the means by which any waste materials will be protected from contamination via segregation, and a description of the means to be employed in recycling the above materials consistent with the requirements for acceptance by recycling processors to be utilized and the New York City Department of Sanitation (DSNY). Hazardous waste, universal waste, and used oil must be separated and stored in their own dedicated storage areas and managed in compliance with NYSDEC Hazardous Waste, Universal Waste and Used Oil Regulations, USDOT 49 CFR Hazardous Material Transportation Regulations, and in accordance with DEP EHS Policies and Procedures.

List of waste transporters, transfer stations, beneficial use facilities, disposal facilities and recyclers with addresses, phone numbers, and permits, which the Contractor intends to utilize during the Project for the purpose of complying with the Construction Waste Management Plan. The Plan should list where both recyclable and non-recyclable materials will be recycled, reused, or disposed, and how those materials will be transported.

3. Hazardous wastes: The Plan shall specifically note the proper method of disposal for anticipated hazardous wastes or potentially hazardous wastes as detailed in 01 35 45 – Hazardous Materials Control. The Plan shall state that the hazardous waste transporter must hold a current New York State Part 364 Waste Transporter Permit in accordance with NYCRR Part 364. The permit must authorize the transporter to take the hazardous waste to the Transportation, Storage and Disposal Facility (TSDF) identified in the permit. The Construction Waste Management Plan must state that the hazardous waste will be transported in compliance with USDOT Hazardous Materials Transportation regulations in Title 49 of the CFR.
4. Non-hazardous wastes: The Plan shall specifically note the proper method of removal of anticipated non-hazardous waste. The Plan shall state the transporter must hold a current New York State Part 364 Waste Transporter Permit to transport the waste to a TSDF that accepts non-hazardous waste.
5. The Plan shall include the method of recycling office materials such as clean white paper, mixed paper, toner cartridges for laser printers, copiers, fax

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machines, and other electronic waste. Each item shall be recycled in accordance with the manufacturer's instructions.

6. The Plan shall include the coordination of product deliveries to designated prepared areas in order to minimize Site storage time and potential damage to stored materials and the return of packing materials, where economically feasible.

B. Final Submittal: The Contractor shall submit a Construction Waste Management Final Summary Report (“Final Summary Report”) upon Substantial Completion. The Summary Report should tabulate total waste material, quantities diverted from landfill and means by which it is diverted, and shall include a statement noting that the recycling/diversion goal outlined in the CWER has been met.

C. Monthly Submittals: Monthly waste and soil generation/diversion/disposal data shall be tracked in accordance with Section 01 35 27 – Environmental Health and Safety Requirements, paragraph 1.07.C Monthly Contractor EHS Report.

D. Project Meetings: The Construction Waste Management Plan and implementation shall be discussed at the following meetings:

1. Pre-construction Meeting
2. Regular monthly Progress Meetings

1.08 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall designate separate receiving/storage areas for delivered materials and equipment to minimize waste due to excessive materials mishandling, misapplication, weather, and other damage.

1. Promptly inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.
2. Promptly return damaged shipments or incorrect orders to manufacturer.
3. For materials or equipment to be reused or salvaged, use special care in removal, storage and reinstallation to ensure proper function in completed Work.

B. Periodically inspect stored products to assure products are undamaged and are maintained under required conditions.

C. Training of employees for handling and storing waste materials shall be in accordance with DEP EHS Policies and Procedures.

D. The requirements herein shall supersede any conflicting statements wherever they may appear in the Contract Documents.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

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- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
 - A. Not Used

PART 2 PRODUCTS

- 2.01 MANUFACTURERS
 - A. Not Used
- 2.02 MATERIALS / EQUIPMENT
 - A. Not Used
- 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

PART 3 EXECUTION

- 3.01 EXAMINATION / PREPARATION
 - A. Not Used
- 3.02 IMPLEMENTATION
 - A. The Contractor shall be responsible for the implementation of the approved Construction Waste Management Plan. The Contractor shall be responsible for the provision of containers and the removal of all waste, non-returned surplus materials, and debris from the Site in accordance with the Plan and in compliance with all federal, state, and local regulations, as well as DEP EHS Policies and Procedures.
 - B. Monies received for recycling and/or salvaged materials shall remain with the Contractor, except for items specifically identified in the Contract Documents.
 - C. Contractor(s) shall use construction and demolition methods and processes to ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
 - D. When encountered as part of the Work, the Contractor shall dispose of construction waste by recycling methods in accordance with the NYC Recycling Law: Local Law 19 (1989) and Local Law 87 (1992), and NYC's Commercial Recycling Regulations: Rules Governing the Recycling of Private Carter-Collected Waste (September 1993).

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- E. All material to be recycled shall be separated from normal refuse, per NYCDOS Rules. Material not required to be recycled shall be disposed of by the Contractor as specified and in accordance with all applicable federal, state, and local regulations and DEP EHS Policies and Procedures.
 - F. When encountered as part of the Work for sites outside New York City, the Contractor shall dispose of construction waste by recycling methods in accordance with all federal, state, and local regulations and DEP EHS Policies and Procedures.
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Not Used
- 3.04 STARTUP / DEMONSTRATION
- A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
- A. Not Used

END OF SECTION

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NO TEXT ON THIS PAGE

**SECTION 01 75 10 – PRELIMINARY AND FINAL FIELD TESTS
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PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Field Test Schedule and Updates
2. System Test Procedures
3. Contractor Responsibilities
4. Preliminary Field Tests of Equipment
5. Preliminary Field Tests of Systems
6. Final Field Tests of Equipment
7. Final Field Tests of Systems

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the**

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 32 10 - Progress Scheduling
- B. Section 01 43 05 - Contractor's Work Quality
- C. Section 01 79 05 – Equipment Startup and Training

1.04 REFERENCES

A. Definitions:

- 1. "System": A System, for purposes of testing, is defined as consisting of the component equipment, valves, piping, instrumentation, controls, ducts, accessories, etc., which are required for the proper functioning of each piece of equipment and the System as a whole. The purpose of the System testing is to demonstrate the capability of the equipment, interconnections, and accessories to perform as specified.

1.05 DESCRIPTION

- A. All field tests, including equipment and Systems tests, shall be performed in accordance with the requirements of this Section. The requirements contained herein shall apply, whether or not this Section is specifically referenced elsewhere in the Contract Documents.
- B. Field tests shall include preliminary and final field tests of equipment and Systems.
 - 1. Preliminary field tests of equipment and Systems shall be made with potable water and air in lieu of the water components and chemicals for which the equipment and Systems are designed.
 - 2. Final field tests of equipment and Systems shall utilize water components, chemicals and air for which the equipment and Systems are designed.
 - 3. All tests shall be performed in strict compliance with applicable manufacturer's and Engineer's instructions.
 - 4. No testing of Systems shall commence before the associated pipelines have been satisfactorily tested for leakage in accordance with the requirements of the Contract.
- C. For a successful test of equipment or System, the equipment or System shall operate trouble free for the continuous period of time, as specified below. If there are any interruptions in operation during the test, the test shall be repeated until the equipment or System operates trouble free for the specified time period.
- D. System Test Procedures:
 - 1. The following are to be considered a part of all System test procedures:

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- a. Variable capacity equipment shall be operated over the full capacity range of the maximum, minimum and at least three (3) intermediate points for a minimum of 30 minutes at each point.
- b. Multiple equipment groupings are to be operated both singly and together up to the maximum capacity of the System.
- c. Header and cross connected groups of units are to be operated using all connecting combinations.
- d. All equipment items, including standby units are to be tested. It may be necessary to repeat System tests at maximum condition to insure that standby units are included in System tests.
- e. Each operating unit shall be run for at least one hour alone (equipment field test) and for four hours as a System at maximum capacity after reaching stable operating conditions.
- f. All equipment, interconnecting piping and accessories are to be checked for leakage and specified rate performance capability. Instrumentation and controls shall be tested as part of the equipment.

E. Contractor Responsibilities:

1. For preliminary field tests of equipment and Systems, the Contractor shall furnish all labor, lubricants, fuel, power, water, materials, plant and instrument air, instruments and equipment required for the tests.
2. For final field tests of equipment and Systems, the Contractor shall furnish all labor, lubricants, materials, fuel, power, instruments and equipment required for the tests.
3. All testing shall be performed by the Contractor and witnessed by the Engineer, DEP Operations personnel and, when applicable, representatives of the Town of Mt. Pleasant. Preliminary field testing of equipment and systems and final field testing of equipment and systems shall be performed within the time periods designated in the preliminary construction schedule (CPM) during regular weekday daytime working hours.

1.06 QUALITY ASSURANCE

- A. Nothing stated herein shall affect the requirements contained in Section 01 43 05 – Contractor's Work Quality; or the specific pressure testing requirements for piping systems specified in the Contract Documents. Such tests shall be performed at the scheduled time, prior to backfilling, encasement or enclosure, if applicable. However, checking the systems for leakage at the pressures developed, particularly for leakage of the visible type, shall be performed as part of the tests included herein.

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1.07 SUBMITTALS

- A. The Contractor shall submit a preliminary and final field test schedule to the Engineer within 120 days after the date for commencing work in the Notice to Proceed. The test schedule shall be updated every 2 months or sooner if necessary, until completion of the required testing. The field test schedule shall itemize all key tasks in chronological order, based on the Construction CPM Schedule specified in Section 01 32 10 – Progress Scheduling, to meet all the requirements of this Section. All preliminary and final field testing to be conducted shall be organized and scheduled in accordance with the approved test procedure.
- B. The field test schedule shall include proposed test dates, preliminary or final field test, equipment or System being tested, specification references, equipment identification numbers, and indication of whether the test procedure has been submitted for approval and approval status.
- C. The Contractor shall notify the Engineer in writing 30 days prior to any testing. The Contractor shall not proceed with any testing until the test procedure has been approved by the Engineer.
- D. Before each test commences, the Contractor shall submit a detailed test procedure and manpower schedule to the Engineer for approval.
- E. Following successful completion of field tests, the Contractor shall submit a final report, compiling all test procedures used with results and data obtained during the tests.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 IMPLEMENTATION

A. Preliminary Field Tests of Equipment:

1. Each item of equipment shall be field tested with either water or air as suitable for the system, and shall operate trouble free in accordance with the procedures prescribed in the Contract Documents, preliminary tests shall demonstrate that equipment and appliances were properly installed, meet their specified operating cycles and characteristics, and are free from defects such as overheating, overloading and undue vibration.
2. A successful test shall consist of at least one continuous hour of trouble-free operation unless a longer period is specified in the Contract Documents.

B. Preliminary Field Tests of Systems:

1. All Systems shall be field tested with either water or air as suitable for the system and shall operate trouble free for four continuous hours, or longer if so specified in the Contract Documents.
2. The Systems shall be tested by operating the systems equipment together as a unit with all related piping, valves, electrical controls and mechanical operations.
3. The tests shall prove that all equipment and appurtenances of each system are properly installed, free from defects, meet their specified operating cycles and characteristics when operating as part of the system.
4. Systems with automatic control systems shall be operated continuously by the automatic control system for four continuous hours, or longer if specified in the Contract Documents.
5. To satisfy the requirements for preliminary testing of equipment and Systems, the Contractor shall submit data per the approved test procedure and receive approval from the Engineer.

C. Final Field Tests of Equipment and Systems:

1. The following requirements shall be met prior to the final field testing of equipment and systems:
 - a. All required operating instructions, maintenance manuals, bulletins, and shop drawings shall be approved and distributed unless otherwise specifically allowed by the Engineer.
 - b. All spare parts shall be delivered unless otherwise specifically allowed by the Engineer

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- c. The equipment and systems shall be inspected, operated, successfully tested, and adjusted by the manufacturer's representative in the presence of the Engineer and representatives of DEP. All instruction sessions for operating personnel shall also be completed unless otherwise specifically allowed by the Engineer. All instrumentation shall be field calibrated and previously tested.
 - d. After completion of Item c above and when leakage tests of pipelines are completed, the equipment or system shall then be given a final field test.
 2. Equipment and systems shall be subject to final field tests in accordance with the procedures prescribed in the Contract Documents and approved test procedure for each test and as supplemented herein.
 3. Equipment shall be given a running test, at its rated capacity, of normal (start-and-stop) operation and during such test shall demonstrate its ability to operate without vibration or overheating, and shall prove without question its fitness for services in accordance with the approved test procedures. Unless otherwise specified, final field tests of equipment which will be operating continually shall be given a minimum running test of three continuous 8-hour tests for each unit. Other equipment shall be given a running test for a minimum period of four continuous hours, or as otherwise approved by the Engineer. For final field tests of equipment and Systems to be deemed successful, they shall be run continuously and trouble – free in accordance with the approved test procedure for each test, and data shall be submitted and approved by the Engineer.
 4. The Contractor shall provide all labor and materials needed to supply all water or other media needed for final field testing.
 5. After completion of final System and equipment tests, the equipment and systems shall be operated by DEP for a two-week period under normal operating conditions. The Contractor shall schedule and have delivered sufficient training and instruction to City personnel to ensure that during the two week test the equipment and Systems will be operated properly and safely. Should the equipment and Systems function normally during this period the equipment and Systems shall have successfully passed the final field tests and will be accepted for additional testing and/or operation by DEP. The Contractor shall warrant and guarantee that all equipment shall function satisfactorily for a period of one year from Substantial Completion.
- D. Systems:
 1. The following equipment groupings shall be tested together as Systems, in accordance with the Contract Documents:
 - a. Electric Utility System
 - 1) Service Entrance Feeder Cable(s)/Conduit(s)

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- 2) Property Line Manhole(s) including Splice
 - 3) Metering
 - 4) System Proof Test as per Electrical Utility Standard (EO-2022)
 - b. Standby Power (Generator) System
 - 1) Generator(s)
 - 2) Low-Voltage (LV) Generator (Paralleling) Switchgear
 - 3) Resistive Load Bank
 - 4) LV Mimic Control Panel & Annunciator
 - 5) Automatic Transfer Control (ATC)
 - c. Medium-Voltage (MV) Power Distribution System
 - 1) Service Entry Switchgear(s)
 - 2) MV Cast-Coil Transformer(s)
 - 3) MV Switchgear
 - 4) MV Mimic Control Panel
 - 5) DC Power System, including Battery system, DC panel, etc.
 - d. LV Power Distribution System
 - 1) MV Interrupter Switch(s)
 - 2) MV Transformer(s)
 - 3) LV Switchgear(s)
 - 4) LV Mimic Control Panel & Annunciator
 - 5) ATC
 - 2. Testing for buried piping systems shall be done in accordance with Section 33 05 05 Buried Piping Installation
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Not Used
- 3.04 STARTUP / DEMONSTRATION
- A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
- A. Not Used

END OF SECTION

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NO TEXT ON THIS PAGE

**SECTION 01 78 10 – PROJECT CLOSEOUT
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Items to be completed
2. Final record documents
3. Special tools and appliances
4. Spare parts and maintenance materials
5. Lubricants
6. Piping and equipment identification

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Section 01 78 39 – Final Record Documents

1.04 REFERENCES

A. Not Used

1.05 DESCRIPTION

A. As construction of the Project enters the final stages of completion, the Contractor shall, in concert with accomplishing the requirements set forth in the Contract Documents, attend to or have already completed the following items as they apply to the Contract:

1. Scheduling equipment manufacturers' visits to the Site.
2. Required testing of Project components.
3. Scheduling start-up and initial operation.
4. Scheduling and furnishing skilled personnel during initial operation.
5. Correcting or replacing defective work, including completion of items previously overlooked or work which remains incomplete, all as evidenced by the Engineer's "Punch" Lists.
6. Attend to any other items listed herein or brought to the Contractor's attention by the Engineer.

B. The Contractor's attention is directed to the fact that required certificates and information listed herein must be submitted earlier in accordance with other Specifications.

1.06 QUALITY ASSURANCE

A. Not Used

1.07 SUBMITTALS

A. In addition to any requirements of the New York City Standard Construction Contract, before the determination of Substantial Completion is issued, the Contractor shall submit to the Engineer all required records, certifications, etc., which are specified in the Contract Documents. A partial list of such items appears below, but it shall be the Contractor's responsibility to submit all items which are required by the Contract Documents:

1. Test results of Project components.
2. Performance Affidavits for equipment.

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3. Certification of equipment or materials in compliance with Contract Documents.
 4. Operation and maintenance instructions or manuals for equipment.
 5. One set of neatly marked-up record drawings showing as-built changes and additions to the Work under this Contract.
 6. Any special guarantees or bonds.
- B. Final Record Documents
1. In addition to any requirements of the New York City Standard Construction Contract, in order to obtain Final Acceptance, the Contractor shall furnish Final Record Documents in accordance with Section 01 78 39 – Final Record Documents.
- C. Lubricant Survey
1. A lubrication survey, made by a lubricant supply firm, subject to the approval of the Engineer shall be provided by the Contractor.
 2. The lubrication survey shall list all equipment furnished, under this Contract, with the equipment manufacturer's lubrication recommendations and an interchangeable lubricants tabulation standardizing and consolidating lubricants whenever possible.
- D. Spare Parts List
1. A complete list of spare parts and maintenance materials to be furnished shall be submitted to the Engineer for approval as part of the Shop Drawing submittals.
- E. Special Tools List
1. The Contractor shall submit a complete list of special tools and appliances to be furnished, for approval by the Engineer, as a part of the Shop Drawing submittals.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery

1. Spare Parts
 - a. Upon acceptance of the spare parts by the Engineer, the Contractor shall deliver the spare parts for storage to the location designated by DEP upon request by the Engineer.
2. Lubricants
 - a. The Contractor shall furnish lubricants for all equipment supplied under this Contract in one delivery consisting of a minimum number

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of products, reflecting the results of the lubrication survey, as specified herein.

B. Storage

1. Spare Parts

- a. All parts shall be securely boxed and tagged, and clearly marked on the box and individually for identification as to the name of manufacturer or supplier, applicable equipment, part number, description and location within the equipment or system that the part is installed.
- b. Complete information shall also be provided for use and reordering of spare parts.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Spare Parts

1. Spare parts and maintenance materials shall be furnished in accordance with all applicable Specifications.
2. Two complete spare sets of all lamps supplied as a part of electrical control equipment shall be furnished by the Contractor, unless otherwise called for in the Contract.

B. Special Tools

1. Special tools and appliances which are needed to adjust, operate, maintain, or repair the equipment furnished under this Contract shall be provided in accordance with the Contract.
2. Special tools and appliances shall be furnished in approved painted steel cases, properly labeled, and equipped with heavy duty cylinder locks and duplicate keys.

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. The Contractor shall obtain from the Manufacturer and provide to DEP the Manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Lubricants

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1. The Contractor shall furnish and deliver such oil, grease and any special lubricants that are necessary for proper operation of all equipment furnished under this Contract. Identification and listing of such lubricants shall be made as part of the Shop Drawing submittals. The quantity furnished shall be sufficient for equipment start-up, operation prior to final acceptance of the Work, and for operation during the guaranty period as defined in Article 24 of the Standard Construction Contract. The grade of lubricants furnished shall be in accordance with the recommendations of the equipment manufacturers made on the approved equipment shop drawings.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 INSTALLATION

- A. Piping and Equipment Identification

1. The Contractor shall furnish and install identification signs for all equipment, control panels, valves, and piping identification in accordance with specific requirements of the Contract for piping and equipment identification.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. In addition to any requirements of the New York City Standard Construction Contract, before the determination of Substantial Completion is issued, the Contractor shall clean and perform final adjustment of the various building components as specified in the Specifications, including but not limited to the following:

1. Clean all glass and adjust all windows and doors for proper operation.
2. Clean all finish hardware after adjustment for proper operation.

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3. Touch up marks or defects in painted surfaces and touch up any similar defects in factory finished surfaces.
4. Wax all resilient flooring materials.
5. Remove bitumen from gravel stops, fascias, and other exposed surfaces.
6. Remove all stains, marks, fingerprints, soil, spots and blemishes from all finished surfaces, tile, stone, brick, and similar surfaces.

END OF SECTION

SECTION 01 78 24 – SPARE PARTS AND MAINTENANCE MATERIALS
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor shall inventory, store, and deliver all spare parts and maintenance materials as shown, specified, and/or required.
- B. The following index of this Section is presented for convenience:

Article	Title	Section Page
PART 1	GENERAL	1
1.01	Summary	1
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1.03	Related Sections	1
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PART 2	PRODUCTS	5
2.01	Manufacturers	5
2.02	Materials / Equipment	5
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PART 3	EXECUTION.....	5
3.01	Examination / Preparation	5
3.02	Implementation	5
3.03	Field Testing / Quality Control	5
3.04	Startup / Demonstration	6
3.05	Adjusting / Protection / Cleanup.....	6

- C. The following schedule, attached after the “End of Section” designation, is a part of this Section:

- 1. Schedule 01 78 24-1, Spare Parts and Maintenance Materials Schedule.

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

SECTION 01 78 24 – SPARE PARTS AND MAINTENANCE MATERIALS
CONTRACT KENS-EAST-2

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. Furnish all spare parts and maintenance materials shown, specified, and/or required by the Contract Documents.
- B. Contractor shall provide data for each distinct spare part or maintenance material, in paper and electronic format, as specified herein.
- C. Contractor shall attach bar-code tag stickers, furnished by the Engineer, to each distinct spare part or maintenance material.
- D. Schedule delivery of all spare parts and maintenance materials for the Work over a reasonable period of time and in coordination with DEP personnel and the Engineer.
- E. All spare parts and maintenance materials shall be turned over to DEP in new condition and shall be furnished in manufacturers' unopened cartons, boxes, crates, or other protective covering, suitable for preventing corrosion or deterioration, for the maximum length of storage indicated by the part manufacturer.
- F. The Contractor shall turn over spare parts and maintenance materials to DEP upon completion of the Work or when DEP assumes beneficial occupancy or as directed by DEP or Engineer. Contractor shall then place them in permanent storage rooms or areas designated by the DEP or Engineer.
- G. Contractor shall be fully responsible for loss or damage to all spare parts and maintenance materials until such time they are handed over and accepted by DEP.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Submittals shall include, but not be limited to:
 - 1. Complete lists of spare parts shall be submitted to DEP for approval prior to procurement and fabrication.
 - 2. Action Submittals:
 - a. List of all spare parts and maintenance materials and data:
 - 1) The spare parts and maintenance materials list and data shall be submitted in paper and electronic format:
 - a) The electronic format shall be a spreadsheet that allows data to be uploaded into a commercial database system owned by DEP.
 - b) Refer to Schedule 01 78 24-1, Spare Parts and Maintenance Materials Schedule, located after the

SECTION 01 78 24 – SPARE PARTS AND MAINTENANCE MATERIALS
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"End of Section" designation, for the paper and electronic format.

- 2) The spare parts and maintenance materials list and data shall be submitted to the Engineer at least 120 Days prior to delivery.
3. Information Submittals:
 - a. Schedule of the intended dates for spare parts and maintenance materials deliveries.
 - b. Submit a letter of transmittal for each part or maintenance material shipment, including the following information, at a minimum:
 - 1) Date of letter and transfer of parts and materials.
 - 2) Contract title and number.
 - 3) Contractor's name and address.
 - 4) A complete inventory of the parts and materials, listing the applicable Specification Section and equipment item for each.
 - 5) A place for DEP to sign and confirm receipt of the parts and materials.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall deliver spare parts and maintenance materials in accordance with the requirements of the Contract Documents. In addition:
 1. Spare parts and maintenance material delivery shall require a minimum written notice to Engineer of 7 Days.
 2. The Contractor shall attach bar-code stickers to each approved spare part or maintenance material, upon receipt.
 - a. The Engineer shall furnish bar code stickers and transmit the bar code stickers to the Contractor.
 - b. The sticker for any spare part shall be affixed to shipment packaging for that part.
 - c. If additional stickers are required for split deliveries or re-delivery of previously rejected parts, they will be furnished by the Engineer and transmitted to the Contractor.
- B. The Contractor shall store and handle spare parts and maintenance materials in accordance with the requirements of the Contract Documents. In addition:
 1. Store and handle spare parts and maintenance materials in accordance with manufacturer recommendations.

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2. During construction and prior to acceptance by DEP, the Contractor shall store spare parts or maintenance materials in the Contractor's buildings or construction trailers. Storage locations shall have floor, roof, and closed sides, and be in accordance with the part manufacturers' recommendations.
 - a. Contractor shall protect spare parts and maintenance materials from weather, condensation, and humidity.
 - b. If the Contractor's assigned location is inappropriate, an alternate storage location shall be used, as designated by DEP, and at no additional cost to DEP.
 - c. Upon placement of each item in the storage location, the item bar-code sticker or tag shall be scanned into DEP Database along with the shelf bar-code sticker using hand held Radio Frequency Computers.
3. DEP personnel reserve the right to inspect each spare part or maintenance material upon delivery for adherence to approved submittals and reject any part or parts in accordance with said inspection.
 - a. Packaging shall be opened by the Contractor to allow such inspection.
 - b. DEP personnel reserve the right to reject any spare parts or maintenance materials during such inspection.
 - c. Any spare parts or maintenance materials rejected shall be taken back by Contractor and the Contractor shall resubmit a new spare part or maintenance material at no additional cost to DEP.
 - d. The Contractor shall provide DEP personnel with access, and transport if required, to the Contractor's storage facilities.
4. On-site storage locations, including final storage locations, shall be established and approved by DEP before delivery is made.
5. After acceptance of delivered spare parts and maintenance materials, the Contractor shall place accepted spare parts and maintenance materials in a storeroom directed by DEP personnel.
 - a. All spare parts and maintenance materials shall be identified, assigned a storeroom and location as directed by DEP personnel, delivered, shelved, and logged into the shelf or bin via scanning the barcode to the database referenced herein.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

SECTION 01 78 24 – SPARE PARTS AND MAINTENANCE MATERIALS
CONTRACT KENS-EAST-2

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 IMPLEMENTATION

- A. Data for each distinct spare part or maintenance material, per approved submittals, shall be recorded and entered into the existing computer database, provided by DEP and as directed by the Engineer.

1. Reference Schedule 01 78 24-1, Spare Parts and Maintenance Materials Schedule, located after the End of Section designation.
2. Data shall include, but not necessarily be limited to:
 - a. Contract number.
 - b. Specification Section number.
 - c. Description of equipment for which part is being provided.
 - d. Equipment number (per DEP numbering system).
 - e. Manufacturer of part, manufacturer's part number.
 - f. Supplier / vendor for part, with name and contact information.
 - g. Unit price of part.
 - h. Quantity required to be delivered.
3. No spare parts or maintenance materials shall be accepted by DEP unless all data listed above has been entered into the database and barcodes have been applied as specified.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

SECTION 01 78 24 – SPARE PARTS AND MAINTENANCE MATERIALS
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- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

SECTION 01 78 24 – SPARE PARTS AND MAINTENANCE MATERIALS
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SCHEDULE 01 78 24-1
SPARE PARTS AND MAINTENANCE MATERIALS SCHEDULE

CONTRACT _____ EQUIPMENT DESCRIPTION AND NUMBER _____

EQUIPMENT SPEC. SECTION _____ SUBMITTAL # _____ REVIEW CYCLE # _____

PART DESCRIPTION	MANUFACTURER NAME	MANUFACTURER PART NO.	VENDOR NAME	VENDOR PART NO.	COMPONENT Y/N?	COMPONENT SERIAL #	QUANTITY ON ORDER (PER SPEC)

SECTION 01 78 24 – SPARE PARTS AND MAINTENANCE MATERIALS
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NO TEXT ON THIS PAGE

**SECTION 01 78 25 – OPERATIONS AND MAINTENANCE MANUALS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. General requirements.
2. Operation and Maintenance Manual requirements.
3. Binding and format requirements.
4. Submittals.

B. The following index of this Section is presented for convenience:

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1.07	Submittals	6
1.08	Delivery, Storage, and Handling	6
1.09	Spare Parts, Special Tools, and Supplies	6
1.10	Special Warranty Provisions / Guarantee Periods	6
PART 2	PRODUCTS	6
2.01	Manufacturers	6
2.02	Materials / Equipment	6
2.03	Fabrication / Assembling / Finishes	6
2.04	Source Quality Control / Shop Tests	6
PART 3	EXECUTION.....	7
3.01	Examination / Preparation	7
3.02	Implementation	7
3.03	Field Testing / Quality Control	7
3.04	Startup / Demonstration	7
3.05	Adjusting / Protection / Cleanup.....	7

1.02 PAYMENT

- A.** No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

SECTION 01 78 25 – OPERATIONS AND MAINTENANCE MANUALS
CONTRACT KENS-EAST-2

1.03 RELATED SECTIONS

- A. Section 01 78 39 – Final Record Documents

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. As a prerequisite to obtaining payments in excess of 50 percent of the equipment cost for equipment furnished under this Contract, the Contractor shall prepare, submit and obtain the Engineer's approval, as designated by "Approved," of an Operation and Maintenance Manual ("Manual") for each item of equipment supplied under the Contract. Approval is a prerequisite for continuing payments for equipment furnished by the Contractor, providing instructional services and equipment start-up.
- B. Each Manual shall be prepared especially for each installation and shall include all pertinent and legible instructions, preventative maintenance instructions, technical bulletins and other printed matter required to provide accurate and comprehensive information for the safe and proper operation, maintenance and repair of the equipment.
- C. Operation and Maintenance Manual Requirements:
 - 1. The Manuals shall include, but not be limited to, the following:
 - a. Complete, detailed written operating instructions for each product or piece of equipment including: equipment function; operating characteristics; limiting conditions; operating instructions for startup, normal and emergency conditions; regulation and control; and shutdown.
 - b. Complete, detailed written preventive maintenance instructions, including all information and instructions required to keep a product or piece of equipment properly lubricated, adjusted and maintained so that the item functions economically throughout its full design life. Preventive maintenance instructions include, but are not limited to, the following:
 - 1) A written explanation with illustrations for each preventive maintenance task.
 - 2) Recommended schedule for execution of preventive maintenance tasks.
 - 3) Lubrication charts.
 - 4) Table of alternative lubricants.
 - 5) Troubleshooting instructions.
 - 6) List of required maintenance tools and equipment.

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- 7) Nameplate data of each component, year of installation, Contract number and Specification number.
 - c. Name, address and telephone number of the manufacturer and the manufacturer's local representative(s).
 - d. Installation instructions.
 - e. Emergency operating instructions and capabilities.
 - f. Troubleshooting and corrective maintenance (repair) procedures.
 - g. Drawings suitable for assembly and disassembly of entire system or unit, and each component, and approved wiring and control diagrams, all as required for operation, maintenance and repair of the equipment supplied. Drawings shall be black on white, clearly legible and no larger than 11" x 17".
 - h. Parts list with current prices and ordering information.
 - i. List of recommended spare parts and the recommended number of each.
 - j. Name, address and telephone number of nearest parts supply house and nearest repair service center.
 - k. Warranties, guarantees, bonds and service contracts.
 - l. Long-term and short-term manufacturer's recommended equipment storage procedures.
 - m. Written explanations of all safety considerations relating to operation and maintenance procedures.
 - n. Name, address and telephone number of manufacturer, manufacturer's local service representative, and subcontractor or installer.
 - o. Copy of all approved shop drawings.
 - p. Catalogs, diagrams, schematics, drawings, instruction bulletins and manuals marked by underlining, checking, the use of arrows or the obliteration or removal of extraneous data, so as to pertain only to the specific equipment item for which the manual is supplied.
 - q. Complete electrical schematics and wiring diagrams. Complete wiring between terminal points must be shown. Computerized diagrams are not acceptable.
2. Reference to features and elements of equipment, such as operational limits of time, speed, pressure, temperature, etc. shall be clear, complete and compatible with authoritative published engineering reference documents. All functional components, electrical systems, equipment, etc. shall be shown on diagrams and discussed in the text so as to identify their proper

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system relationship. Operation, service, trouble-shooting, checkout and in-line and bench repair procedures, identifying specific system characteristics of the equipment shall be provided. The information shall include recommended procedures and frequencies for preventive maintenance such as inspection, adjustment, lubrication, calibration and cleaning.

3. Equipment parts shall be identified by manufacturer's part number and located with relation to other components of the equipment utilizing "exploded" type drawings for clarity, if required. Complete parts lists shall be included, which indicate the part number, the part description, applicable serial and model numbers, current unit prices and the name, address and telephone number of the nearest equipment manufacturer's representative and nearest service and spare parts warehouse. Complete instructions for the ordering of all replaceable parts shall be noted in this section of a Manual. Recommendations as to spare parts and spare inventory levels shall be made. Where pertinent, lead time and shelf life values and preservation, packaging and labeling methods shall be also recommended.
4. All copyrighted material used in the Manual or in any operation required in the performance of the Contract will be preceded by the Contractor obtaining the copyright holder's written permission on behalf of DEP to use such material in perpetuity.

D. Binding and Format Requirements:

1. Each Manual shall be bound in a durable, permanent, hard cover binder of one (more if required) volume with a complete index of the Manual's contents arranged by subject matter and in order of presentation in each volume. Applicable equipment item numbers, as shown in the Contract Documents shall be prominently included at their appropriate location in the index. The title of the Manual shall be securely affixed to the binder in two places: the front cover and the binder back edge. The title shall identify the Project by number and name, location of the site, state the volume is an O&M Manual, generally classify the equipment and state the manufacturer's name and equipment model number.
2. Intermediate submittals of the Manual for approval by the Engineer need not be hard bound.
3. Use 8½-inch by 11-inch paper of high rag content and quality. Larger drawings or illustrations (no larger than 11" x 17") are acceptable if neatly folded to the specified size in a manner which will permit easy unfolding without removal from the binder. Provide reinforced punched binder tab. Or provide fly-leaf for each product.
4. All text must be legible typewritten or machine printed originals or high quality copies of same.

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5. Each page shall have a binding margin of approximately 1½ inches and be punched for placement in a three-ring loose-leaf or triple post binder. Provide binders. Identify each binder with the following:
 - a. Title "OPERATING AND MAINTENANCE MANUAL"
 - b. Project title and number.
 - c. Contract title and number.
 - d. Identity of building or structure as applicable.
 - e. Identity of general subject matter covered.
 6. Use dividers and indexed tabs between major categories of information such as operating instructions, preventive maintenance instructions, or other. When necessary, place each major category in a separate binder.
 7. Provide a Table of Contents for each binder. Identify products by their functional names in the Table of Contents and at least once in each chapter or section. Thereafter, abbreviations and acronyms may be used if their meaning is explained in a table in the back of each binder. Use of model or catalog numbers or letters for identification is not acceptable.
- E. Submittals:
1. The Contractor's submittal to the Engineer for approval shall consist of five (5) complete sets of each Manual and five (5) copies of an itemized listing providing cross-references between the Specification, the approved Shop Drawings, and the Manual submittal.
 2. A transmittal will be returned to the Contractor indicating the status of the Manual and will include a tabulation of any pages being returned with review comments and noting any extra pages required clarifying or amplifying the comments. Copies of only the pages containing comments and any additional pages needed to clarify or amplify the comments will be attached to the transmittal. The status of the Manual will be noted on the front page of the Manual, which will also be attached to the transmittal, and will be stamped either, "Furnished as Submitted" or "Furnish as Corrected", when the Manual submittal substantially conforms to the requirements of this Section and requires minor corrections; or "Revise and Resubmit" when the Manual submittal is considered inadequate, inaccurate or lacking essential information.
 3. The Contractor shall rectify all submittals annotated "Furnish as Corrected," or "Revise and Resubmit" within 15 days of receipt of such notice by replacing pages or adding additional data, as required. The Manual's Index of Contents and the itemized, cross-referenced listing shall be revised to reflect all revisions or additions made. Then, five (5) copies of the revised material shall be resubmitted to the Engineer for approval.

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4. When the status of the Manual is stamped "Rejected," a transmittal to the Contractor will return the copies of the Manual intact with the reason for the rejection stated. The Manual will be stamped "Rejected" when the submittal is considered illegible, or does not contain a complete index of contents and/or an itemized list of cross references, or is so incomplete and lacking in required documentation as to preclude a meaningful review by the Engineer. Within 15 days of receipt of such notice the Contractor shall revise the Manual and resubmit to the Engineer for approval.
5. Final Approved Copies of the Manuals:
 - a. After a Manual submittal receives final approval status, signified by the annotation "Furnish as Submitted", the Contractor shall furnish the final Manual to the Engineer in the quantities and formats specified in Section 01 78 39 – Final Record Documents.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

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- PART 3 EXECUTION
 - 3.01 EXAMINATION / PREPARATION
 - A. Not Used
 - 3.02 IMPLEMENTATION
 - A. Not Used
 - 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
 - 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
 - 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

SECTION 01 78 25 – OPERATIONS AND MAINTENANCE MANUALS
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NO TEXT ON THIS PAGE

**SECTION 01 78 39 – FINAL RECORD DOCUMENTS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the requirements for all Final Record Documents.
- B. The following index of this Section is presented for convenience:

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3.03	Field Testing / Quality Control	4
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3.05	Adjusting / Protection / Cleanup.....	7

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 29 10 – Schedule of Values
- B. Section 01 32 30 – Job Photographs and Videos
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 78 40 – Records in Paper Formats
- E. Section 01 78 42 – Records in Electronic Formats

SECTION 01 78 39 – FINAL RECORD DOCUMENTS
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F. Section 01 78 25 – Operation and Maintenance Manuals

1.04 REFERENCES

- A. Archive: For the purposes of this Section, to Archive means to furnish as a final record document.
- B. As-Built Drawings. The “As-Built Drawings” reflect the “as constructed” final product. These drawings shall use the same title blocks and sheet numbers as the original “Bid Set Drawings”, with the exception that an “AB” is prefixed onto the original drawing number.
- C. Final Copy Shop Drawing (FCSD): Final Copy Shop Drawing means the approved copy (Furnish as Submitted (FAS), Furnish as Noted (FAN), or Furnish as Corrected (FAC)) of the Shop Drawing as described in Section 01 33 00 - Submittal Procedures, corrected to reflect any deviations made for the installed condition showing the actual construction.
- D. Conformed Drawings: The Conformed Drawings are the original Bid Set Contract Drawings modified to incorporate the changes made by addenda to the Invitation for Bids issued during the bid period.
- E. Conformed Set Contract: The Conformed Set Contract is the original Bid Set Contract modified to incorporate the changes made by addenda to the Invitation for Bids issued during the bid period.
- F. Bid Set Drawings (or Design Drawings): The Bid Set Drawings consist of the original Contract Drawings issued by DEP with the Invitation for Bids.
- G. Bid Set Contract (including Addenda): The Bid Set Contract is the text of the original Contract (excluding Contract Drawings) issued by DEP with the Invitation for Bids, including any Addenda issued during the bid period.
- H. Change Orders: The Change Orders include registered Change Order forms and the complete sets of attached text and/or drawings for all design and field Change Orders.
- I. Operations and Maintenance Manuals: When specified, Operations and Maintenance Manuals (“O&M Manuals”) shall be prepared by the Contractor in conformance with Section 01 78 25 - Operation and Maintenance Manuals. Final copies of the O&M Manuals shall be submitted in accordance with the requirements of this Section.
- J. EPMIS: DEP’s web-based Enterprise Project Management Information System (“EPMIS” or “the System”) used to manage all Project communications, workflows and document submittals.
- K. Key Documents: For purposes of this Section, Key Documents shall include, but not be limited to, the following items:
 - 1. Signed copy of the Contract;
 - 2. The Contractor’s bonds;

SECTION 01 78 39 – FINAL RECORD DOCUMENTS
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3. Signed and submitted Bid Schedule of Prices;
 4. DEP Award Folder contents;
 5. Contract Notice of Award letter;
 6. Notice to Proceed letter;
 7. Approved Schedule of Values as described in Section 01 29 10 – Schedule of Values;
 8. Written determination by the Engineer or Resident Engineer, as applicable, that the Work is substantially complete, as described in Article 14 of the Standard Construction Contract;
 9. Final Approved Punch List;
 10. Final evaluation;
 11. Final extension of time (if applicable);
 12. Claim settlements (if applicable);
 13. Certificate of Occupancy;
 14. Warranties;
 15. Structure Survey (per Article 9 of the General Conditions);
 16. Regulatory Transition Plan (where applicable).
- L. Job Photographs and Videos: The photographs and videos furnished in accordance with Section 01 32 30 – Job Photographs and Videos.
- M. Additional Documents: Any additional documents that the Engineer directs to be furnished as a final record document in accordance with the requirements of this Section.
- 1.05 DESCRIPTION
- A. Not Used.
- 1.06 QUALITY ASSURANCE
- A. Project records in electronic and paper formats shall be submitted in conformance with the following specifications, as applicable:
1. All records in electronic format shall be produced in conformity with Section 01 78 42 – Records in Electronic Formats.
 2. All records in paper formats shall be produced in conformity with Section 01 78 40 – Records in Paper Formats.
- 1.07 SUBMITTALS
- A. Format

SECTION 01 78 39 – FINAL RECORD DOCUMENTS
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1. The Contractor shall submit the final record documents in electronic and paper formats, according to the requirements of Table 1 – Summary of Final Record Documents to be Furnished, attached at the end of this Section.

B. Quantities

1. The quantities and formats to be furnished for each Final Record Document shall be as shown in Table 1.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Final Record Documents shall be delivered to the Engineer.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 IMPLEMENTATION

- A. As-Built Drawings

1. As-Built Drawings shall be prepared by the construction manager (CM). However, the Contractor shall furnish all necessary information to the CM for preparation of the As-Built Drawings. Prior to final acceptance of the Contract Work, the Contractor shall document all deviations and changes from the configurations shown on the original Contract Drawings or revised

SECTION 01 78 39 – FINAL RECORD DOCUMENTS
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drawings issued during the course of executing the Work. These deviations and changes shall include, but not be limited to, topographic features, relocation of structures, or locations of underground items such as pipelines, duct banks, manholes or footings. Survey distances, coordinates and/or elevations shall be included to accurately locate all such items. The Contractor shall submit this information to the CM in the format directed by the CM.

B. Final Copy Shop Drawings (FCSDs)

1. The Contractor shall furnish all FCSDs to DEP.
 - a. The FCSD shall be the approved copy (FAS, FAN, or FAC) of the Shop Drawing, corrected to reflect any deviations made for the installed condition showing the actual construction.
2. In addition to submitting the complete set of FCSDs as a final item at the end of construction, the Contractor shall prepare and submit FCSDs for approval on a continual basis during the performance of the Work when the particular item of Work for a FCSD has been completed. The Contractor shall submit the FCSD within 30 days after the completion of the Work item.
3. The drawing revision boxes shall have all previous revisions and references removed from the drawings. The revision boxes shall indicate “Final Copy Shop Drawing.”
4. Each drawing shall bear the original submittal file number, without the revision number, which shall be written in the lower right hand corner of a drawing above the title box. The file number shall also have a prefix, which identifies it as a FCSD.
 - a. For example, if the file number for an approved Shop Drawing is 26 05 91-002, the FCSD will be numbered “FCSD-26 05 91-002”,
5. Supporting Documentation: Supporting documentation shall bear the correlating FCSD file number so as to identify it. All supporting documentation (e.g., catalog cuts, test results, calculations, etc.) shall be submitted, together with the related FCSD so as to maintain a complete set of all documents submitted with each FCSD.
6. FCSD Submittal for Approval
 - a. Two (2) paper prints of each FCSD full size where applicable shall be submitted for approval. The drawing shall be checked by the Resident Engineer against the field records and a copy shall either be stamped “Approved” or returned with comments for correction and re-submittal by the Contractor. The Contractor shall retain one (1) approved set of the FCSDs for use in submitting the entire set in paper and electronic copies.

SECTION 01 78 39 – FINAL RECORD DOCUMENTS
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C. Bid Set Contract

1. If the Contractor does not have a complete set of the original Bid Set Contract (including Addenda) in the original PDF format (non-scanned), it may request a set from the Engineer. Upon request, the Bid Set Contract and Addenda will be provided to the Contractor in PDF format if possible. If a PDF format is not available, then a paper copy set may be utilized. This may also be requested from the Engineer if required and shall be provided if possible.
2. The Contractor shall Archive the entire set of Contract Documents, except Contract Drawings, as discussed below. This set shall include all the sequential pages of the Contract Documents and shall include:
 - a. Front and back covers
 - b. Invitation for Bids
 - c. Information for Bidders
 - d. Table of Contents
 - e. Notice to Bidders
 - f. Standard Construction Contract
 - g. General Conditions
 - h. Schedule of Wage Rates
 - i. Specification Sections
 - j. Addenda
3. The signed (executed) parts of the Standard Construction Contract shall be included by the Contractor as part of the Key Documents.

D. Bid Set Drawings (Design Drawings).

1. The Bid Set Drawings shall be Archived. If the Contractor does not have a complete set of the original Bid Set Drawings in AutoCAD format, the Contractor may request a set from the Engineer. If possible, the Bid Set Drawings will be provided to the Contractor in AutoCAD format, bound with their respective data sets.

E. Conformed Set Contract

1. The Conformed Set Contract shall be Archived.

F. Conformed Drawings

1. The Conformed Drawings shall be Archived. If the Contractor does not have a complete set of the Conformed Drawings in the AutoCAD format, it may request a set from the Engineer. If possible, the Conformed Drawings will be provided to the Contractor in AutoCAD format, bound with their respective data sets.

SECTION 01 78 39 – FINAL RECORD DOCUMENTS
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- G. Change Orders
 - 1. All Change Orders (both field and design) produced during the construction of the Project shall be Archived.
 - H. Operations and Maintenance (O&M) Manuals
 - 1. The O&M Manuals shall be Archived.
 - 2. O&M Manuals should have been submitted and reviewed as part of the shop drawings submission and review process in accordance with Section 01 78 25 - Operations and Maintenance Manuals.
 - 3. Final, approved copies of the O&M Manuals shall be furnished during the progress of the work in accordance with Section 01 78 25 - Operations and Maintenance Manuals. Additional electronic copies of each manual shall be submitted as part of the Final Record Documents.
 - I. Key Documents
 - 1. Key Documents produced during the construction of the Project shall be Archived. They shall consist generally of the items defined above.
 - J. Additional Documents
 - 1. Any Additional Documents such as Soil Classification Reports, Environmental Impact Statements, Site Assessments, Geotechnical Reports, permits and RFIs shall also be Archived when directed by DEP. If the Contractor does not have copies of any documents, they will be provided by the Engineer, when possible, in electronic or paper format.
 - K. Job Photographs and Videos
 - 1. Job Photographs and Videos produced during the performance of the Work shall be Archived.
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Not Used
- 3.04 STARTUP / DEMONSTRATION
- A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
- A. Not Used

END OF SECTION

SECTION 01 78 39 – FINAL RECORD DOCUMENTS
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

**SECTION 01 78 39 – FINAL RECORD DOCUMENTS
CONTRACT KENS-EAST-2**

Table 1			
<u>Summary of Final Record Documents To Be Furnished</u>			
Final Record Document Type	EPMIS	Electronic (USB Drive)	Paper
As-Built Drawings	1 set (PDF/A & AutoCAD)	4 sets (PDF/A & AutoCAD)	2 sets
Final Copy Shop Drawings	1 set (PDF/A & AutoCAD)	4 sets (PDF/A & AutoCAD)	1 set
Conformed Drawings	1 set (PDF/A & AutoCAD)	4 sets (PDF/A & AutoCAD)	NA
Bid Set Drawings	1 set (PDF/A & AutoCAD)	4 sets (PDF/A & AutoCAD)	NA
Bid Set Contract (including Addenda)	1 set (PDF/A)	4 sets (PDF/A)	1 set
Conformed Contract	1 set (PDF/A)	4 sets (PDF/A)	NA
Change Orders (Text & Drawings) (Design & Field)	1 set (PDF/A)	4 sets (PDF/A)	NA
O&M Manuals	1 set (PDF/A)	6 sets (PDF/A)* 2 compilation sets*	5 sets *
Key Documents	1 set (PDF/A)	4 sets (PDF/A)	NA
Additional Documents	1 set (PDF/A)	4 sets (PDF/A)	NA
Job Photographs	1 set (TIFF)	2 sets (TIFF)	NA
Job Videos	1 Set (MPEG 2)	2 Sets (MPEG 2)	NA

* Each paper copy of an O&M manual shall have an electronic copy of the Manual in a fitted sleeve attached on the inside of the front cover of the binder for the Manual. These shall be furnished to the Operating Bureau in accordance with the requirements Section 01 78 25 - Operation and Maintenance during the progress of the work. Two extra electronic sets of each manual or two compilation sets be furnished as part of the Final Record Documents.

SECTION 01 78 39 – FINAL RECORD DOCUMENTS
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

**SECTION 01 78 40 – RECORDS IN PAPER FORMATS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the requirements for all Final Record Documents to be produced in paper formats.
- B. Expected longevity of paper documents without significant deterioration under normal use and storage conditions.
- C. Properties of the paper and of the printing processes, and the tests required to demonstrate these properties.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 78 39 - Final Record Documents

SECTION 01 78 40 – RECORDS IN PAPER FORMATS
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B. Section 01 78 25 - Operation and Maintenance Manuals

1.04 REFERENCES

A. Definitions:

1. Small-Format Documents: 11 inches by 17 inches or smaller
2. Large-Format Documents: larger than 11 inches by 17 inches

B. Reference Standards:

1. ANSI/NISO Z39.48 - Permanence of Paper for Publications and Documents in Libraries and Archives

1.05 DESCRIPTION

A. Final Record Documents

For the Final Record Documents specified in Section 01 78 39 - Final Record Documents, the following directions shall apply.

1. Drawings

a. As specified in Section 01 78 39 - Final Record Documents, provide full size, paper copies of the Final Copy Shop Drawings and As-Built Drawings (if required).

1) Bid Set and Conformed Drawings are not required to be furnished as paper copies but shall be furnished as part of the electronic archives.

b. Paper copies are to be produced from the electronic copies.

2. Bid Set - Contract

a. A single set of the Bid Set Contract in paper format shall be provided by the Contractor, and it shall be identical to the copy distributed for bid. They shall be furnished as bound volumes.

b. All Addenda shall be produced in paper format by the Contractor. Each Addendum shall be bound separately and include all attachments including sketches and drawings. Drawings shall be attached using half-size drawings (11 inches x 17 inches).

3. O&M Manuals

a. As required in Section 01 78 25 - Operation and Maintenance Manuals, submit hard bound copies and electronic copies of each O&M Manual during the progress of the Work.

b. No additional paper copies are required to be submitted as part of the Final Record Documents.

SECTION 01 78 40 – RECORDS IN PAPER FORMATS
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4. Key Documents
 - a. Key Documents, as defined in Section 01 78 39 - Final Record Documents, are not required to be produced in paper format.
 5. Change Orders
 - a. Change orders are not required to be produced in paper format.
 6. Job Photographs
 - a. The job photographs are not required to be produced in paper format for purposes of the Final Record Documents.
 7. Additional Documents
 - a. Additional Documents are not required to be produced in paper format.
- 1.06 QUALITY ASSURANCE
- A. Testing
 1. Test Method: All printing processes and materials used to produce the documents covered by this Section shall be tested periodically to ensure proper function, using the National Archives and Records Administration Technical Information Peel Test.
 2. Test Frequency: All printing processes and materials used to produce the documents covered by this Section shall be tested not less than twice a day, once at the beginning of the work day, and once at the end of the work day.
 - B. Inspections
 1. DEP may carry out inspections of the production facilities without notice.
- 1.07 SUBMITTALS
- A. Paper Certification: All documents covered by this Section shall be accompanied by a certification from the manufacturer of the paper that it complies with ANSI/NISO Z39.48.
 - B. Printing Test Certification: The organization that operates the printing processes and materials used to produce the documents covered by this Section shall submit the following documentation as proof that the tests have been carried out:
 1. An affidavit, signed by the supervisor responsible for the production area, certifying that the tests have been performed in accordance with the procedures described in the National Archives and Records Administration Peel Test.
 2. All of the Peel Test targets actually used to perform the tests.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Not Used

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1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Properties of Paper

1. All paper used for documents covered by this Section shall conform to the standards of ANSI/NISO Z39.48, as amended herein, for pH, tear resistance, alkaline reserves and paper stock.
2. Paper Stock
 - a. Uncoated paper shall be used.
 - b. Uncoated paper shall not be less than 24 pounds basis weight.

B. Printing Processes

1. Small Format Documents, With Color Images and with Black and White Images
 - a. Only electro-photographic printing shall be used. When color electro-photographic printing is used, the process shall be certified by the manufacturer of the printer as not soluble in water, chemically stable, and resistant to fading, for a period of not less than 50 years. All documents printed using a color electro-photographic printer shall be accompanied by a certification from the manufacturer of the printer that the process is in compliance with this requirement.
2. Large-Format Documents, With Black and White Images
 - a. Only electro-photographic printing shall be used. Large-Format Documents shall be printed in black and white, unless color is an essential information component of the document. An example of documents where color may be an essential information component is a topographic drawing produced from data in a Geographic Information System. Color prints, when required, shall comply with the provisions specified below.
3. Large-Format Documents, With Color Images and with Black and White Images

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- a. Either electro-photographic or inkjet printing shall be used. When inkjet printing is used, a formulation of ink shall be used that is certified by the manufacturer of the printer as not soluble in water, chemically stable, and resistant to fading, for a period of not less than 50 years. All documents printed using an inkjet printer shall be accompanied by a certification from the manufacturer of the inks that the inks are in compliance with this requirement.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 APPLICATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

SECTION 01 78 40 – RECORDS IN PAPER FORMATS
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

SECTION 01 78 42 – RECORDS IN ELECTRONIC FORMATS
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. This Specification describes the requirements for the electronic records for the items specified in Section 01 78 39 - Final Record Documents
- B. This Specification does not cover digital objects which include a time base correction code (e.g., analogue or digital video recordings, analog or digital audio recordings, instrumentation data feeds, etc.), or geo-coded objects (produced by Geographic Information Systems (GIS)).
- C. This Specification does not cover digital records stored in EPMIS.
- D. Exhibit A – Folder Structure
- E. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

**SECTION 01 78 42 – RECORDS IN ELECTRONIC FORMATS
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1.03 RELATED SECTIONS

- A. Section 01 32 30 - Job Photographs and Videos
- B. Section 01 78 39 - Final Record Documents
- C. Section 01 78 40 - Records in Paper Formats

1.04 REFERENCES

- A. ANSI/AIIM MS44 – Recommended Practice for Quality Control of Image Scanning
- B. ANSI/AIIM MS52 – Recommended Practice for the Requirements and Characteristics of Original Documents Intended for Optical Scanning
- C. ANSI/AIIM TR34 – Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management and Micrographic Systems
- D. ISO 19005-1 - Document Management -- Electronic document file format for long-term preservation - Part 1: Use of PDF 1.4 (PDF/A-1).

1.05 DESCRIPTION

- A. Archive: For the purposes of this Section, to Archive shall mean to furnish as a Final Record Document.
- B. Metadata: Metadata is commonly defined as “data about data.” For the purposes of this Section, Metadata refers to the “descriptive metadata” that describes the content and form of the construction records known as Final Record Documents (i.e. contract name, document date, construction phase, engineer of record, etc.) and supports the discovery (searching) and identification of the resources.
- C. Portable Document Format-Archival (PDF/A): A standard that identifies a "profile" for electronic documents that ensures the documents can be reproduced the exact same way. A key element to this reproducibility is the requirement for PDF/A documents to be 100% self-contained. All of the information necessary for displaying the document in the same manner every time is embedded in the file. This includes, but is not limited to, all content (text, raster images and vector graphics), fonts, and color information. A PDF/A document is not permitted to be reliant on information from external sources (e.g. font programs and hyperlinks).

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

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1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. File Transfer Media

1. The current file transfer medium is a waterproof USB solid state drive (SSD) also known as a flash drive. Alternative file transfer media may be used, at the discretion of DEP.
2. The USB SSD used for producing the electronic Archives shall be:
 - a. Corsair Flash Survivor USB 3.0 with 256 gigabytes storage
 - b. Or approved equal.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Source of Electronic Records

1. In preparing the electronic records, the Contractor shall make every reasonable effort to obtain from the originator (e.g., the manufacturer) documents in their original electronic format and incorporate these in the Final Record Documents. Subject to the approval of the Engineer, electronic records may be scanned from a paper version only when the Contractor cannot obtain the electronic version from the originator.

B. Metadata

1. For each type of Final Record Document, a Metadata table shall be prepared in Microsoft Excel which will furnish the specified data for that document.

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The data elements shall be furnished to the Contractor by DEP prior to production of the Final Record Documents USB SSD.

2. The Metadata Excel tables shall be utilized as the Final Record Document Log. Templates for the Metadata Excel table for each Final Record Document will be provided by the DEP.
3. The Metadata Excel Table shall be included in the USB SSD of each Final Record Document type and shall serve as an index for the files of the record in the USB SSD. Each file indexed in the Metadata Table shall be hyperlinked so that clicking on the file name opens that file. The filenames given on the Metadata Table must exactly match the files on the USB SSD to which they are hyperlinked.
4. A sample Metadata Excel table will be provided by DEP.

C. File Compression, File Formats, and Quality Control

1. File compression is not permitted for any of the files in any format.
2. File formats acceptable to DEP are ISO 19005-1 Portable Document Format-Archival (PDF/A); Tagged Image File Format (TIFF), version 6.0 (“II” format) and AutoCAD. All files shall be delivered to DEP with file names that use the default file extension for each of the above formats.
3. Portable Document Format-Archival (PDF/A)
 - a. Security Settings: Records converted to PDF/A must have all security settings deactivated (e.g., encryption, master passwords, and/or permissions) prior to transfer to DEP. Deactivating security settings ensures DEP’s ability to support long term migration and preservation of the records.
 - b. Review of Special Features: Because of the complexities associated with certain PDF features, DEP will review PDF/A records containing special features on a case-by-case basis when the records are scheduled. Examples of special features include but are not limited to: digital signatures; links to other documents, files or sites; embedded files (including multimedia objects); form data; comments and/or annotations.
 - c. Fonts: Electronic records that have been converted to PDF/A from their native electronic formats must have all fonts referenced in the record embedded within the PDF file to guarantee the visual reproduction of all text as created. This requirement is met by having, as a minimum, subsets of all referenced fonts embedded within the PDF/A file. All fonts embedded in PDF/A records must be publicly identified as legally embeddable (i.e., font license permits embedding) in a file for unlimited, universal viewing and printing;

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- d. Scanning Production Requirements: Records converted from scanned images also must adhere to the production requirements described in Paragraph 6 below.
4. Tagged Image File Format (TIFF)
 - a. In the “II” format (i.e., little-endian), byte order is always from the least significant byte to the most significant byte.
 5. Vector Drawings
 - a. Each vector drawing (produced by a Computer-Assisted Design (CAD) system shall be delivered to DEP in two different file formats: Native AutoCAD and Portable Document Format (PDF/A).
 - b. Drawings will be “bound” to include all related matter, such as base files, font files, and shapes. Each file shall be viewable and printable, in its entirety, without recourse to external matter.
 6. Text Files
 - a. The file format for all text files, whether converted from office automation systems or scanned, is PDF/A.
 - b. The quality of documents to be scanned shall be governed by ANSI/AIIM MS52 "Recommended Practice for the Requirements and Characteristics of Original Documents Intended for Optical Scanning".
 - c. Quality Control in the scanning process shall follow the practices established in ANSI/AIIM MS44 “Recommended Practice for Quality Control of Image Scanning” and ANSI/AIIM TR34 “Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management and Micrographic Systems”. The sampling rates for each type of Quality Control (visual and printed) shall be established by written agreement with DEP. The Subcontractor producing Final Record Documents shall supply a description of the Quality Control inspection performed as part of the scanning process and a report on the results of the last inspection performed on the images and the date of that inspection.
 - d. Documents shall be scanned using equipment and scanning parameters sufficient to ensure full reproduction of all significant detail in the documents, such as (but not limited to) curved lines and fill in drawings, color and tonal gradations in photographic images, the smallest printed text, handwritten notes, and signatures. Records may be scanned in bitonal (1-bit) mode and 300 pixels per inch (ppi) or better only when the records consist exclusively of clean printed type possessing high inherent contrast (e.g., laser printed or typeset on a white background). Records shall be scanned in gray scale (8-

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bit) and 300 ppi or better when the records consist of textual documents of poor legibility because of low inherent contrast, staining or fading (e.g., carbon copies, thermofax, or documents with handwritten annotations or other markings), or that contain halftone illustrations or photographs. Records shall be scanned in color (24-bit RGB) and 300 ppi or better when the records contain color information important to interpretation or content.

7. Digital Photographs
 - a. The file format for digital photographs is TIFF.
 - b. Photographic (raster) images shall be produced directly by digital cameras.
 - c. Digital cameras shall produce records with true optical resolution. Images shall not be resized or interpolated to a higher resolution from a lower resolution.
 - d. Photographic images shall be provided as continuous-tone (8-bit) gray scale or color (24-bit or 48-bit RGB) raster images.
 - e. Digital camera files shall be captured as specified in Section 01 32 30 - Job Photographs and Videos.

8. LIDAR survey files
 - a. The file format for LIDAR point cloud data is LAS.
 - b. The LIDAR survey data, including the position and orientation of all point clouds, shall be registered to the same reference coordinate system.
 - c. Pre-processing of LIDAR data shall include registering each individual scan into the same reference coordinate system and filtering out noise points from raw scanning data.
 - d. The LIDAR survey data shall be post-processed to create a control survey referenced, 3D CADD model that incorporates the completed excavation surface and site grading of the Project area.

3.02 IMPLEMENTATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

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3.05 ADJUSTING / PROTECTION / CLEANUP

 A. Not Used



END OF SECTION

SECTION 01 78 42 – RECORDS IN ELECTRONIC FORMATS
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EXHIBIT A
USB SSD Folder Structure

The USB SSD shall have a folder structure similar to the ones shown below.

For a USB SSD with one set of Final Record Documents

“ KENS-EAST-2 – Bid Drawings (PDF Files)
 Metadata Table- KENS-EAST-2 – As-Built Drawings - PDF.xls”

For a USB SSD with more than one set of Final Record Documents:

“ KENS-EAST-2 – Bid Drawings (PDF)
 KENS-EAST-2 – Bid Drawings (PDF Files)
 Metadata Table- KENS-EAST-2 – As-Built Drawings - PDF.xls”
“ KENS-EAST-2 – Bid Drawings (AutoCAD)
 KENS-EAST-2 – Bid Drawings (AutoCAD Files)
 Metadata Table- KENS-EAST-2 – As-Built Drawings - AutoCAD.xls”

**SECTION 01 79 05 – EQUIPMENT START-UP AND TRAINING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Representatives of Equipment Manufacturers
2. Start-up Services
3. Training of plant personnel
4. Lesson plans
5. Training aids
6. Qualifications of training specialists

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A.** No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

SECTION 01 79 05 – EQUIPMENT START-UP AND TRAINING
CONTRACT KENS-EAST-2

1.03 RELATED SECTIONS

- A. Section 01 75 10 – Preliminary and Final Field Tests

1.04 REFERENCES

- A. Not Used

1.05 DESCRIPTION

- A. Representatives of Equipment Manufacturers:

1. The Contractor shall provide the services of qualified factory trained representatives of the equipment manufacturers, who shall provide the following services:
 - a. Supervise and assist in the installation of the equipment to ensure a proper installation of the equipment.
 - b. Check the installation of the equipment and make all necessary adjustments prior to placing the equipment in service.
 - c. Supervise the preliminary and final equipment and system field test Work specified in Section 01 75 10 - Preliminary and Final Field Tests.
 - 1) Additional acceptance testing supervision resulting from the failure to meet the specified performance requirements shall be at the Contractor's expense.
 - d. Conduct training of DEP personnel as specified herein. One day of training by a manufacturer's representative shall be defined as a minimum of eight (8) hours on-Site.
2. The manufacturers' representatives shall devote, at a minimum, the amount of full time specified under the Contract Documents.
3. The Contractor shall coordinate all equipment start-up services and training with the City, the Engineer and the manufacturers.

- B. Start-Up Services:

1. The equipment start-up and initial operating period shall begin after satisfactory completion and acceptance of the preliminary and final equipment field tests and preliminary system field tests. The start-up and initial operating period shall demonstrate that the equipment functions as specified and shown under actual operating conditions by operating continuously for at least twenty-eight (28) days with no more than twenty-four (24) hours of total down time and no more than four (4) unscheduled shutdowns. Equipment start up and initial operating period shall be complete after a minimum of twenty-eight (28) days of continuous operation and when the manufacturer and the Engineer have mutually agreed that the equipment is in suitable condition for continuous operation.

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2. During the equipment start up and initial operating period, the Contractor shall furnish the services of factory trained specialists of the equipment manufacturers for the equipment to assist in the start-up and operation of the equipment.
- C. Training:
1. As part of these services, the City will provide the necessary personnel to be trained in the operation and maintenance of the equipment. Training shall occur after the initial operational period is complete.
 2. The training shall consist of both classroom and field instruction. The purpose of field instruction shall be to reinforce topics covered in the classroom and to identify the location of any valves, pushbuttons, control panels switches, and other equipment required for operation; and to identify the location of any maintenance equipment such as grease fittings, oilers, isolation valves, safety lockout switches, and other equipment.
 3. All training shall take place at the Work Site at a place specified by the City and shall be conducted by qualified training specialists.
 4. Separate training sessions shall be conducted for City mechanical operations and maintenance personnel and for City electronic and electrical maintenance personnel.
 5. The Contractor shall coordinate the manufacturers training services with the City and the Engineer, providing a minimum of fourteen (14) days prior notice of training, subject to the approval of the Engineer and the City.
 6. In order to provide training for an adequate number of City operation and maintenance personnel, a minimum of two 8-hour training days shall be provided for each item of equipment, unless otherwise specified in the Contract Documents.
 7. Training shall be limited to no more than two days per week. No training shall be conducted on Mondays and Fridays. The two days cannot be consecutive days.
 8. The Contractor shall deliver all training material, including any training videos or presentations, to the Engineer and the City a minimum of 14 days prior to the scheduled training.
 9. All recorded videos shall be professionally done.
- D. Lesson Plans:
1. The Contractor shall submit the equipment manufacturer's lesson plans, which shall include specific information about each item of equipment or equipment system, including controls. Lesson plans shall include but not be limited to the following information and meet the following requirements:

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- a. The Contractor shall submit the equipment manufacturer's lesson plans for approval by the Engineer no less than sixty (60) days prior to the date that the training is to take place.
 - b. Lesson plans shall indicate the estimated duration of each segment of the training and the training audience that the instruction is to address. The training audience refers to City mechanical operation and maintenance personnel and City electronic/electrical maintenance personnel, as appropriate.
 - c. The lesson plan shall indicate when training aids are used or referred to during the course of instruction.
2. An outline of required lesson plan contents is included below:
- a. Equipment Description:
 - 1) Purpose and function of equipment and auxiliary equipment and systems.
 - 2) Physical arrangement of equipment components and electrical supply.
 - 3) General function of controls, including automatic and manual operation, interlocks, and shutdowns.
 - b. Equipment Operation:
 - 1) Operating requirement for equipment to perform satisfactorily.
 - 2) Typical operating characteristics.
 - 3) Start-up and shutdown procedures.
 - 4) Use of controls.
 - c. Equipment Monitoring:
 - 1) Recommended routine instrument readings and operational checking.
 - 2) Early warning signs of developing operational or equipment problems.
 - 3) Procedures for handling non-routine problems such as alarms, power failures, component failures, etc.
 - d. Equipment operational trouble-shooting procedures.
 - e. Safety and Housekeeping:
 - 1) Safety features of the equipment.
 - 2) Safe practices.
 - 3) Housekeeping practices.

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- f. Description of the use of the equipment manufacturer's O&M Manual as regards operation.
- g. Preventive Maintenance Requirements:
 - 1) Maintenance needs for equipment.
 - 2) Identification of procedure to satisfy maintenance need (relate to equipment manufacturer's O&M Manual, which should have detailed descriptions of maintenance procedures).
 - 3) Outline or summarize procedures.
 - 4) Recommended schedule for performing preventive maintenance.
 - 5) Provide preventive maintenance record forms (if available).
- h. Maintenance Inspection Program:
 - 1) Parts, components and areas of equipment to inspect for routine preventive maintenance.
 - 2) Recommended frequency of inspection.
 - 3) Inspection procedures.
 - 4) Problem identification.
- i. Maintenance Trouble-shooting:
 - 1) Sections in O&M Manual detailing trouble-shooting procedures.
 - 2) Summarize trouble-shooting procedures.
 - 3) Testing equipment used in trouble-shooting.
 - a) Demonstration of use of specialized testing equipment if supplied with equipment.
 - b) Other testing equipment.
 - 4) Tests used to verify trouble-shootings findings.
- j. Disassembly and Assembly:
 - 1) Summarize disassembly and assembly procedures.
 - 2) O&M Manual coverage of subject.
 - 3) Testing to verify success of corrective maintenance.
- k. Equipment Calibration:
 - 1) Calibration needs and tolerances.
 - 2) Calibration equipment.

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3) O&M Manual listing of calibration ranges, tolerances and settings.

l. Name, address and telephone number of nearest parts supply house and nearest repair service center.

m. Warranty information and service contract description, if applicable.

E. Training Aids:

1. Training aids shall be used as an integral part of the training program. Training aids shall include text and/or pictorial handouts specific to the equipment supplied. Handouts shall be legible and printed on good quality stock. Handouts shall be submitted when lesson plans are submitted.

2. Additional training aids shall be used for maximum training effectiveness and shall include the following as appropriate:

a. Audio-visual aids, for example, videos, PowerPoint presentations, flow charts, posters, diagrams, and catalogue cuts.

b. Models and samples, for example, cutaways, spare parts, tools, miniature models, equipment assemblies, and damaged parts.

3. The use of additional training aids shall be identified in the lesson plan, and a description of the additional training aids shall be given.

1.06 QUALITY ASSURANCE

A. The Contractor shall submit the equipment manufacturer's documentation of the qualifications of their proposed training specialists for approval by the Engineer sixty (60) days prior to the date of proposed training. The documentation shall include the experience of the training specialists in operation and maintenance of the equipment and a summary of training experience.

B. Only those training specialists whose qualifications have been approved by the Engineer shall conduct training.

1.07 SUBMITTALS

A. Not Used

1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

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- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
 - A. Not Used
- 2.02 MATERIALS / EQUIPMENT
 - A. Not Used
- 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

- PART 3 EXECUTION
- 3.01 EXAMINATION / PREPARATION
 - A. Not Used
- 3.02 APPLICATION
 - A. Not Used
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

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NO TEXT ON THIS PAGE

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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, tools, and equipment to perform all operations necessary to characterize, classify and determine the requirements for handling, reuse and disposal of all materials to be excavated.
- B. The primary method of characterizing soils shall be through in-situ sampling. No stockpiling of excavated material on-site or ex-situ sampling will be allowed without written approval from the Engineer.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 35 27 - Environmental, Health and Safety Requirements
- B. Section 01 35 45 - Hazardous Materials Control

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- C. Section 01 74 20 - Construction Waste Management
- D. Section 31 23 19 - Dewatering
- E. Section 31 23 16 - Excavation
- F. Section 31 23 23 - Fill
- G. Section 31 25 10 - Dust, Soil Erosion and Sediment Control

1.04 REFERENCES

A. Definitions

1. Analyte-free Water: Water containing less than the detection limits for volatile organics, pesticides, PCBs and inorganics. Compliance shall be verified either by the supplier or by an analytical laboratory.
2. Case-Specific Beneficial Use Determination (BUD): Under 6 NYCRR Part 360, Section 360.12(d), NYSDEC sets forth the requirements for petitioning NYSDEC to obtain a Case-Specific BUD, and the criteria for reviewing, granting, or denying of the BUD. For reuse of a solid waste to be determined a beneficial use, the petition must satisfy all criteria outlined under 6 NYCRR Part 360, Section 360.12(d).
3. Composite Sample: Composite sampling is comprised of grab samples which are initially collected from within a grid area and then combined into a single sample. This sample is representative of the entire grid area from which the grab samples were collected.
4. Excavated Material: All material regardless of its nature, except rock or boulders that have been excavated. Refer to Section 31 23 16 – Excavation.
5. Ex-situ Soil Sampling: Sampling of soil that has been excavated and stockpiled.
6. Fill: Soil and similar material excavated or brought to the project site for the purposes of construction. All fill material must meet the requirements of Section 31 23 25 – Fill. Fill from an off-site source shall be non-hazardous.
7. Grab/Discrete Sample: A single sample is collected at a particular time and place that represents the composition of the soil only at that time and place.
8. In-situ Soil Sampling: Sampling of soil prior to excavation and most representative of undisturbed conditions.
9. Pre-Determined Beneficial Use for fill material: Under 6 NYCRR Part 360, Section 360.13(b) Waste cessation. “Fill material ceases to be solid waste in accordance with the following:
 - a. Restricted-use fill and limited-use fill – once delivered to the site of reuse;
 - b. General fill generated outside of the City of New York – once a determination that it is general fill has been made;

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- c. General fill generated within the City of New York – once delivered to the site of reuse.”
 - d. Under 6 NYCRR Part 360, Section 360.13 (c), Exemption for on-site reuse of fill material. “Fill material used as backfill for the excavation from which the fill material was taken, or as fill in areas of similar physical characteristics on the project property is exempt from regulation” under 6 NYCRR Part 360. “If fill material exhibits historical or visual evidence of contamination (including odors), and will be used in an area with public access, the relocated fill material must be covered with a minimum of 12 inches of soil or fill material that meets the criteria for general fill, as defined in” Section 360.13, Special requirements for pre-determined beneficial use of fill material.
10. Qualified Environmental Professional (QEP): “a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified” in 6 NYCRR Part 360, Section 360.2(b)(213). An Environmental Professional (EP) as defined in Section 01 35 27 – Environmental, Health and Safety Requirements may meet the requirements of a QEP.
11. Waste Classification:
- a. Regulated Solid Waste:
 - 1) Construction and Demolition (C&D) Debris: Waste resulting from the construction, remodeling, repair and demolition of structures, buildings and roads. Such waste includes fill material, demolition wastes, and construction wastes. Materials that are not C&D debris (even if generated from construction, remodeling, repair, and demolition activities) include municipal solid waste, friable asbestos-containing waste, corrugated container board, electrical fixtures containing hazardous liquids such as fluorescent light ballasts or transformers, fluorescent lights, furniture, appliances, tires, drums, fuel tanks, containers greater than 10 gallons in size, and any containers having more than one inch of residue remaining on the bottom.
 - 2) Hazardous Solid Waste: Material shall be considered a characteristic hazardous solid waste when it exhibits any of the following: ignitability, corrosivity, reactivity, or toxicity for Volatile Organic Compounds (VOCs), semi-VOCs (SVOCs), metals, pesticides, or herbicides, as defined in 6 NYCRR Part 371 or 40 CFR Section 261. Under New York State (NYS) regulations, a material that contains 50 ppm or

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greater of PCBs is considered a hazardous waste. The Environmental Protection Agency (EPA) considers a material that contains 50 ppm or greater of PCBs to be a Toxic Substances Control Act (TSCA)-regulated waste. All hazardous waste shall be considered unsuitable for reuse, and shall be disposed of at an approved permitted hazardous waste landfill.

3) Non-Hazardous Contaminated Waste: Non-hazardous contaminated waste includes soil commingled with or containing other waste, petroleum and petroleum products, except those present solely as a result of normal use of vehicles on roadways or parking areas, and pesticides except those present solely as a result of the proper application in normal agricultural or horticultural practices. Physical evidence that soil is contaminated shall include visual identification of waste, chemical odors, vapor emission, and chemical staining.

4) Non-hazardous Petroleum-contaminated Waste: Exhibits a discernible petroleum-type odor, contains visible petroleum product, or may be associated with a reported spill.

b. Non-regulated Solid Waste: This applies to materials that, before being beneficially used (as determined by the NYSDEC or applicable out-of-state regulatory agency) were solid waste. Material used as described in 6 NYCRR Part 360, specifically Section 360.12(c) and Section 360.12(d) is no longer considered solid waste.

B. Reference Standards

1. EPA QA/G-4, Guidance on Systematic Planning Using the Data Quality Objectives Process, February 2006 or latest revision
2. USEPA Office of Solid Waste, Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (SW-846), Third Edition, December 1996 with updates or latest revision
3. USEPA 40 CFR Chapter I, Subchapter R, - Toxic Substance Control Act (TSCA), Part 761 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
4. NYSDEC regulations, 6 NYCRR Part 360, Solid Waste Management Facilities General Requirements
5. NYSDEC regulations, 6 NYCRR Part 371, Identification and Listing of Hazardous Wastes (40 CFR Part 261)
6. NYSDEC regulations, 6 NYCRR Part 375, Environmental Remediation Programs
7. American Society for Testing and Materials (ASTM) Standards:

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- a. D422 - Method for Particle-Size Analysis of Soils.
- b. D1556 - Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
- c. D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))
- d. D6938 - Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.05 DESCRIPTION

A. Sampling Requirements

1. Fill Material:

- a. Material to be excavated and proposed for reuse as fill under a Pre-Determined Beneficial Use must meet the requirements of 6 NYCRR Part 360, Section 360.13(a), Applicability, Section 360.13(b), Waste Cessation, or Section 360.13(c), Exemption for On-site Reuse of Fill Material. If these criteria cannot be met, such material must meet Section 360.12(d), Case-specific beneficial use determinations - general.
- b. Under 6 NYCRR Part 360, Section 360.13, soil may be determined by the Contractor's QEP to be suitable for reuse, without sampling, if any of the following criteria can be satisfied:
 - 1) "Fill material generated outside of New York City with no evidence of historical impacts such as reported spill events, or visual or other indications (odors, etc.) of chemical or physical contamination" as referenced in Part 360.13(a)(2), and does not originate "from a site with industrial land use as defined in 6 NYCRR Part 375-1.8(g)(2)(iv)" as referenced in Part 360.13(d)(2)(ii).
 - 2) "Fill material originates from a location within the City of New York unless the quantity of fill material does not exceed ten cubic yards from one site and the ten cubic yards or less of material does not contain historic evidence of impacts such as reported spill events, or visual or other indication (odors, etc.) of chemical or physical contamination" as referenced in Part 360.13(d)(1).
 - 3) Exemption for on-site reuse of fill material under 6 NYCRR Part 360, Section 360.13 (c).
- c. Sampling, pursuant to 6 NYCRR Part 360, Section 360.13(d), is required when the above criteria cannot be met as determined by the Contractor's QEP. Fill material samples shall be analyzed for, at a

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minimum, metals, PCBs/pesticides, and SVOCs as listed in 6 NYCRR Part 375, Subdivision 375-6.8(b) per 6 NYCRR Part 360.13(e)(2)(i). In addition, and only if site conditions warrant, fill material shall also be analyzed for additional parameters as referenced in Part 360.13(e)(2)(ii-iv).

- d. Sampling is performed within the planned excavation boundaries at frequencies as defined in 6 NYCRR Part 360, Section 360.13(e)(1), Table 1: Minimum Analysis Frequency for Fill Material, unless otherwise required by the beneficial use facility / treatment, storage, and disposal facility (TSDF).
 - e. Analytical data is used to determine acceptable fill material uses (general fill, restricted-use fill, and limited-use fill), as defined in 6 NYCRR Part 360, Section 360.13(f), Table 2: Fill Material Beneficial Use.
 - f. If it is determined by the Contractor's QEP during construction that soils cannot be reused in New York State, additional sampling shall be performed to meet the out-of-state beneficial use facility / TSDF requirements.
2. When relocating soils on the same site, hazardous soils, non-soil wastes, or hot spots, as evidenced by visual observation, hand-held instruments or analytical results, must not be incorporated. All such material shall be removed for disposal off-site. Soil sample results greater than 5 ppm lead by Toxicity Characteristic Leaching Procedure (TCLP) shall be reported to the Engineer immediately.

B. Off-Site Beneficial Use Facility / TSDF

1. The Contractor shall submit the name(s) of the selected off-site soil beneficial use facilities / TSDFs and their location(s) to the Engineer for approval.
2. Reuse of excavation spoils off-site must be prioritized over disposal. TSDFs shall only be approved where reuse options are not available.
3. Note that some companies may have multiple beneficial use facilities or TSDFs, each possessing differing requirements regarding the types of materials accepted, the specific analytical testing parameters that must be performed for each material, and the frequency of sampling required for each material. It is the Contractor's responsibility to determine the types of materials accepted, specific waste acceptance criteria (analytical parameters) and frequency of testing requirements for each of its proposed facilities.
4. The Contractor shall confirm the location(s) and permit status, as well as check for outstanding violations and enforcement actions at each selected beneficial use facility / TSDF. The Engineer shall verify the information provided by the Contractor for each facility prior to approval.

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5. If an approved facility is not available during construction, the Contractor shall be fully responsible for procuring alternate approved facilities at no additional cost to the City. Any additional sampling and analysis required and labor involved in selecting new facilities after the initial reuse or disposal facilities are accepted shall be the responsibility of the Contractor.
- C. Project Conditions
1. Stockpiling: No stockpiling of excavated material on-site or ex-situ sampling will be allowed without written approval from the Engineer. Soils stockpiled for onsite reuse do not require sampling if they meet the conditions in Article 1.05.A.1.b.
 - a. If stockpiling is considered necessary, and approved by the Engineer, sampling shall be conducted by collecting representative grab samples throughout the soil stockpile. Surface soil shall not be used as sampling material. Multiple samples shall be classified based on biased worst case to be considered fully representative of the soils being sampled for reuse in New York State. The Contractor is also required to satisfy the specific sampling requirements of the beneficial use facility or TSDF.
 - b. During stockpiling activities, the Engineer may identify quantities within each 300 cubic yard portion that differ in appearance from the bulk of the material as per 6 NYCRR Part 360, Section 360.13(e)(1) Table 1. In this case, the Engineer will direct the Contractor to segregate these variable materials for separate stockpiling on-site.
 - c. All stockpiles of excavated materials shall be managed on site as required in Section 31 25 10 – Dust, Soil Erosion and Sedimentation Control.
 2. Decontamination of Sampling Equipment: All sampling equipment shall be certified clean or precleaned, prior to collection of each sample, by the following method:
 - a. Wash all sampling equipment, secondary containers (e.g., mixing bowls for composite sampling) and aluminum foil with non-phosphate laboratory grade detergent and distilled water.
 - b. Triple rinse with distilled water.
 - c. Rinse with isopropyl alcohol, or if samples are visibly contaminated with petroleum use a solvent, such as hexane or other alternate approved by the Engineer.
 - d. Triple rinse with analyte-free water.
 3. Disposal of Decontamination Solutions: Collect all decontamination solution and dispose of it through a licensed chemical waste disposal service if unsuitable for treatment on-site by incorporation into existing on-site treatment processes as defined in Section 31 23 19 – Dewatering.

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1.06 QUALITY ASSURANCE

A. Laboratory Requirements:

1. The Contractor shall provide the services of a laboratory certified by the New York State Department of Health Environmental Laboratory Approval Program (NYSDOH-ELAP) to perform applicable testing and chemical analyses for the duration of the Work.
2. The laboratory shall also meet the certification requirements of the beneficial use facility / TSDF that will be utilized by the Contractor for the duration of the Work.

B. Permits and Regulations:

1. The Contractor shall obtain all necessary permits and perform all Work in compliance with applicable requirements of OSHA, and other governing authorities having jurisdiction.

C. Field QA/QC Samples:

1. Shall be collected and analyzed in accordance with the protocol for site samples.
2. The number of QA/QC samples required for a quantity of soil shall meet all beneficial use facility / TSDF requirements, and the approval of the Engineer.

D. Sample Turn-Around: The Contractor shall provide for prompt sampling and turn-around of analysis so as not to delay the Project. If a turn-around time of less than ten (10) business days is required due to delays in construction scheduling or other constraints, Contractor shall provide for such at no additional cost to the City.

1.07 SUBMITTALS

A. The Contractor shall submit Shop Drawings and other materials, including, but not limited to, those listed below for the approval of the Engineer. Where the Contractor's QEP determines that no sampling is required, at a minimum a Field Sampling Plan per Article 1.07.A.2 shall be submitted.

1. DEP Environmental, Health, and Safety (EHS) Drilling and Boring Checklist: The Contractor shall work with the Engineer and BEDC to complete all necessary portions of the EHS Drilling and Boring Checklist. This shall be completed and submitted to the Engineer a minimum of 60 days prior to the proposed commencement of the drilling/boring work. No drilling/boring work shall be performed at the Site without completion and written approval of the EHS Drilling and Boring Checklist from the Engineer. Updates to the checklist shall be completed and submitted whenever there is a change of the drilling subcontractor or scope of drilling/boring work; or new EHS hazards have to be considered in performing the Work.
2. Field Sampling Plan (FSP): A FSP, prepared by the Contractor's QEP, shall be submitted to the Engineer for approval 30 days following Notice to

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Proceed. The Engineer will approve the FSP only if it clearly provides a means to collect the information necessary to allow for classification of all material proposed for excavation and if it will ultimately generate data necessary for on-site reuse as per 6 NYCRR Part 360, Section 360.13, or Section 360.12 (d), or to gain approval from the Contractor's chosen off-site beneficial use facility / TSDF. No sampling shall be conducted until the Engineer has reviewed and formally approved the FSP in writing. The FSP shall include the following at a minimum:

- a. Protocols for the collection and analysis of samples that represent all soils to be excavated.
- b. Each composite sample will be comprised of multiple (3-5) discrete samples that are representative of the horizontal and vertical extent of the excavation footprint.
 - 1) When VOC analysis is required, two (2) discrete (biased worst case) VOC samples will be collected for every one (1) composite sample.
 - 2) When soils are visibly heterogenous, composite and discrete (for VOCs, when applicable), samples will be obtained to represent each visually different stratum or section of the excavation site, regardless of the overall excavation volume.
- c. A detailed outline of the BUD or beneficial use facility / TSDF requirements for sampling, testing and analysis including specific number and types of samples per unit volume of soil to be excavated.
- d. Parameters analyzed for soils to be reused or disposed, as defined in 6 NYCRR Part 360, Section 360.13 (e), in addition to any other parameters required by the beneficial use facility / TSDF.
- e. A scaled site map showing:
 - 1) existing fixed landmarks;
 - 2) proposed excavation limits or area to be excavated divided into distinct vertical and horizontal grids, identifying the volume of soil or fill that each sample will represent;
 - 3) specific sampling locations that are representative of the entire depth of excavation and that will conform to the applicable sampling frequency requirement;
 - 4) identification numbers of the sample grids, relative depth, sampling intervals, and volumes reflective of the Contractor's excavation method.
 - a) Sampling intervals shall account for existing subsurface data, historic sampling information, including descriptions, depths, orientation, and location of material of potentially different

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- classifications, and shall minimize undue mixing of excavated soils.
- f. Proposed sampling, handling, preservation, and storage of equipment procedures, including transfer procedures, and sampling equipment decontamination procedures.
 - g. Proposed analytical methods, in accordance with SW-846, latest edition, for the analyses to be performed.
 - h. Procedures for assessing precision, accuracy, degree of representation, comparability and completeness of samples and data, including performance audits and proposed protocols for corrective measures where problems are identified in accordance with Article 1.06 -- Quality Assurance.
 - i. Schedule of field inspections.
 - j. A statement that the sampling program is in accordance with the Contract requirements.
 - k. Manufacturer, catalog data and calibration records of all analytical equipment to be used on-site.
 - l. Name and address of analytical laboratory, copy of laboratory certification, and Quality Assurance Manual.
 - m. Description of QA/QC samples and any additional requirements of the reuse or disposal facilities.
 - n. The organizational structure of the Contractor's and all Subcontractors' quality management (QM) personnel, including:
 - 1) names, titles and contact information;
 - 2) resumes;
 - 3) responsibilities;
 - 4) authorities; and
 - 5) qualifications.
3. Field Sampling Summary Report (FSSR): Hard copies of the FSSR shall be submitted to the Engineer for review in a timeframe, dependent on the extent of the data collection effort, determined by the Engineer at the time. The FSSR shall contain all laboratory analytical results obtained from the field sampling event and shall allow the Engineer to determine if the soil is acceptable for beneficial use or requires disposal at a permitted TSDF. At minimum, the FSSR shall include the following information:
- a. A detailed account of any field procedures used which deviated from those established in the FSP.
 - b. A summary table listing the analytical results (with individual ID for each sample) with highlighted exceedances of 6 NYCRR Part 360,

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Section 360.13 (f), Table 2: Fill Material Beneficial Use, all beneficial use facility / TSDf acceptance criteria, and RCRA characteristics, as applicable.

- c. Location of each sampling point (using individual ID from analytical results summary table) on the scaled site map created in the FSP.
- d. A complete set of field notes collected and maintained by the Contractor during sampling. The field notes shall be made available to the Engineer during the sampling program.
- e. Boring or probe logs from each sampling location containing a continuous stratigraphic description of all material encountered. Descriptions of material shall include, but not be limited to, color, odor, staining, field screening measurement, relative grain size distribution, material composition, moisture content, and cohesive properties.
- f. Depth intervals for each sample, whether a grab or composite, and any special notes, which are included on the laboratory chain-of-custody forms.
- g. Copies of all laboratory chain-of-custody forms for samples that are collected for analysis.
- h. Analytical Results: The Contractor shall submit analytical results for sampled soil material to the Engineer within three (3) business days of receiving such data from the laboratory. Analytical results data shall be managed by utilizing a computer spreadsheet or database program as approved by the Engineer. Data shall be organized in such a way that all samples may be tracked from collection through analysis.
 - 1) The analytical results generated for a ten (10) business day turn-around time deliverable shall include a Form I (or equivalent) showing compounds analyzed for, and concentrations detected, and associated chain-of-custody reports to the Engineer.
 - 2) The final data package generated by the laboratory shall include the following information:
 - a) A Form I showing pertinent physical data presented in concise, easy to follow formats (i.e., sample number, laboratory ID, client, date of sample preparation, date analyzed, percent moisture, dilution factor, sample matrix, units, undetected and detected compounds, etc.).
 - b) Reference to analytical methodology used.

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- c) General discussion including a description of sample types, tests performed, any problems encountered, and any general comments (case narrative).
 - d) Data from each discrete sample reported using cross-referencing between site samples and quality control samples and including all pertinent dates, information and reporting limits.
 - e) Associated quality control samples such as blanks, spikes and spike duplicates, laboratory duplicates, laboratory control samples, field duplicates and appropriate check standards.
 - f) Copies of chain-of-custody sheets.
- 3) The information must be delivered on CD or via electronic mail to the Engineer. All electronic data must be certified to be virus-free.

- B. Monthly Submittals: Monthly soil generation/diversion (on site and off site reuse)/disposal data shall be tracked in accordance with Section 01 35 27 – Environmental Health and Safety Requirements, paragraph 1.07.C Monthly Contractor EHS Report, and 01 74 20 – Construction Waste Management.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Sample Identification:

- 1. All samples shall be identified with a sample label in addition to an entry on a chain-of-custody record. The label shall be identified upon receipt by the laboratory and cross-referenced to the chain-of-custody record.
- 2. Any inconsistencies shall be noted on the custody record. Laboratory personnel shall notify the Sampling and Analysis Manager immediately if any inconsistencies exist in the paper work associated with the samples, and Contractor shall collect new samples to replace those with inconsistencies which cannot be rectified.

- B. Sample Labels: The field team shall complete the following information on a sample label for each sample bottle:

- 1. Site Name
- 2. Job Number
- 3. Sample Number
- 4. Sample Description
- 5. Company Name
- 6. Parameters to be analyzed
- 7. Date
- 8. Time

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9. Preservation Technique Employed
 10. Sample labels shall be attached to the sample bottles
- C. Completion of Chain-of-Custody Record:
1. Maintain a chain-of-custody record on all samples. A chain-of-custody record is a printed multi-part form that accompanies a sample or group of samples as custody is transferred from person to person. A chain-of-custody record is a controlled document.
 2. As soon as is practical after sample collection, preferably after decontamination, the following information shall be entered on the chain-of-custody form. All information shall be recorded in ink.
 - a. Project number: Enter the alphanumeric designation assigned by the field team that uniquely identifies the project site.
 - b. Project name: Enter the site name.
 - c. Samplers: Sign the name(s) of the sampler(s).
 - d. Station number: Enter the sample number for each sample in the shipment. This number appears on the sample identification label.
 - e. Date: Enter a six-digit number indicating the year, month, and day of sample collection.
 - f. Time: Enter a four-digit number indicating the time of collection in 24-hour time, for example, 13:54.
 - g. Matrix/Type: Indicate the type of sample; composite or grab.
 - h. Station location: Describe the location where the sample was collected.
 - i. Number of containers: For each sample number, enter the number of sample bottles that are contained in the shipment.
 - j. Remarks: Enter any appropriate remarks.
 - k. Sample Shipment:
 3. Custody of samples shall be maintained throughout the shipment of samples to the selected laboratory (ies). All samples shall be packaged and shipped daily to ensure that no sample is held at the site more than 24 hours. Samples shall be delivered directly to the laboratory using the following procedures:
 - a. Use waterproof high-strength plastic ice chests or coolers only.
 - b. After filling out the pertinent information on the sample label and tag, put the sample in the bottle or vial and screw on the lid. For bottles other than VOC sample bottles, secure the lid with tape (tape on VOC bottles may cause contamination).
 - c. Place inert cushioning material such as vermiculite or "bubble-wrap" in the bottom of the cooler.

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- d. Enclose the bottles in clear plastic bags through which sample labels are visible, and seal the bag. Place bottles upright in the cooler in such a way that they do not touch and will not touch during shipment.
 - e. Put in additional inert packing material to partially cover sample bottles (more than half-way). Place double-bagged crushed ice around, among, and on top of the sample bottles.
 - f. Fill cooler with cushioning material.
 - g. Put paperwork (chain-of-custody record) in a waterproof plastic bag and tape it with packing tape to the inside lid of the cooler.
 - h. Tape the drain shut.
 - i. Secure lid by taping. Wrap the cooler completely with strapping tape at a minimum of two locations. Do not cover any labels.
 - j. Attach completed shipping label to top of the cooler.
 - k. Put "This Side Up" labels on all four sides and "Fragile" labels on at least two sides of coolers containing glass containers.
 - l. Ship the cooler overnight by commercial carrier (e.g., Federal Express, UPS), laboratory carrier or field personnel to the respective laboratory.
 - m. Custody forms for the samples shall be signed by the Contractor's designated representative who is relinquishing custody. The custody form shall include the air bill number, method of shipment, and time and date of the transfer of custody.
4. Custody seals shall be applied to the front and back of the sample coolers. A shipping label with return address shall be applied as well as the air express bill and any Department of Transportation (DOT) required labels or markings.
- D. Transferring Custody of Samples to Shipper, if applicable: Contractor shall transfer custody of samples to a shipper as follows:
1. Sign, date, and enter time on the chain-of-custody report under "Relinquished by."
 2. Make certain that shipper signs the "Received by" entry.
 3. Enter name of the carrier under next "Relinquished by" category. Receiving laboratory shall sign "Received for Laboratory by" on lower line and enter date and time.
- E. Transferring Custody from Sampler or Shipper to Common Carrier:
1. The shipper or Contractor shall transfer custody of samples to a common carrier as follows:
 - a. Sign, date, and enter time under "Relinquished by" entry.

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- b. Enter name of carrier (e.g., UPS, Federal Express) under "Received by."
 - c. Enter bill-of-lading or Federal Express airbill number under "Remarks."
 - d. Place the original of the chain-of-custody form in the appropriate sample shipping package. Retain a copy with field records.
 - e. Sign and date the custody seal. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field.
 - f. Wrap the seal across filament tape which has been wrapped around the hinges of the shipping package at least twice.
 - g. Fold the custody seal over on itself so that it sticks together.
 - h. Complete other carrier-required shipping papers.
 - i. In instances when the Common Carrier will not accept responsibility for handling chain-of-custody forms, the Contractor shall ensure that the record is packed within the sample package.
- F. Laboratory Custody Procedures: Once the samples arrive at the laboratory, the Contractor shall ensure that custody of the samples is maintained by laboratory personnel. The laboratory shall, at a minimum, document the chain of custody through each stage of analysis from receipt to final reporting.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used
- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
- A. Not Used
- 2.02 MATERIALS / EQUIPMENT
- A. Not Used
- 2.03 FABRICATION / ASSEMBLING / FINISHES
- A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Testing shall be in accordance with the sampling requirements of Article 1.05.A.
 - 1. Parameters analyzed for soils to be reused on-site per 6 NYCRR Part 360.13(e)(2), if the exemption for on-site reuse of soil does not apply, shall be at a minimum metals, PCBs/pesticides, and SVOCs listed in 6 NYCRR Part 375-6.8(b). The parameter list will be expanded to include the following, as applicable:
 - a. Asbestos, if demolition has taken place onsite;
 - b. VOCs listed in Part 375-6.8(b);
 - c. Volume of physical contaminants, if present;
 - d. Parameters analyzed for soils to be reused or disposed off-site shall be the RCRA characteristics, including ignitability, corrosivity, reactivity, and Toxicity Characteristic Leaching Procedure (TCLP) for metals, SVOCs, VOCs, and pesticides and herbicides, in addition to any other parameters required by the beneficial use facility or TSDF.
 - 1) If any soil sample results are greater than 5 ppm lead by TCLP the Contractor shall immediately notify the Engineer. (See Section 01 35 45 – Hazardous Materials Control for implementation of a Community Air Monitoring Program (CAMP) in the event that hazardous levels of lead are detected in soil.)
- B. Field sampling shall be completed in ample time to prevent delay of the excavation work or the work of any other contractor.

3.02 IMPLEMENTATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Sampling frequencies shall be per Article 1.05.B.
- B. Classification of soils for reuse or disposal shall be carried out by the Engineer.
- C. Conduct testing in accordance with the approved FSP.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

SECTION 02 41 10 – DEMOLITION AND REMOVALS
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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to complete the demolition, removal, disposal and relocation Work.
- B. Included, but not limited to, are demolition and removals of existing materials, structures, equipment, or work necessary to install the new Work, as shown and specified and to connect same with existing work in an approved manner. Demolition includes structural concrete, foundations, walls, doors, windows, structural steel, metals, roofs, masonry, attachments, appurtenances, piping, electrical and mechanical equipment, paving, curbs, walks, fencing, and similar existing facilities.
- C. Demolitions and removals which may be specified under other Sections shall conform to requirements of this Section.
- D. The Contractor shall obtain all required permits from the City and other agencies having jurisdiction.
- E. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 74 20 - Construction Waste Management
- B. Section 02 24 20 - Soil Sampling and Analysis
- C. Section 31 23 16 - Excavation
- D. Section 31 25 10 - Dust, Soil Erosion and Sediment Control
- E. Section 33 01 10.60 - Disinfection of Piping, Tanks, Structures and Equipment

1.04 REFERENCES

- A. 29 CFR 1926 - Safety and Health Regulations for Construction (Subpart T - Demolition)
- B. 29 CFR 1910 - Occupational Safety and Health Standards
- C. ANSI/ASSE A10 - Construction and Demolition Safety Standards
- D. AWS D12.1 - Reinforcing Steel Welding Code
- E. NYCDEP - Environmental Health and Safety Policies and Procedures – Vol. III. Control of Hazardous Energy Lock-Out/Tag-Out, or latest version

1.05 DESCRIPTION

- A. Protection:
 - 1. Demolition and removal Work shall be performed by competent workers experienced in the various types of demolition and removal Work required. The Work shall be carried through to completion with the prevention of damage to structures and the adjacent property and with due regard to the safety of City employees, work persons on the Site, and the public. The Work will be performed so as not to interfere with the use of, and free and safe passage to and from, adjacent structures.
 - 2. The Contractor shall provide, erect and maintain catch platforms, lights, barriers, weather protection, warning signs and other items as required for proper protection of the public, occupants of the building, work persons engaged in demolition operations, and adjacent construction.
 - 3. The Contractor shall provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.
 - 4. The Contractor shall provide and maintain temporary protection of the existing structure designated to remain where demolition, removal and

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construction work is being done, connections made, materials handled or equipment moved. The Contractor shall be responsible for any damage to the existing structure or contents by reason of providing insufficient protection.

5. The Contractor shall take necessary precautions to control dust as required by Section 31 25 10 – Dust, Soil Erosion and Sediment Control. Dust shall be prevented from rising by wetting demolished masonry, concrete, plaster and similar debris. All portions of the existing buildings affected by the operations under this Section shall be protected by dustproof partitions and other adequate means.
6. The Contractor shall monitor the atmosphere inside the aeration tanks, in particular for the presence of hazardous gases, in accordance with the requirements of this Contract and all applicable laws and regulations.
7. The Contractor shall provide adequate fire protection in accordance with local Fire Department requirements.
8. The Contractor shall carry out all operations so as to avoid interference with operations and Work in the existing facilities and the work under other contracts.
9. The Contractor shall be solely responsible for making all necessary arrangements and for performing all necessary work involving the discontinuance or interruption of all utilities or services.
10. Any equipment, piping and appurtenances removed without proper authorization, and that are necessary for the operations of the existing or expanded facilities, shall immediately be replaced to the satisfaction of the Engineer at no cost to the City.
11. Closing or obstructing of roadways, sidewalks, and passageways adjacent to the Work by the placement or storage of materials will not be permitted, and all operations shall be conducted with minimum interference to traffic.
12. The Contractor shall repair damage caused by its operations to existing structures and equipment to remain, or to any property belonging to the City or its employees.
13. The Work shall comply with 29 CFR Part 1926 -- Safety and Health Regulations for Construction, applicable provisions and recommendations of ANSI/ASSE A10 -- Construction and Demolition Safety Standards, New York City Construction Code, New York City Electrical Code, all other governing codes and rules, and as specified herein or shown in the Contract Documents.
14. The Contractor shall make such investigations, explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal.

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15. Demolition and removal of hazardous materials shall be in accordance with applicable federal, State and Local regulations.
- B. Permits: The Contractor shall obtain all permits from all appropriate regulatory agencies required for closing or obstructing streets and sidewalks. Obtain all air permits as required for demolition of any building or structure located in New York City including a Demolition Permit from the Department of Buildings and a DEP Registration for Demolition from the Department of Environmental Protection, Bureau of Environmental Compliance.
- C. Condition of Buildings, Structures and Equipment:
1. The City does not assume responsibility for the actual condition of buildings, structures and equipment to be demolished and removed.
 2. Conditions existing at the time of inspection for bidding purposes will be maintained by the City so far as practicable. However, there is no guarantee by the City that the number of fixtures, amount of equipment or any other material of value existing at bidding time in the buildings and structures to be demolished will be present in the structures when they are demolished. The Contractor shall have no claim against the City because of the absence of such fixtures and materials.
 3. The conditions of existing structures and equipment shown on the Contract Documents is based on visual inspection and a walk-through survey only. Neither the Engineer nor the City will be responsible for interpretations or conclusions drawn therefrom by Contractor.
- D. Scheduling: The Contractor shall carry out operations so as to avoid interference with City's operations and work in the existing facilities.
- E. Notification: At least 48 hours prior to commencement of a demolition or removal, Contractor shall notify the Engineer in writing of his proposed schedule. City will inspect the existing equipment or facilities and review with the Contractor those items which are to remain the property of the City. No removals shall be started without the permission of the Engineer.
- F. Coordination: The Contractor shall coordinate all electrical shutdowns with the Engineer and the Kensico Site Responsible Individual as defined in the DEP Policies and Procedures. The Contractor shall confirm all equipment is de-energized, and install required lock-out and tag-out devices on electrical equipment to prevent accidental re-energizing of the equipment.
- G. Pre-Demolition Meeting:
1. The Contractor shall have a pre-demolition meeting with the Engineer and representatives of other related construction contracts, if any, in the presence of the Resident Engineer, to review all of the work areas that will be affected by the removal of materials from demolition.
- H. Removal: Material shall be removed in accordance with Section 01 74 20 – Construction Waste Management.

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1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Contractor shall submit Shop Drawings and material specifications for the approval of the Engineer. Submittals shall include, but not be limited to proposed methods, equipment and operating sequences to be used in performance of the demolition and removals work, abandonment, protection in place of existing utilities, and handling of hazardous materials.
- B. The Contractor shall demonstrate how coordination of operations and sequence for shut-off, capping, temporary services, continuation of utility services, and other applicable items will be provided to ensure no interruption of City's operations.
- C. Sequence and Schedule: The Contractor shall submit a detailed schedule showing the sequence and duration of demolition activities.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

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3.02 IMPLEMENTATION

A. General:

1. The Work required shall be done with care, and shall include all necessary shoring, bracing, and support to prevent movement, settlement, or collapse of existing structures or facilities. The Contractor shall be responsible for any damage caused by demolition and removal Work to any part or parts of existing structures or equipment designated for reuse or to remain. The Contractor shall perform patching, restoration and new work in accordance with applicable technical sections and details of the Contract Documents.
2. Surfaces of walls, floors, ceilings, or other areas which are exposed by any of the removals specified herein, and which will remain as architecturally finished surfaces, which have holes, scars, chipped or other damaged surfaces revealed by the removal, shall be repaired by the Contractor with the same or matching materials as the existing surface or as may be otherwise approved by the Engineer.
3. Pollution Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with Section 31 25 10 – Dust, Soil Erosion and Sediment Control and all governing regulations pertaining to environmental protection.
 - a. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
 - b. Clean adjacent structures, facilities, and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to conditions existing prior to the start of the Work.
 - c. The use of calcium chloride for dust control will not be allowed.
4. All supports, pedestals and anchors shall be removed with the equipment and piping unless otherwise specified or required. Concrete bases, anchor bolts and other supports shall be removed to approximately one inch below the surrounding finished area, and the recesses shall be patched to match the adjacent areas. Superstructure wall and roof openings shall be closed, and damaged surfaces shall be patched to match the adjacent areas, as specified under applicable sections of the Specifications, as shown on the Contract Drawings, or as directed by the Engineer. Wall sleeves and castings shall be plugged or blanked off, all openings in concrete shall be closed in a manner meeting the requirements of the appropriate sections of the Specifications, as shown on the Contract Drawings and as directed and approved by the Engineer.
5. Any materials or items designated to remain the property of the City shall be removed with care and stored at locations designated by the City.

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6. Where equipment is shown or specified to be removed and relocated, the Contractor shall not proceed with removal of this equipment without the prior approval of the Engineer. Upon approval, and prior to commencing removal operations, the equipment shall be operated in the presence of representatives of the Contractor, the City and the Engineer. Such items shall be removed with care, under the supervision of the trade responsible for reinstallation, and shall be protected and stored until required. Material or equipment damaged during removal shall be replaced with similar new material or equipment. Any equipment that is removed without proper authorization and is required for plant operations shall be replaced at no cost to the City.
7. Wherever piping is to be removed for disposal, the Contractor shall drain the piping and adjacent pipe and headers that are to remain in service shall be blanked off or plugged and then anchored in an approved manner.
8. Where alterations occur, or new and old work join, the Contractor shall cut, remove, patch, repair or refinish the adjacent surfaces to the extent required by the construction conditions, so as to leave the altered work in as good a condition as existed prior to the start of the work. The materials and workmanship employed in the alterations shall be of the same quality as required for new work of the same type.
9. The Contractor shall confine cutting of existing roof areas designated to remain to the limits required for the proper installation of the Work. The Contractor shall cut and remove insulation and weather protection, and provide temporary weathertight protection as required until new roofing and flashings are installed.
10. The Contractor shall remove enclosures, signs, guards, and the like when no longer required or when directed by the Engineer at the completion of the Work.
11. The Contractor shall dispose of all demolition materials, equipment debris, and all other items not marked or specified by the City or the Engineer to remain as property of the City, off site and in conformance with the requirements of the Contract and all existing applicable laws and regulations.
12. Building Demolition:
 - a. Unless otherwise approved by the Engineer the Contractor shall: proceed with demolition from the top of the structure to the ground. Complete demolition work above each floor or tier before disturbing supporting members of lower levels.
 - b. Demolish concrete and masonry in small sections.
 - c. Remove structural framing members and lower to ground by means of hoists, derricks, or other suitable methods.

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- d. Break up and remove foundations and slabs-on-grade, unless otherwise shown to remain.
 - e. Locate equipment used for demolition work, and remove demolished materials, so as not to impose excessive loads on supporting walls, floors or framing.
 - f. Regrade in accordance with Section 31 23 16 - Excavation.
13. The Contractor shall de-energize and disconnect electrical service to all structures and equipment prior to demolition or relocation. No demolition activity shall commence prior to electrical disconnection.
14. All construction and demolition debris that has come in contact with regulated solid waste shall be cleaned to the satisfaction of the Engineer before leaving the Site.
15. The use of explosives is not permitted.
- B. Structural Removals**
- 1. The Contractor shall remove concrete, structures and sub-structures to the lines and grades shown unless otherwise directed by the Engineer. The removal of masonry beyond these limits shall be at the Contractor's expense and these excess removals shall be reconstructed to the satisfaction of the Engineer with no additional compensation to the Contractor.
 - 2. The Contract Drawings show approximate available information on thickness of existing concrete to be removed and the extent of reinforcement. It is the Contractor's responsibility, before commencing the demolition work, to verify the thickness of existing concrete to be removed and the extent to which it is reinforced by suitable means as deemed necessary by the Contractor in the field. The City does not guarantee the accuracy of existing concrete thickness to be removed or the extent of reinforcement shown on the Contract Drawings, as actual concrete thickness or reinforcement may vary. No additional compensation will be made because of variations from the thickness of concrete or for variations in the extent of reinforcement shown on the Contract Drawings.
 - 3. All concrete, stone, masonry, roofing materials, reinforcement, structural or miscellaneous metals, plaster, wire mesh and other items contained in or upon the structure shall be removed and taken from the Site and disposed of at a permitted facility. Demolished items shall not be used in backfill.
 - 4. After removal of parts or all of masonry walls, slabs and like work which tie into new work or existing work, the point of junction shall be neatly repaired so as to leave only finished edges and finished surfaces exposed.

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5. When conducting demolition activities on masonry materials (i.e., brick and concrete), the Contractor shall perform work area and personal exposure monitoring in accordance with applicable regulations and standard industrial hygiene methods, until sufficient data is generated to demonstrate compliance with permissible exposure limits for crystalline silica, as calculated according to 29 CFR 1926.55 and 1926.57, employing exposure control methods specified in 29 CFR 1926.1153(c)(1). Compliance with permissible exposure levels must be demonstrated with a minimum of three (3) consecutive readings taken seven (7) days apart, for each new work task or change in equipment, process, or control measure.

C. Mechanical Removals

1. Mechanical removals shall consist of dismantling and removing existing pipes, pumps, motors and other facilities as specified, shown, or required for the completion of the work. It shall include cutting, capping, draining, and plugging as required, except that the cutting of existing piping for the purpose of making connections thereto will be included under Division 40 of the Specifications.
2. Existing process, water, chemical, and other piping shall be removed where shown on the Contract Drawings. All removed piping shall be removed to the nearest solid support, capped and left in place. Piping shall be purged and made safe by the Contractor prior to removal or capping. Disposal of any chemicals or other purged material in accordance with the requirements of Section 01 35 45 - Hazardous Materials Control and other applicable environmental, health, and safety (EHS) requirements of the Contract shall be the responsibility of the Contractor. Where piping that is to be removed passes through existing walls, it shall be cut off and properly capped on each side of the wall.
3. When underground piping is to be altered or removed, the remaining piping shall be properly capped. Abandoned underground piping may be left in place unless it interferes with new work or is shown or specified to be removed.
4. Any required demolition or changes to potable water piping and other plumbing system work shall be made in conformance with all applicable codes. Portions of the potable water system that may have been altered or opened shall be pressure tested and disinfected in accordance with Section 33 01 10.60 – Disinfection of Piping, Tanks, Structures and Equipment and local codes. Other plumbing piping and heating piping shall be pressure tested only.
5. Provide all caps, plugs, blind flanges, shut-off valves and other work and materials required to remove from service existing piping and necessary to keep existing piping in service where shown or required.

D. Pavement, Curb and Sidewalk Removals:

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1. Remove existing pavement, including base and surface courses, stabilized sub-bases, curbs, and gutters as required to construct new facilities or as shown. Before removing, saw a straight joint at least 1-1/2-inches deep between sidewalk and pavement designated for removal and that left in place. Curbs and gutters shall be removed to the nearest construction joint beyond the limit of demolition shown on the Contract Drawings.
2. Provide for satisfactory transition between replaced pavement and sidewalks and the portions remaining in place.

E. Electrical Removals:

1. Electrical removals shall consist of the removal of existing generators, transformers, distribution switchboards, control panels, motors, conduits and wires, and miscellaneous electrical equipment all as shown, specified, or required to perform the work.
2. All existing electrical equipment and fixtures to be removed shall be removed with such care as may be required to prevent unnecessary damage to keep existing systems in operation and maintain the integrity of the grounding systems.
3. Distribution switchboards shall be removed or modified as shown in the Contract Documents. Switchboards to be removed shall be disconnected and dismantled, and all components shall be disposed of off the Site. Circuit breakers and other control equipment on modified switchboards that will no longer be used shall be removed unless otherwise shown or specified. All new openings cut into the modified switchboard panels shall be cut square and dressed smooth to the dimensions required for the installation of the new equipment.
4. Motors shall be disconnected and removed where shown or specified. Motors not marked or designated by the City or the Engineer to be salvaged shall be removed from the Site. Motors or other electrical gear designated for reuse shall be stored in enclosed, heated storage.
5. Conduits and wires shall be abandoned or removed where shown. All wires in abandoned conduits shall be removed, salvaged, turned over to the City and stored where directed by the Engineer. Abandoned conduits concealed in floor or ceiling slabs, or in walls, shall be cut flush with the slab or wall at the point of entrance. The conduits shall be suitably plugged and the area repaired in a flush, smooth, approved manner. Exposed conduits and their supports shall be disassembled and removed from the Site. Repair all areas of work to prevent rust spots on exposed surfaces.
6. The Contractor shall coordinate all electrical shutdowns with the Engineer and the facility's Responsible Individual as defined in the DEP Policies and Procedures. The Contractor shall confirm all equipment is de-

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energized, and install required lock-out and tag-out devices on electrical equipment to prevent accidental re-energizing of the equipment.

F. Miscellaneous Removals:

1. Contractor shall remove miscellaneous items where shown on the Contract Documents or where necessary for the construction of new structures or modification of existing structures. Anchor bolts shall be cut back one inch below the concrete surface and the hole patched.

G. Modifications and Closures:

1. Modifications shall conform to all applicable requirements of the Contract Documents, and the directions and approvals of the Engineer.
2. Where alterations require cutting or drilling into existing floors, walls, and roofs, the holes shall be repaired in an approved manner. Contractor shall repair such openings with the same or matching materials as the existing floor, wall, or roof, or as otherwise approved by the Engineer. All repairs shall be smoothly finished unless otherwise approved by the Engineer.
3. Openings in existing concrete slabs, ceilings, roofs, masonry walls, floors and partitions which are not to be used in the new work shall be closed and sealed as shown or otherwise directed by the Engineer.
4. Where parts of existing structures are to remain in service, demolish the portions to be removed, repair damage, and leave the structure in proper condition for the intended use. Remove concrete and masonry to the lines designated by drilling, chipping, and other suitable methods. Leave the resulting surfaces true and even, with sharp straight corners that will result in neat joints with new construction or be satisfactory for the purpose intended. Where existing reinforcing rods are to extend into new construction, remove the concrete so that the reinforcing is clean and undamaged. Cut off other reinforcing flush with the surface.
5. New work shall be keyed into the existing in an acceptable manner. New reinforcing steel shall be welded to the existing reinforcing. Welding shall conform to AWS D12.1, Reinforcing Steel Welding Code. In general, the same or matching materials as the existing adjacent surface shall be used. The finished closure shall be a smooth, tight, sealed, permanent closure with all exposed surfaces smooth finished and acceptable to the Engineer.

H. Maintenance and Clean Up:

1. Contractor shall maintain the buildings, structures, and other City properties free from accumulations of waste, debris, and rubbish caused by the demolition and removal operations.
2. Contractor shall provide on-site dump containers for collection of waste materials, debris and rubbish, and shall wet down dry materials to prevent blowing dust.

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3. At reasonable intervals during the progress of the demolition and removal work or as directed by the Engineer, the Contractor shall clean the Site and properties and dispose of all waste materials in accordance with the applicable regulations and requirements of this Contract.

I. Catch basin, manhole, and handhole abandonment

1. Catch basins, manholes and handholes shall be abandoned in accordance with NYCDEP BWSO Standard Sewer and Water Main Specification section 51.41.3 (E).
2. Contractor shall perform (at a minimum) the following work in order to properly abandon existing basins and inlets:
 - a. Existing frames, grates, covers and other castings shall be removed.
 - b. Existing basins and inlets shall be broken down to a depth of four feet below grade.
 - c. Pipe connection openings to existing basins and inlets shall be bulkheaded with brick masonry.
 - d. The bottom slabs of existing basins and inlets shall be broken up in such a manner as to prevent water from being trapped.
 - e. The entire openings of existing basins shall be filled in with hydraulic fill and compacted.
 - f. All castings and debris removed as a result of the above demolition work shall become the property of the Contractor and shall be properly disposed at the Contractor's expense. Such castings and debris shall not be permitted for use as fill.
3. Prior to Fluoride manhole or handhole abandonment the Contractor shall flush the fluoride lines with potable water to waste. Contractor shall legally dispose of waste at no additional cost to the City.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

**SECTION 02 43 10 – RELOCATION OF UTILITIES
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to complete the protection, maintenance and relocation of utilities located off-site and on-site.

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

B. Overhead Utilities and Pole Relocation

1. Payment for the Contractor’s coordination with the utility companies shall be included in Contract Item LS-3 – Work Result, as specified in Section 01 27 00 - Measurement and Payment.

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2. Payment for relocation of overhead poles and overhead lines shall be made under allowance as specified in Section 01 27 00 – Measurement and Payment.

C. Undetected/Unmapped Utilities

1. Payment for relocation, removal, or repair of undetected/unmapped utilities will be made under an allowance as specified in Section 01 27 00 – Measurement and Payment. Such payment will include the cost of all labor, equipment and materials necessary to perform all Work to protect-in-place, support, maintain, replace, install and repair or relocate unknown/unforeseen utilities.

1.03 RELATED SECTIONS

- A. Section 01 27 00 – Measurement and Payment

1.04 REFERENCES

A. Definitions

1. Utilities are defined as sewer lines, storm lines, water lines, gas lines, electric lines, lighting facilities, street lighting, water, electric, telephone and cable lines, storm sewer, catch basins, sanitary sewer, gas, oil and related underground structures owned by DEP or other companies.

B. Reference Standards

1. Subpart 753-3 of Rule 53 of the Industrial Code (New York State Department of Labor), latest edition.

1.05 DESCRIPTION

A. DEP Utilities

1. The Contractor shall furnish all labor, materials and equipment required to protect-in-place, support, maintain and repair or relocate DEP utilities both on-site and off-site of the project location as directed by the Engineer during the Contract Work.
2. Unless otherwise shown or specified in the Contract Documents or specifically directed by the Engineer, the Contractor shall, during the entire construction period, maintain in continuous operation and service existing DEP utilities both on-site and off-site of the project location, except as otherwise approved by the Engineer for shutdown of any such facilities for specific periods of time to connect new facilities into existing facilities or to repair, relocate, support or shift the existing facilities.
3. All Work must be performed under the supervision of DEP Bureau of Water Supply and Operations and shall conform to the design standards of that Bureau.

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4. For the relocation of DEP utilities including water and sewer lines as a result of the proposed Work under this Contract, the Contractor shall coordinate and get approval from the Engineer prior to the removal of any existing facility or to start any construction. The Contractor shall sequence shut down of water and sewer mains in coordination with the Engineer.
 5. The Contractor shall execute the Work in such a way as to prevent damage or injury to existing DEP facilities both on-site and off-site of the project location, all adjacent private properties and occupants thereof, which might result from Work or other causes, and so as not to interfere with the use of, and free and safe passage to and from, DEP sites.
 6. Restoration of hydrants and hydrant connections and all other City structures shall be in conformity with the requirements of the Contract Documents and the specifications of the Bureau of Water and Sewer Operations.
- B. Unforeseen Utilities
1. The Contractor shall notify the Engineer of any unknown utility found during construction and shall, when directed by the Engineer, do all necessary Work to relocate, maintain in place, abandon, remove or replace these utilities.
 2. Unforeseen Utilities are utilities not shown on the Contract Drawings that are found during the construction Work.
- C. Overhead Utilities and Pole Relocation
1. Overhead utility lines and support poles are present within the Site.
 - a. The utility lines on the support poles are owned by the following entities:
 - 1) Consolidated Edison
Paul Dedvukaj
(646) 879 – 2546
dedvukajp@coned.com
 - 2) Verizon
 - 3) Cablevision (Altice)
 2. The Contractor shall furnish all labor, materials and equipment required to protect-in-place, support, maintain and repair, or relocate utilities encountered or disturbed during the Contract Work.
 3. All existing utilities that interfere with the Work shall be removed, relocated, maintained and protected in place or by other means taken care of as required by the Department or utility company having jurisdiction.

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4. During the progress of the Work, the Contractor shall cooperate with the public utility companies to safeguard from injuring existing surface, subsurface or overhead structures in the vicinity of Work. The Contractor shall give the public utility companies ample notice before commencing Work at locations where existing surface, subsurface or overhead structures owned by utility companies, interfere with the Contract Work.

D. Coordination with Utilities Companies

1. The Contractor shall contact the overhead utility companies to coordinate utility and support pole relocation in accordance with the Contractor's schedule.
2. Marking of Underground Utilities
 - a. On receiving the Commissioner's written Notice to Commence Work (Notice to Proceed), the Contractor shall call 811 to make arrangements for the complete identifications and marking of all underground utilities on the Project area. The Contractor shall protect and maintain these markings as Work proceeds.
3. Notice to Utility Companies to Remove Structures
 - a. The Contractor shall, except as otherwise directed by the Engineer, give notice in writing to all utility and other companies or individuals owning or controlling any pipes, conduits, tunnels tracks or other structure which shall be found, upon excavating, to occupy the place of the Work to be built as required under this Contract so that said companies or individuals may remove their structures at their expense and shall not cause any hindrance to or interfere with such companies or individuals in removing their structures. But if said utility, railroad, or other companies or individuals within, five days after receipt of such notice shall fail to remove their structures, the Contractor shall, upon the approval of the Engineer, remove the same, it being expressly understood that the cost thereof shall not be charged against the City, but shall be a matter for adjustment between the Contractor and the company or companies or individuals concerned.
4. Notice to Utility Companies to Support, Protect, Temporarily Remove and Replace Structures within the Limits of Work
 - a. The Contractor shall, except as otherwise directed by the Engineer, hereof, give notice in writing to all utility and other companies or individuals owning or controlling any pipes, conduits, tunnels, tracks or other structures which are found within the limits of ordered excavation so that said companies or individuals may protect, support or temporarily remove and replace their structures, and it shall not cause any hindrance to, or interference with any such utility company or companies or individuals in protection,

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supporting or temporarily removing and replacing main and service pipes, conduits, tunnels, lampposts, lamps, tracks or other structures but the Contractor shall allow the said company or companies or individuals to take all such measures as are necessary to accomplish their requirements.

- b. The Contractor shall comply with the provisions of subpart 753-3 of Rule 53 of the Industrial Code (New York State Department of Labor) latest edition, copies of which may be obtained at the Department of Labor.
 - 5. The Contractor shall provide the utility companies access to the existing and proposed support pole locations to perform the required relocation Work, as well as a flat and stable working surface.
 - 6. The Contractor, overhead utility companies, and any Subcontractor(s) shall meet with DEP, prior to commencing with the relocation Work to discuss Work Plans, driller checklist, etc.
- E. Maintenance of Existing Facilities Operational
- 1. Unless otherwise shown or specified in the Contract Documents or specifically directed by the Engineer, the Contractor shall, during the entire construction period, maintain in continuous operation and service existing utilities, except as otherwise approved by the Engineer for shutdown of any such facilities for specific periods of time to connect new facilities into existing facilities or to repair, relocated, support or shift the existing facilities.
- F. Utilities Operated by Franchised Operators
- 1. The City shall not be liable for any costs incurred by the Contractor as a result of the compliance, non-compliance, or improper compliance by the franchised operators of underground facilities, with subpart 753-3 of Rule 53 of the Industrial Code.
 - 2. The City shall not be liable for any costs incurred by the Contractor for the support, protection and maintenance of underground facilities owned by franchised operators of such facilities
- G. Restoration of Pavements
- 1. Restoration of pavements shall be made in conformity with the requirements of the NYS Department of Transportation Standard Specifications, latest edition. The Bidder shall acquaint himself with such requirements before submitting the bid. The Contractor shall give the Department of Highways four weeks written advance notice before proceeding with final restoration of pavements, walks and curbs.
- H. Existing Sewer Structures

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1. All existing sanitary or storm sewer, catch basins and basin connections, including those that are owned by or not by the Department, shall be temporarily supported or permanently supported as needed.

1.06 QUALITY ASSURANCE

A. Standards

1. The Contractor shall comply with standards specified herein and in accordance with Article 5 of the General Conditions.

B. Requirements of Regulatory Agencies

1. The Contractor shall comply with NYS Industrial Code Rule 753
2. The City shall not be liable for any costs incurred by the Contractor as a result of the compliance, non-compliance, or improper compliance of any regulations.
3. The City shall not be liable for any costs incurred by the Contractors for the support, protection and maintenance of underground facilities owned by franchised operators of such facilities.

1.07 SUBMITTALS

A. For the overhead utility and pole relocation, the Contractor shall coordinate with the utility owners to obtain their proposed relocation plans and submit for approval to the Engineer, the following:

1. Proposed pole and anchor relocation plan;
2. Schedule for planned relocations;
3. Work plans by each utility company outlining the sequencing of proposed work and list of proposed equipment;
4. Drilling and boring checklist

B. For any existing utility that is to be relocated or restored, the Contractor shall submit for approval to the Engineer a relocation layout including plan, profile and section as applicable with information related to the existing and final condition of the utility to be relocated or restored. The relocation layout must include fittings, appurtenances, thrust blocks and restraints, pipe or structure supports, trenching and bedding, anticipated dewatering operations, support of excavation, and corresponding calculations showing conformance with all applicable building codes and design standards. The relocation layout and calculations shall be signed and sealed by a Professional Engineer licensed and registered in the State of New York.

C. During the progress of Work, the Contractor shall keep an up-to-date set of the Relocation Drawings showing field and working drawings modifications. Immediately upon completion of Work, the Contractor shall provide As-built Drawings showing the actual Work performed under this Section as specified in the

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Contract Documents. Relocation Drawings shall include all necessary plans, sections and details, with all reference dimensions and elevations required for complete Record Drawings of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Not Used

2.02 MATERIALS / EQUIPMENT

A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Field Verification

1. The Contractor shall field verify that dimensions are as indicated on approved Shop Drawings and as indicated by the Department or Utility Company having jurisdiction
2. The Contractor shall notify the owners of the utilities or structures concerned before starting any work. The Contractor further assumes all liability and responsibility for the underground utility pipes, conduits or structures shown or not shown on the Contract Documents.
3. Determination of Location and Depth:
 - a. The Contractor shall determine the true location and depth of all utilities and service connections; including the type, material, and condition of any utility which may be affected by or affect the work.

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- b. The Contractor shall coordinate with all Companies and field locate all underground lines before starting any construction or ordering any materials for fabrication.
- 4. Exposure in Advance of Trenching:
 - a. Expose all utility mains ("test-pit") that must be crossed or closely paralleled in accordance with the Contract Documents.
 - b. The Contractor shall provide the location and depth of the "test-pit" utilities to the Engineer after field location.
 - c. Expose all service connections before excavation in the area.
 - d. All cost incurred in exposing utilities shall be borne by the Contractor.

3.02 IMPLEMENTATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

SECTION 02 82 05 – ASBESTOS MANAGEMENT
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. This Section details the requirements for construction and demolition activities affecting Asbestos-Containing Materials (ACM), trace asbestos materials (i.e., Building Materials containing 1% or less of asbestos), and Asbestos-Containing Waste Materials, as shown on the Contract Drawings, specified herein, or required to complete the Work, including all ACM identified and impacted by the Work. All Work under this Section shall be performed using methods, tools, and equipment that have demonstrated effectiveness in preventing asbestos fibers from migrating outside of the Regulated Abatement Work Area and are in compliance with all applicable rules and regulations.
- B. In the absence of analytical testing results for certain materials, the material shall be classified as material containing both asbestos and polychlorinated biphenyls (PCBs) pending the analytical results. The Disturbance, Abatement/Removal, construction/ demolition, and disposal of materials containing both asbestos and PCBs shall be in accordance with the pertinent federal, state, and local regulations. For activities affecting materials and structures coated with PCB-containing bitumastic coatings, refer to Section 02 84 05 - PCBs Management for specific training, handling, and disposal requirements that must be implemented by the Contractor in addition to the requirements of this Section.
- C. All Work under this Section shall be performed to minimize the creation of airborne emissions; minimize the quantity of waste generated; protect the health and safety of all personnel and welfare of the public; and avoid adverse environmental impacts.
- D. Unless otherwise specified, the Work of this Section shall also be performed in accordance with the most current New York City Department of Environmental Protection (DEP) Environmental Health and Safety (EHS) Policies and Procedures (including Asbestos Management, and Spill Prevention, Environmental Release Reporting and Investigation), NYCDEP Bureau of Engineering Design and Construction EHS Standards, and applicable federal, state, and local regulations. It should be noted that DEP Asbestos Projects being conducted on New York City property that is physically located outside of the five boroughs, would be subject to the requirements of 12 NYCRR 56, and not the requirements of RCNY Title 15, Chapter 1.
- E. All independent third party air monitoring shall be outside this Contract and performed by others.
- F. The Contractor shall perform all Work under this Section without damaging or contaminating non-regulated areas. Where such areas are damaged or contaminated, as determined by the DEP, the Contractor shall restore the areas to their original condition at no additional cost to the City.

SECTION 02 82 05 – ASBESTOS MANAGEMENT
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- G. The Contractor shall label all known ACM in the field to prevent accidental disturbance by workers.
- H. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.
- B. At the completion of abatement activities, the Contractor is responsible for submitting all of the documentation required herein. Payment to abate and dispose of ACM and resulting Asbestos-Containing Waste Materials produced by this Work will not be made until all required documentation, including the following is provided to the City:
 1. Copies of all NYSDOL and DEP Asbestos Control Program (ACP)-approved Asbestos Project notifications, work permits, Variances, Work Place Safety Plans, and any applicable documentation filed or received from the NYSDOL and DEP ACP, including Notices of Violations (NOV).
 2. Copies of the Asbestos Abatement Contractor’s Handling license.

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3. Copies of DEP and NYSDOL Asbestos Handler Supervisor and Asbestos Handler certificates, where applicable, for all workers engaged in the Project.
4. A copy of the Asbestos Abatement Contractor’s daily Isolation Barrier book (bound notebook). Copies of laboratory reports and Chain-of-Custody (COC) documents for Exposure Monitoring conducted by the Asbestos Abatement Contractor, including the name, address, and New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) registration number of the laboratory used for air sample analysis.
5. All data related to bulk sampling, including the results of any asbestos surveys performed by a DEP-certified Asbestos Investigator and NYSDOL-certified Asbestos Inspector, where applicable.
6. The Asbestos Work Plan submitted and implemented in accordance with the requirements of this Section.
7. The total quantity of ACM abated.
8. The start and completion dates of the Asbestos Project(s).
9. A signed copy of the manifest from the asbestos-permitted landfill with complete COC documentation, certifying the amount of asbestos waste delivered;
10. The name and address of the asbestos waste transporter.

1.03 RELATED SECTIONS

- A. Section 01 35 27 - Environmental Health and Safety Requirements
- B. Section 01 35 45 - Hazardous Materials Control
- C. Section 02 84 05 - PCBs Management

1.04 REFERENCES

A. Definitions

1. Abatement: Any and all procedures physically taken to control fiber releases from ACM. This includes Removal, Encapsulation, enclosure, cleanup, and Repair.
2. Adequately Wet: Defined by the EPA (40 CFR 61.141) as a material sufficiently mixed or penetrated with amended water to prevent the release of Visible Emissions. If Visible Emissions are observed coming from an ACM or asbestos waste, then the material has not been “Adequately Wetted.” However, the absence of Visible Emissions is not evidence of being Adequately Wet. ACM must be fully penetrated with the wetting agent to be Adequately Wet. If the ACM being abated is resistant to amended water penetration, the wetting agent shall be applied to the

SECTION 02 82 05 – ASBESTOS MANAGEMENT
CONTRACT KENS-EAST-2

material prior to and during Abatement as necessary to minimize the potential for fiber releases.

3. **Aggressive Air Sampling:** A method of sampling within a Negative Pressurized Enclosure (NPE) in which mechanical equipment is used before and during the sampling period to stir up settled dust/asbestos fibers. Mechanical equipment includes 20-inch fans and forced air equipment (e.g., a one-horsepower leaf blower).
4. **Air Sampling Technician:** A person who performs Asbestos Project air sampling and possesses a valid Air Sampling Technician certificate issued by the NYSDOL.
5. **Ambient Air Monitoring:** The measurement or determination of airborne asbestos fiber concentrations outside but in the general vicinity of the Work site, performed in accordance with NIOSH or EPA sampling methodologies.
6. **Asbestos Abatement Contractor:** A Subcontractor licensed by the NYSDOL who performs Abatement during an Asbestos Project, or employs persons performing such Abatement.
7. **Asbestos Abatement Permit:** A permit issued by the DEP ACP in accordance with RCNY Title 15, Chapter 1, authorizing the performance of construction Work for Asbestos Projects involving any of the activities defined in RCNY Title 15, Chapter 1-26(a) (1)-(13).
8. **Asbestos Assessment Report (Form ACP-5):** A form submitted to the DEP ACP by which a DEP-certified Asbestos Investigator certifies that a building or structure (or portion thereof) is free of ACM or the amount of ACM to be abated constitutes a Minor Asbestos Project.
9. **ACM:** Any material containing greater than one percent asbestos.
10. **Asbestos Handler:** An individual certified by the DEP and/or NYSDOL who disturbs, removes, encapsulates, repairs, or encloses ACM. Asbestos Handlers working on projects within the five boroughs shall possess both DEP and NYSDOL certifications. Asbestos Handlers working on projects outside of the five boroughs shall possess NYSDOL certifications.
11. **Asbestos Handler Supervisor:** An individual certified by the DEP and/or NYSDOL who supervises the asbestos handlers during an Asbestos Project, and ensures that proper asbestos Abatement procedures as well as individual safety procedures are being adhered to. Asbestos Handler Supervisors working on projects within the five boroughs shall possess both DEP and NYSDOL certifications. Asbestos Handler Supervisors working on projects outside of the five boroughs shall possess NYSDOL certifications.
12. **Asbestos Project:** Any Work performed in connection with the alteration, renovation, modification, or demolition of a building or structure, or in connection with the replacement or repair of equipment, pipes, or electrical

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equipment not located in a building or structure, which will involve the Abatement, Disturbance, or cleanup of friable or Non-Friable Asbestos. Asbestos Projects are classified as either Large Asbestos Projects, Small Asbestos Projects, or Minor Asbestos Projects in New York State and New York City, and each type of project involves several phases, which can include: background air monitoring, mobilization, pre-abatement/Containment construction, Abatement, cleaning/re-cleaning, final Clearance Air Monitoring, Containment breakdown, and demobilization.

13. Asbestos Project Notification (Form ACP-7): A form submitted to the DEP ACP for all Large Asbestos Projects and Small Asbestos Projects. Minor Asbestos Projects do not require an ACP-7 form.
14. Asbestos-Containing Waste Material: ACM or asbestos-contaminated objects requiring disposal.
15. Building Materials: Any and all materials listed in 12 NYCRR 56-5.1(f)(1), including but not limited to interior and exterior finished, equipment, plaster, roofing, flooring, caulking, sealants, tiles, insulation, and mortar and refractory bricks used in the construction of boilers.
16. Clean Room: An uncontaminated area or room that is part of the Personal Decontamination Enclosure System, with provisions for the storage and changing of “street clothes” into clean Personal Protective Equipment (PPE).
17. Clearance Air Monitoring: Area air monitoring performed inside the Restricted Area and Regulated Abatement Work Area after the completion of the final cleaning, final waiting period, and Final Visual Inspection by the Asbestos Handler Supervisor and Project Monitor. Aggressive Air Sampling shall be performed as part of the Clearance Air Monitoring activities inside of the Containment.
18. Containment: The NPE within the Restricted Area, which establishes the Regulated Abatement Work Area, and surrounds the location where the asbestos Abatement is actually taking place.
19. Critical Barrier: A term used by the NYSDOL to define barriers that seal-off all openings to or within the defined Regulated Abatement Work Area, including but not limited to operable windows, skylights, doorways, ducts, grills, diffusers, and any other penetrations to surfaces adjacent to or within the Regulated Abatement Work Area.
20. Disturbance: Any activities that disrupt the matrix of ACM, or Asbestos-Containing Waste Materials. This includes activities that generate dust, debris, Visible Emissions, or airborne asbestos fibers, including moving friable ACM or Asbestos-Containing Waste Materials from one place to another.

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21. Encapsulation: The coating or spraying of ACM, or the bare substrate surface that is exposed after an Abatement, with a pigmented (i.e., non-transparent) liquid sealant that creates a membrane over the surface of the material (bridging encapsulant) or penetrates into the material and binds its components together (penetrating encapsulant).
22. Excursion Limit: Defined in the OSHA Asbestos Standard for the Construction Industry (29 CFR 1926.1101) as individual exposure, without regard to the use of respirators, to an airborne concentration of asbestos fibers of 1.0 fiber per cubic centimeter of air (1.0 f/cc) averaged over a 30-minute sampling period. No employee of the Contractor shall at any time be exposed to concentrations of asbestos fibers above the Excursion Limit.
23. Exposure Monitoring: Personal air sampling performed outside the respirator within the breathing zone of individuals that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee, for the purpose of determining compliance with OSHA’s Asbestos Standard for the Construction Industry (29 CFR 1926.1101). Analytical results from Exposure Monitoring will be used to select appropriate respiratory protection and PPE for individuals within a Restricted Area and Regulated Asbestos Work Area. For the purpose of this Section, Exposure Monitoring samples shall be collected from individuals who are representative of each task being conducted by the Contractor, and all Exposure Monitoring shall follow pertinent NIOSH or EPA sampling methodologies.
24. Final Visual Inspection: An inspection performed by the Project Monitor and Asbestos Handler Supervisor at the completion of the final waiting period on an Asbestos Project (but prior to Clearance Air Monitoring). The inspection is performed in accordance with ASTM E1368 to determine the completeness of Abatement and cleanup.
25. Friable Asbestos: A term used by the NYSDOL to define any ACM or asbestos waste that can be crumbled, pulverized or reduced to powder when dry, by hand pressure.
26. Glovebag: A manufactured, impervious, bag-like enclosure with two (2) inward-projecting long sleeve gloves, one (2) inward-projecting waterwand sleeve, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The Glovebag is constructed and installed to surround an object or area to be abated, and contain all asbestos fibers released during the Abatement process.
27. High-Efficiency Particulate Air (HEPA) Filter: A filter designed to remove 99.97% of all particles greater than 0.3 micrometers (μm) in diameter. For the purpose of this Section, HEPA vacuum and Negative Air Pressure Equipment (i.e., Microtraps) used by the Contractor shall meet the Standard for Safety High-Efficiency, Particulate, Air Filter Units (UL 586) developed by Underwriters Laboratories.

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28. Holding Area: A room or area in the Waste Decontamination Enclosure System utilized for the temporary (i.e., no longer than the current work shift) storage of containerized asbestos waste, prior to its transfer to a final on-site storage container (i.e., dumpster, trailer, or roll-off) or a licensed asbestos waste transport vehicle. The Holding Area is located between the washroom and an uncontaminated area.
29. Independent Third Party Monitor: A NYSDOL-licensed asbestos contractor who will be contracted by the Engineer or the City, and is completely independent of the Asbestos Abatement Contractor involved with the Asbestos Project. The independent third party who conducts ambient and clearance air monitoring or Project Monitoring on an Asbestos Project shall not have any business, personal, or other relationship with the Asbestos Abatement Contractor.
30. Isolation Barrier: A term used to define the construction of partitions, the placement of solid materials, and the plasticizing of apertures to seal off the Regulated Abatement Work Area from surrounding areas and contain asbestos fibers.
31. Large Asbestos Project: An Asbestos Project involving the Removal, enclosure, Encapsulation, Repair, Disturbance, cleanup, or handling of 260 linear feet or more of ACM, or 160 square feet or more of ACM.
32. Log: An official record, maintained by the Asbestos Abatement Contractor, of all activities that occurred during the Asbestos Project. The Log shall be in the form of a bound notebook, and at a minimum, identify the following information: (a) the building owner, agent, contractor, and workers; (b) daily activities, cleanings, and waste transfers; (c) the names and certificate numbers of all Asbestos Handlers and Asbestos Handler Supervisors; (d) the results of inspections of decontamination systems, barriers, and negative pressure ventilation equipment; (e) summaries of all corrective actions and Repairs; (f) work stoppages with reasons for stoppages; (g) manometer readings at least twice per work shift; (h) daily checks of emergency and fire exits; (i) any unusual events.
33. Microtrap: (See definition of “Negative Air Pressure Equipment”).
34. Minor Asbestos Project: An Asbestos Project involving the Removal, enclosure, Encapsulation, Repair, Disturbance, cleanup, or handling of 25 linear feet or less of ACM, or 10 square feet or less of ACM.
35. Negative Air Pressure Equipment: A local exhaust system capable of maintaining air pressure within the Containment at a lower pressure than the air outside of the Containment. The Negative Air Pressure Equipment also provides for the HEPA filtration of all air exhausted from the Containment.

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36. Non-Friable Asbestos: A term used by the NYSDOL to define any ACM or asbestos waste that cannot be crumbled, pulverized or reduced to powder when dry, by hand pressure.
37. Obstruction: The blocking of a means of egress with any temporary structure or barrier. Polyethylene sheeting shall not be considered an Obstruction when it is prominently marked with exit signage or paint, and cutting tools (i.e., a knife or razor blade) are attached to the work area side of the sheeting for use in the event that the sheeting must be cut to permit egress. A corridor shall not be considered obstructed when there is a clear path measuring at least three feet wide.
38. OSHA Monitoring: (See definition of “Exposure Monitoring”).
39. P-100 Filter: (See definition of: “HEPA”).
40. Perimeter Monitoring: (See definition of “Area Monitoring”).
41. Permissible Exposure Limit (PEL): Defined in the OSHA Asbestos Standard for the Construction Industry (29 CFR 1926.1101) as individual exposure, without regard to the use of respirators, to an airborne concentration of asbestos fibers of 0.1 fibers per cubic centimeter of air (f/cc) calculated as an 8-hour Time-Weighted Average (TWA). No employee of the Contractor shall at any time be exposed to concentrations of asbestos fibers above the PEL. See also Excursion Limit.
42. Personal Decontamination Enclosure System: A series of connected rooms designed to control the passage of Asbestos Handlers, and other authorized individuals into the Regulated Abatement Work Area from uncontaminated areas. The system consists of a Clean Room, a Shower Room, and an equipment room separated from each other and the Regulated Abatement Work Area by airlocks and curtained doorways.
43. Personal Monitoring: (See definition of “Exposure Monitoring”).
44. Phase Contrast Microscopy (PCM): An analytical method (e.g., NIOSH 7400) used for determining the asbestos fiber concentration in an air sample.
45. Polarized Light Microscopy (PLM): An analytical method (e.g., 40 CFR 763, Subpart F, Appendix A or ELAP Item 198.1 or 198.6) used for determining the asbestos content in a bulk material.
46. Post Abatement Air Monitoring: (See definition of “Clearance Air Monitoring”).
47. Presumed Asbestos-Containing Material (PACM): Material suspected of containing asbestos as described in 15 RCNY 1-38. PACM is considered to be ACM unless proven otherwise by appropriate bulk sampling and laboratory analysis.
48. Project Designer: A person who performs Asbestos Project design functions and possesses a valid Project Designer certificate issued by the NYSDOL.

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49. Project Monitor: A person who performs Asbestos Project Monitoring functions and possesses a valid Project Monitor certificate issued by the NYSDOL
50. Regulated Abatement Work Area: The portion of the Restricted Area where Abatement Work actually occurs. This includes the interior of the Restricted Area Containment enclosure. For Glovebag operations, the areas contiguous to where the operation takes place are Regulated Abatement Work Areas. For tents, the interior of each tent is a Regulated Abatement Work Area. For exterior, Non-Friable Asbestos Abatement conducted without the establishment of negative air ventilation systems or Containment enclosures, the entire Restricted Area surrounding the Abatement location is considered to be the Regulated Abatement Work Area.
51. Removal: The stripping of any ACM from surfaces or components of a building or structure.
52. Repair: A term used by the DEP to define a corrective action using specified work practices (e.g., Glovebags or tents) to minimize potential asbestos fiber releases from minimally damaged ACM.
53. Restricted Area: An area established and marked for the Abatement portion of an Asbestos Project. The area shall include, but not be limited to, Regulated Abatement Work Areas and any contiguous decontamination enclosure systems, adjoining staging areas where work materials, debris, or waste materials from such Work may accumulate, and waste storage areas (e.g., dumpsters, trailers, or roll-offs).
54. Shower Room: A room between the Clean Room and the equipment room in the Personal Decontamination Enclosure System set up to prevent cross-contamination by ensuring the removal of potential asbestos contamination from the body that may have accumulated during Abatement operations. The Shower Room shall have hot and cold running water controllable at the tap, shall be arranged for complete showering during decontamination, and shall include clean, dry towels, soap, and shampoo in quantities sufficient to accommodate the personnel working on the Asbestos Project.
55. Small Asbestos Project: An Asbestos Project involving the Removal, enclosure, Encapsulation, Repair, Disturbance, cleanup, or handling of more than 25 linear feet but less than 260 linear feet of ACM, or more than 10 square feet but less than 160 square feet of ACM.
56. Suspect ACM: All friable and non-friable materials suspected of containing asbestos as determined by a certified NYSDOL Asbestos Inspector or certified DEP Asbestos Investigator, which have not been sampled and analyzed for asbestos content. Suspect ACM includes PACM.
57. Tent: (See definition of “Containment”).

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58. Transmission Electron Microscopy (TEM): An analytical method (e.g., 40 CFR 763, Subpart F, Appendix A or ELAP Item 198.4) used for determining the asbestos fiber concentration in an air sample, or for determining the asbestos content in a bulk material.
 59. Trace Asbestos-Containing Material: A building material that contains less than or equal to 1% of asbestos.
 60. Variance: Relief from specific requirements set forth in state or local asbestos regulations, which is granted in writing by the agency that enforces the regulations.
 61. Visible Emission: Any emission containing particulate material that can be seen without the aid of instruments.
 62. Waste Decontamination Enclosure System: A series of connected rooms designed to control the transfer of materials and equipment from the Regulated Abatement Work Area. The system consists of a washroom and a Holding Area separated from each other and the Regulated Abatement Work Area by airlocks and curtained doorways.
 63. Wet Cleaning: The process of eliminating asbestos contamination from surfaces, equipment, or other objects by using cloths, mops, or other cleaning tools that have been saturated with amended water.
 64. Worker Decontamination Enclosure System: (See definition of “Personal Decontamination Enclosure System”).
 65. Work Place Safety Plan: Construction documents prepared by a registered design professional and submitted for review to the DEP ACP in order to obtain an Asbestos Abatement Permit. The plan shall include, but not be limited to, plans, sections, and details of the Regulated Abatement Work Area clearly showing the extent, sequence, and means and methods by which the Work is to be performed.
- B. Reference Standards:
1. The Contractor shall comply with all applicable regulations, standards, and guidelines of federal, state, and local environmental and occupational safety and health agencies regarding ACM, trace asbestos materials, and Asbestos-Containing Waste Materials. These regulations, standards, and guidelines include, but are not limited to the following:
 - a. ASTM International:
 - 1) E1368 – Standard Practice for Visual Inspection of Asbestos Abatement Projects.
 - b. Department of Transportation (DOT):
 - 1) 49 CFR 171 - General Information, Regulations, and Definitions;

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- 2) 49 CFR 172 – Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response information, and Training Requirements;
 - 3) 49 CFR 173 – Shippers: General Requirements for Shipments and Packagings;
 - 4) 49 CFR 178 – Specifications for Packagings.
2. Environmental Protection Agency (EPA):
 - a. 40 CFR 61 - National Emission Standards for Hazardous Air Pollutants (NESHAP);
 - b. 40 CFR 268 – Land Disposal Restrictions;
 - c. 40 CFR 302 – Designation, Reportable Quantities, and Notification;
 - d. 40 CFR 763 - Asbestos Hazard Emergency Response Act (AHERA).
 3. National Institute for Occupational Safety and Health (NIOSH):
 - a. Method 7400 – Asbestos and Other Fibers by PCM;
 - b. Method 7401 – Asbestos by TEM.
 4. City Department of Environmental Protection (DEP):
 - a. Environmental Health and Safety Policies and Procedures – Vol. II, Spill Prevention, Environmental Release Reporting and Investigation;
 - b. Environmental Health and Safety Policies and Procedures – Vol. III, Asbestos Management;
 - c. Environmental Health and Safety Policies and Procedures – Vol. IV, PCB Management;
 - d. RCNY Title 15 Chapter 1 - Asbestos Control Program Rules and Regulations;
 - e. RCNY Title 15 Chapter 19 – Discharges of Wastewater and Other Materials to Public Sewers.
 5. New York City Department of Sanitation (DSNY):
 - a. RCNY Title 16 Chapter 8 – Asbestos Rules and Regulations.
 6. New York State Department of Environmental Conservation (NYSDEC):
 - a. 6 NYCRR 360 - Solid Waste Management Facilities;
 - b. 6 NYCRR 364 - Waste Transporter Permits;
 - c. 6 NYCRR 376 – Land Disposal Restrictions.

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7. New York State Department of Health (NYSDOH):
 - a. 10 NYCRR 55-2 – Approval of Laboratories Performing Environmental Analysis.
8. New York State Department of Labor (NYSDOL):
 - a. 12 NYCRR 56 - Asbestos Rules and Regulations.
9. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910 – Occupational Safety and Health Standards;
 - b. 29 CFR 1910.28 – Safety Requirements for Scaffolding;
 - c. 29 CFR 1926.65 – Hazardous Waste Operations and Emergency Response;
 - d. 29 CFR 1910.134 - Respiratory Protection Standard;
 - e. 29 CFR 1910.1001 - Asbestos Standard for General Industry;
 - f. 29 CFR 1910.1200 - Hazard Communication Standard;
 - g. 29 CFR 1926 - Safety and Health Regulations for Construction;
 - h. 29 CFR 1926.1101 - Asbestos Standard for the Construction Industry.
10. Underwriters Laboratories, Inc. (UL):
 - a. UL 586 – Standard for Safety High Efficiency, Particulate, Air Filter Units.

1.05 DESCRIPTION

- A. Commencement of Work: 10 business days prior to the proposed start of Work at each separate location, the Contractor shall notify the Engineer, the onsite safety staff, and building occupants. No Work may proceed at any location until authorized by the Engineer.
- B. The Contractor shall coordinate any required equipment shutdowns with the Engineer prior to starting the work.
- C. Access Restrictions: The Contractor shall inform the Engineer of proposed access restrictions (i.e., areas or items of equipment which will not be accessible during the proposed Asbestos Project), and provide them estimated time frames (including specific dates) of such proposed access restrictions. The Contractor shall be aware that Other Contractors may be at the Work Site. As a result, the Contractor shall not have exclusive rights to the Work Site, and shall fully cooperate and coordinate the Work with the work of Other Contractors who may be on Site. Therefore, the Contractor shall notify Other Contractors in advance of the abatement Work included herein, to provide them with sufficient time for coordination of interrelated items that are included in their contracts and that must be performed before, after, or in conjunction with the Work included under this Section.

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1. The Contractor shall ensure that Personal and Waste Decontamination Enclosure Systems along with the Regulated Abatement Work Area are constructed of solid materials with lockable doors to prevent unauthorized entry during non-working hours.
- D. Meetings: The Contractor shall visit and investigate the Site and review the Contract Drawings, this Section, DEP EHS Policies and Procedures, and become familiar with any conditions which may affect the Work, as part of the pre-construction meeting and site walk-through. The Contractor shall hold all meetings with appropriate parties as scheduled and as otherwise necessary to accomplish the Work of the Contract in accordance with its specific requirements and standards. In addition to the pre-construction meeting and site walk-through, other meetings may be required or may be requested by the Engineer, including briefings with Site Operations personnel. Written documentation (i.e., “minutes”) of all meetings shall be generated by the Contractor, and copies shall be provided to DEP within three (3) business days following each meeting.

1.06 QUALITY ASSURANCE

- A. Permits and Notifications: The Contractor shall make all necessary notifications, secure any necessary permits and Variances, complete agency-required forms, and pay all fees in conjunction with asbestos Abatement activities, waste transportation, and waste disposal in accordance with federal, state, and local asbestos regulations. Prior to the submittal of any notifications, permit/Variance applications, or forms to regulatory agencies, the Contractor shall provide them to the Engineer for review.
- B. Scheduling: The Contractor shall coordinate and schedule all phases of the work to be performed under this Section with the DEP, Subcontractors, material suppliers, and other parties as necessary to ensure the proper execution of the Work.
- C. Compliance: In addition to the detailed requirements of this Section and DEP EHS Policies and Procedures, the Contractor shall comply with all applicable regulations of federal, state, and local authorities pertaining to the Abatement, Disturbance, cleanup, handling, transportation, storage, and disposal of ACM, trace asbestos materials, and Asbestos-Containing Waste Materials. All matters regarding the interpretation of any regulations, standards, or policies shall be submitted to the Engineer for resolution before starting the Work. Where the requirements of this Section, DEP EHS Policies and Procedures, and federal, state, or local regulations conflict or vary, the most stringent requirements or regulations shall apply.
- D. Rejection of Non-Complying Items: DEP reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements. DEP also reserves the right to reject Contractor submittal items that it deems inappropriate or unacceptable. Included in the category of non-complying items are proposed vendors, Subcontractors or personnel with regulatory citations/violations. The DEP further reserves the right, and without prejudice to other recourse, to

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accept non-complying items subject to an adjustment in the Contract amount, as approved by the DEP.

E. Qualifications:

1. Asbestos Abatement Contractor: The Contractor shall possess a current NYSDOL asbestos license, and shall have successfully completed at least two (2) Asbestos Projects of comparable scope and methodologies to the Work being performed under this Section within the past three (3) years. This experience shall be documented by identifying the following: (a) the name, address, and phone number of each facility where the work was performed; (b) the name of the individual representing the owner at each facility; (c) the types of facilities where the work was performed; (d) the volume and type of each material that was abated; (e) the specific methods of Abatement used at each facility (including the tools, technologies, and engineering controls employed);
2. Asbestos Handler Supervisor: The Contractor shall have on staff and assigned to this Contract an Asbestos Handler Supervisor. The Asbestos Handler Supervisor shall be currently certified by the DEP (if working on Asbestos Projects in the five boroughs) and NYSDOL (for all Asbestos Projects). In addition, the Asbestos Handler Supervisor shall have a minimum of two (2) years' experience on Asbestos Projects, and shall have served as the Asbestos Handler Supervisor on at least three (3) Asbestos Projects of comparable scope and methodologies to the work being performed under this Section.
3. Asbestos Handler: The Contractor shall have on staff and assigned to this Contract a sufficient number of experienced and properly trained Asbestos Handlers. Asbestos Handlers shall be currently certified by the DEP (if working on Asbestos Projects in the five boroughs) and NYSDOL (for all Asbestos Projects), and shall have a minimum of one (1) year of experience on Asbestos Projects, and shall have worked on at least three (3) Asbestos Projects of comparable scope and methodologies to the Work being performed under this Section.

1.07 SUBMITTALS

- A. Thirty business days prior to commencement of the Work of this Section or as directed by the Engineer, the Contractor shall submit the following to the Engineer:
1. Asbestos Inspection and Sampling Plan: The Contractor shall provide an Asbestos Inspection and Sampling Plan to identify suspect asbestos-containing materials and collect confirmatory samples, as appropriate during the inspection.
 2. The Asbestos Inspection and Sampling Plan shall include at a minimum:
 - a. Credentials of the individual responsible for inspection and sampling. At a minimum, the inspection shall be performed by a

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certified NYSDOL Asbestos Inspector or a certified NYCDEP Asbestos Investigator (if performed within the City), who shall have current HAZWOPER training, OSHA 10-hour certification, and confined space entry training, as applicable to the location or work, and shall have performed similar inspection work on at least three (3) projects of comparable scope.

- b. Credentials of the laboratory providing sample analysis. The credentials shall include current certification by the NYSDOH ELAP.
 - c. Sample collection, analysis and reporting protocol in accordance with RCNY Title 15 Chapter 1 and 12 NYCRR Part 56, as applicable to the location or work.
 - d. Health and safety protocol for all investigation activities.
3. Asbestos Inspection Report: The Contractor shall provide an Asbestos Inspection Report summarizing the results of all inspection activities, and as applicable, a sampling narrative, laboratory data packages and inventory of all identified suspect and confirmed asbestos-containing materials. All reporting shall be in accordance with RCNY Title 15, Chapter 1 and 12 NYCRR Part 56, as applicable to the location or Work.
4. Asbestos Work Plan: Each Contractor that will disturb ACM during the course of Work to be performed under this Section shall submit a detailed, project-specific Asbestos Work Plan that addresses Work procedures and equipment to be used during the disturbance, abatement, removal, handling, collection, cleanup, and disposal of ACM and Asbestos-Containing Waste Materials. The Asbestos Work Plan shall be prepared in accordance with RCNY Title 15, Chapter 1 or 12 NYCRR 56, and all other pertinent federal, state, and local regulations. In addition, the Asbestos Work Plan shall follow all applicable DEP EHS Policies and Procedures and shall be coordinated with the Engineer. The Asbestos Work Plan shall also be signed and dated by a NYSDOL-certified Project Designer meeting the definition in this Section. A copy of the Project Designer's current NYSDOL certification shall be attached to the Work Plan. The Asbestos Work Plan shall include the following elements:
- a. Asbestos Control:
 - 1) Drawings showing the location and details of the following:
 - (a) each Regulated Asbestos Work Area; (b) the type, location, and number of negative air pressure machines that will be used, as well as all exhaust locations; (c) proposed electrical hookups and temporary electrical panels; (d) proposed water hookups; (e) each Restricted Area; (f) each Personal Decontamination Enclosure System; (g) each Waste Decontamination Enclosure System; (h) each waste

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- storage area (e.g., dumpster, trailer, or roll-off); (i) restroom areas; (j) areas designated for eating and drinking.
- 2) A detailed discussion regarding the interfacing of trades (i.e., how the Contractor will coordinate the Work with Other Contractors or DEP employees working at the Site) and the sequencing of asbestos-related Work.
 - 3) A detailed discussion regarding the collection, handling procedures, cleanup, and disposal of Asbestos-Containing Waste Materials (including the collection, filtering, and disposal of wastewater).
 - 4) A detailed discussion regarding the procedures and methodologies that will be used to conduct Exposure Monitoring. Provide the name and qualifications (i.e., training and experience documentation) of the individual who will be responsible for conducting the Exposure Monitoring.
 - 5) A detailed discussion regarding housekeeping procedures to be used for maintaining clean Regulated Abatement Work Areas, clean Restricted Areas, and clean decontamination enclosure systems.
 - 6) A detailed discussion regarding the specific methods and procedures that will be used to control fiber releases, and ensure that as per 40 CFR Part 763, Subpart E, of the EPA Asbestos in Schools Rule measured by Phase Contrast Microscopy (PCM), fiber concentrations less than or equal to the clearance and action criteria of 0.01 f/cc of air, or background levels (whichever are greater), are not exceeded outside of each Regulated Abatement Work Area. For projects conducted outside of the five boroughs of New York City, the clearance and action criteria is less than 0.01 f/cc; of air, or background levels (whichever is greater).
 - 7) A detailed task analysis for each Work activity that has the potential to disturb ACM or Asbestos-Containing Waste Materials. Each task analysis shall include, but is not limited to, the following information: (a) the type of Work activity; (b) the tools/equipment that will be used; (c) operation and maintenance practices and procedures that will be used for the tools/equipment; (d) the types of ACM that will be disturbed, or Asbestos-Containing Waste Materials that may be generated when performing the activity; (e) the engineering controls that will be used to control the spread of asbestos fibers during the activity; (f) the proposed crew

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size for the activity and individual employee responsibilities during the activity; (g) housekeeping procedures that will be used during the activity; (h) PPE and proposed respiratory protection that will be used for the activity.

- 8) Equipment and Supplies: Identify the materials and equipment that will be used to perform the Work, including materials and equipment designed to be non-combustible or fire retardant in accordance with the National Fire Protection Association (NFPA) Standards 701 and 255. Materials and equipment utilized for Abatement activities that take place within the five boroughs, shall conform to RCNY Title 15 Chapter 1-61.
 - 9) Rental Equipment Notification: If rental equipment is to be used during the Work, the Contractor shall notify the rental agency in writing concerning the intended use of the equipment, and shall develop and submit an equipment decontamination plan to the Engineer for review and approval prior to the start of Work.
 - 10) Safety Data Sheets (SDSs): Provide SDSs for all chemical products (including wetting agents and encapsulants) to be used for the Work.
- b. Waste Management:
- 1) A description of the types of ACM and Asbestos-Containing Waste Materials associated with the Work (include details regarding whether the materials are friable or non-friable).
 - 2) The estimated quantity of each waste stream that will be generated.
 - 3) The name, address, phone number, and qualifications of each vendor and facility that will be transporting, storing (including transfer stations), or disposing of the wastes. The Contractor shall verify the permit status of the facility as well as check for outstanding violations and enforcement actions. Include a 24-hour phone contact for each vendor and facility.
 - 4) Current permit documentation for the disposal facility indicating that the facility is approved by federal, state, and local regulatory agencies to receive Asbestos-Containing Waste Materials. The documentation shall include an “acceptance letter” from the facility indicating its ability to accept the specific asbestos waste streams that will be generated during this Contract Work.

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- 5) Current 6 NYCRR 364 permit documentation for the waste transporter that will transport Asbestos-Containing Waste Materials from the Work Site to the disposal facility. The documentation shall clearly indicate the transporter's ability to deliver the Asbestos-Containing Waste Materials to the chosen disposal facility.
 - 6) Spill prevention, Containment, and cleanup contingency measures to be implemented during the Work, as well as procedures to be followed during a suspected fiber release or emergency situation. All measures and procedures shall be in accordance with the standards referenced in this Section.
 - 7) A detailed discussion of the on-site handling, storage, Removal, cleanup, and disposal of waste materials. This discussion shall include, but is not limited to, the following:
 - (a) the methods of demarcation that will be used to identify the waste storage areas and each waste bag/container;
 - (b) the methods and procedures that will be used to collect and containerize wastes on a daily basis;
 - (c) the types of bags/containers that will be used to containerize the wastes;
 - (d) the submittal of weekly waste inspection records as required in this Section.
- c. The name and qualifications (i.e., experience and training documentation) of the Asbestos Handler Supervisor who will be responsible for the oversight and execution of the Asbestos Control Plan during activities affecting ACM. At a minimum, the Asbestos Handler Supervisor shall satisfy the qualification requirements set forth in this Section, and shall be onsite during all activities affecting ACM.
- d. Asbestos Abatement Project Notifications and Permits: Submit completed permits and notifications to the Engineer for review and approval prior to submittal to the applicable agencies. All Large Asbestos Projects and Small Asbestos Projects that take place within the five boroughs are required to follow notification and permitting procedures per RCNY Title 15, Chapter 1. All Large Asbestos Projects require notification procedures per 12 NYCRR 56. Documents that may be required based upon the scope and location of the project include, but are not limited to, the following:
- 1) EPA Large Asbestos Project Notification;
 - 2) DEP Asbestos Assessment Report (Form ACP-5);
 - 3) DEP Asbestos Project Notification (Form ACP-7);
 - 4) DEP Asbestos Project Amendment (Form ACP-8);

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- 5) DEP Asbestos Variance Application (Form ACP-9);
 - 6) DEP Asbestos Technical Review Unit Permit (A-TRU Permit);
 - 7) DEP Work Place Safety Plan;
 - 8) NYSDOL Asbestos Project Notification;
 - 9) NYSDOL Asbestos Variance Application.
- e. A detailed schedule for the implementation of the Asbestos Work Plan elements. The schedule shall address the different phases of the Asbestos Project, including the projected start and completion dates for Restricted Area preparation, gross Removal and Abatement, cleanings, Clearance Air Monitoring, and demobilization activities.
- f. Medical Surveillance: For all activities that take place within a Regulated Abatement Work Area, the Contractor shall provide a sufficient number of properly trained, experienced, and certified workers, each of whom shall: (a) have received a medical exam that included a Pulmonary Function Test (PFT) within the past year; (b) have received written medical clearance within the past year, by a licensed physician, to wear a respirator; (c) have received a qualitative or quantitative respirator fit-test within the past year for the specific respirator the employee will be using for this Work.
- g. Employee Documentation: For all activities that take place within a Regulated Abatement Work Area, the Contractor shall provide a sufficient number of properly trained, experienced, and certified workers, each of whom shall: (a) have current NYSDOL-issued and DEP-issued asbestos certificates shall be considered proof of training; (b) documentation for Asbestos Handlers and Asbestos Handler Supervisors that will be used for each Asbestos Project, indicating work experience as required in this Section; (c) dates and written proof of initial medical surveillance and all subsequent examinations by the Contractor or other employer within the past year, and proof that the employee is currently participating in the employer's ongoing medical surveillance program in accordance with this Section; (d) dates and written proof of respiratory clearance and a completed medical exam in accordance with this Section; (e) dates and written proof of a respirator fit-test in accordance with this Section.
- h. A current (i.e., within the last month) signed and notarized statement disclosing all of the Contractor's OSHA, EPA, NYSDOL, DEP, DSNY, and DOT citations/violations on Asbestos Projects within the past three (3) years. If the Contractor will be using a Subcontractor, a current signed and notarized statement disclosing all of the Subcontractor's OSHA, EPA, NYSDOL, DEP, DSNY,

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and DOT citations/violations within the past three (3) years will also be required.

- i. A current (i.e., within the last month) signed and notarized statement disclosing all of the Asbestos Handler Supervisor’s NYSDOL and DEP citations/violations within the past three (3) years.
 - j. Analytical Laboratory Qualifications for Analyzing Air Samples: Submit the name, address, and telephone number of each analytical laboratory selected to perform the analyses of all air samples collected for Exposure Monitoring purposes. The analytical laboratory shall be currently accredited by the American Industrial Hygiene Association (AIHA) and NYSDOH ELAP. Provide copies of current AIHA and ELAP certificates along with dates of accreditation/reaccreditation. ELAP certificates should show evidence of certification for the specific analytical methods that will be used.
5. Documentation: Complete documentation of all Exposure Monitoring activities shall be in accordance with this Section.
6. The Contractor shall submit all Exposure Monitoring results to the DEP no later than 24-hours after the collection of the air samples.
- B. Logs and Recordkeeping: During all Work performed under this Section, the Contractor shall maintain and provide the following documentation:
1. Exposure Monitoring Documentation: Exposure Monitoring Documentation shall be created and shall be made available to the DEP immediately upon request. All laboratory analytical results shall be accompanied by complete COC documentation.
 - a. The Exposure Monitoring documentation shall be signed by the individual who generated the documentation. The content of the documentation shall include, but is not limited to, the following information: (a) sample “start” and “stop” times; (b) flow rates (initial and final) for each sample; (c) the total volume of air collected for each sample; (d) names of individuals being sampled along with the specific Work task each individual is performing; (e) specific respiratory protection and PPE worn by each individual; (f) types (i.e., makes and models) of sampling equipment used; (g) types of sample media (i.e., filters and cassettes) used; (h) the most recent calibration dates, along with the calibration results, for the sampling equipment used; (i) name of the individual who conducted the Exposure Monitoring; (j) dates that the Exposure Monitoring was conducted; (k) Work tasks being performed adjacent to the Restricted Area during the Exposure Monitoring; (l) unique sample numbers used to identify each sample; (m) the phase of the Asbestos

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Project being performed (i.e., background, pre-abatement, Abatement, cleaning, or clearance).

2. Waste Manifest Documentation: A Waste Profile for all asbestos waste shall be completed and submitted to the Engineer for review and approval prior to DEP signature. The Contractor shall submit a Letter of Acceptance form the selected asbestos-permitted landfill stating that the facility will accept the asbestos wastes generated during abatement. The Contractor shall also submit advance copies of the completed manifest for the Engineer's review and approval, prior to NYCDEP signature on the date of disposal. Following disposal, completed and signed waste manifests from the approved, asbestos-permitted landfill, shall be provided to the DEP within 10 business days of disposal. In addition, on-site waste storage areas shall be inspected weekly by the Asbestos Handler Supervisor.
3. Waste Storage Area Inspection Documentation: Each weekly waste storage area inspection shall be documented in the Asbestos Abatement Contractor's bound Log. The Log shall be signed by the Asbestos Handler Supervisor, and shall be made available to the DEP immediately upon request. The content of this documentation shall include, but is not limited to, the following information: (a) the name of the individual that conducted the inspection; (b) descriptions of waste streams being stored; (c) types and quantities of waste containers being used; (d) the current disposal status (i.e., when the waste container is scheduled to be removed from the Work Site) and physical condition of each waste container; (e) the present condition of each waste storage area; (f) the presence/absence of proper labeling for each waste container in accordance with this Section and federal, state, and local regulations.; (g) the methods being used to secure/lock each waste storage area to prevent unauthorized entry.
4. Asbestos Project Inspection Documentation: Project Monitors and Restricted Areas shall be inspected daily by the Asbestos Handler Supervisor.
 - a. Each daily Asbestos Project inspection shall be documented in the Asbestos Abatement Contractor's bound Log. The Log shall be signed by the Asbestos Handler Supervisor, and shall be made available to the DEP immediately upon request. The content of the Log shall include, but is not limited to, the following information: (a) the type of Asbestos Project (i.e., Large Asbestos Project, Small Asbestos Project, or Minor Asbestos Project) being conducted; (b) the current phase of the Asbestos Project (i.e., mobilization, background pre-Abatement, abatement, cleaning, Clearance Air Monitoring, or Containment breakdown); (c) the names of the Asbestos Handlers, Asbestos Handler Supervisors, Project Monitors, and Air Sampling Technicians on site, as well as the name of the company each individual is representing; (d) the types of air

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monitoring (i.e., Exposure Monitoring or area monitoring) being conducted, and the number of samples being collected for each type of air monitoring activity; (e) the results of decontamination enclosure system, Critical Barrier, Isolation Barrier, and Negative Air Pressure Equipment inspections; (f) a summary of corrective actions and Repairs; (g) Work stoppages and the reasons for the work stoppage; (h) manometer readings (at least twice per work shift); (i) emergency and fire exit checks; (j) verification that functional fire extinguishers are present in the Restricted Areas; (k) any unusual events that occurred during the Work; (l) non-compliance issues observed (i.e., observations that conflict with the requirements of the Contractor's Asbestos Work Plan, this Section, DEP EHS Policies and Procedures, or federal, state, and local regulations) along with the corrective actions that were taken to achieve compliance.

5. Contractor Project Record: The Asbestos Handler Supervisor shall maintain a project record in the Regulated Abatement Work Area. The Contractor Project Record shall be made available to the Engineer or DEP for review at any time during the Asbestos Project, and shall be submitted to the DEP within 24- hours after the completion of the Asbestos Project.
 - a. At a minimum, the Contractor Project Record shall contain the following information: (a) copies of DEP and NYSDOL asbestos certificates/licenses for all individuals/companies working on the Asbestos Project; (b) copies of all notifications, amendments, permits, work safety plans, and Variances related to the Asbestos Project; (c) copies of all exposure and Ambient Air Monitoring results generated during the Asbestos Project; (d) documentation of all pressure differential readings for Regulated Abatement Work Areas; (e) copies of all available bulk sample analytical data as well as asbestos survey reports relating to the Asbestos Project; (f) copies of all daily sign-in sheets as defined in this Article; (g) a list of emergency phone numbers, including the local fire department, local police department, nearest hospital, as well as phone numbers for the Engineer and DEP personnel responsible for administering the Asbestos Project; (h) a copy of New York City's Asbestos Control Program Rules and Regulations (Title 15, Chapter 1); (i) a copy of New York State's Asbestos Rules and Regulations (12 NYCRR 56); (j) a copy of EPA's asbestos regulations (40 CFR 61, Subparts A and M); (k) copies of all SDSs pertaining to all chemicals being used during the Asbestos Project; (l) a copy of this Section; (m) a copy of the Contractor's Asbestos Work Plan; (n) copies of all daily air monitoring reports as defined in this Article; (o) copies of all daily Asbestos Project inspection reports as defined in this Article; (p) copies of all weekly waste storage area inspection

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reports as defined in this Article; (q) copies of all DEP EHS Policies and Procedures identified in this Section.

6. Daily Sign-In Documentation: The Contractor shall generate daily sign-in documentation for all individuals entering and exiting each Regulated Abatement Work Area and Restricted Area, for the duration of the Asbestos Project. The daily sign-in documentation shall be maintained in the Asbestos Abatement Contractor's bound Log. The daily sign-in documentation shall be made available to the Engineer or DEP for review at any time during the Asbestos Project.
 - a. At a minimum, daily sign-in documentation shall include: (a) the individual's full name (printed); (b) the individual's signature; (c) the name of the company the individual is representing; (d) the times of entry and exit from the Restricted Area; (e) verification by the Asbestos Handler Supervisor that the individual possesses current DEP and NYSDOL asbestos certifications if the individual intends to enter a Regulated Abatement Work Area.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Respirators: The Contractor shall select respirators approved by NIOSH for use in Regulated Abatement Work Areas where the Abatement or Disturbance of ACM or Asbestos-Containing Waste Materials will occur. If not included within the EHASP the Contractor shall submit their Respiratory Protection Program to DEP for review prior to abatement activities. At a minimum, the Contractor shall provide each individual within a Regulated Abatement Work Area with a half-face, negative pressure, air purifying respirator equipped with HEPA filter cartridges. The Contractor's Asbestos Handler Supervisor shall make all determinations regarding respiratory protection modifications that will be implemented for the Work. All modifications shall be in accordance with the OSHA Asbestos Standard for the Construction Industry (29 CFR 1926.1101) and the Contractor's Asbestos Work Plan. At no time during the Asbestos Project shall respiratory protection within a Regulated Abatement Work Area be downgraded to below the minimum

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requirement of a half-face, negative pressure, air purifying respirator equipped with HEPA filter cartridges.

- B. PPE: The Contractor shall provide personnel who have a potential to be exposed to asbestos with appropriate PPE.
- C. HEPA Filters: HEPA filters used in vacuuming equipment and Negative Air Pressure Equipment must meet or exceed any manufacturer’s specifications and recommendations, as well as specifications presented in the Standard for Safety High Efficiency, Particulate, Air Filter Units (UL 586).
- D. Containment Materials: Plastic sheeting used in the construction of temporary enclosures shall be fire retardant in accordance with NFPA Standard 701. Wood or other materials used in the construction of temporary enclosures shall be non-combustible or fire-retardant in accordance with NFPA 255, ASTM D-2898, ASTM E84, and UL 723.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Safe Work Practices for Trace Asbestos materials
 1. An exposure assessment shall be performed in accordance with 29 CFR 1926.1101(f) (2) (i) to determine if workers disturbing, handling, or performing cleanup activities involving trace asbestos materials, must wear PPE or respiratory protection.
 2. Wetting agents or special work methods shall be utilized to control potential employee exposures to asbestos during the handling, mixing, removing, cutting, application, or cleanup, of trace asbestos materials, except if the use of these wetting agents/work methods is not feasible (e.g., using them may create electrical hazards or equipment malfunctions).
 3. Asbestos-contaminated wastes and debris shall be cleaned-up promptly and disposed of in leak-tight containers. The handling, disposal, and transport of Trace Asbestos-Containing Material wastes is not regulated since the wastes are not ACM (i.e., they do not contain greater than 1% asbestos).
 4. The use of high-speed abrasive saws that are not equipped with “point-of-cut” ventilators or enclosures with HEPA-filtered exhaust air shall be prohibited.

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5. The use of compressed air to cleanup or remove trace asbestos materials is prohibited.

B. Preparation

1. **Utilities:** The temporary use of any on-site utilities shall be subject to the approval of the DEP. The Contractor shall furnish all water and hoses needed for the Asbestos Project, as well as any temporary hookups. Also, the Contractor shall supply all necessary heating equipment and water filtration devices needed for the Work. In addition, all temporary lighting and temporary electrical service to a Regulated Abatement Work Area or a Restricted Area shall be provided by the Contractor, and shall be in weather-proof enclosures and be ground fault protected.
2. **Signs:** The Contractor shall post conspicuous warning signs at all approaches to Regulated Abatement Work Areas, Restricted Areas, and waste storage areas. The signs shall be located at such a distance so that personnel may read the sign and take necessary precautions before entering a Regulated Abatement Work Area, Restricted Area, or waste storage area. Signs shall comply with the requirements of federal, state, and local regulations. Once Clearance Air Monitoring results indicate that a Regulated Abatement Work Area is in compliance with the provisions for re-occupancy set forth in RCNY Title 15, Chapter 1 or 12 NYCRR 56, the signs shall be removed. At a minimum, each sign shall bear the following information in English and the predominant language that is spoken by the Contractor's employees if English is not spoken:

DANGER
ASBESTOS CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA
NO SMOKING

- C. **Fire Extinguishers:** The Contractor shall maintain at least two functional fire extinguishers in each Restricted Area. The fire extinguishers shall have a minimum rating of 2-A:10-B:C, and each fire extinguisher shall be checked daily by the Asbestos Handler Supervisor to ensure that it remains functional throughout the duration of the Asbestos Project.

3.02 INSTALLATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Air Monitoring

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1. Exposure Monitoring: Air monitoring for airborne concentrations of asbestos fibers shall be conducted by the Asbestos Handler Supervisor (or by a qualified air monitoring firm) in accordance with OSHA.
 - a. The Contractor shall collect personal air samples from employees who are anticipated to have the greatest risk of exposure, as determined by the Contractor. Exposure Monitoring shall be conducted during each phase of the Asbestos Project (e.g., pre-abatement, Abatement, and cleanup) for one (1) Work shift from at least one (1) employee that is representative of each type of Work task that is being performed. Each personal air sample will “run” for the employee’s entire Work shift in order to ensure that enough volume (of air) is collected and an accurate 8-hour TWA can be calculated. Representative 30-minute short-term employee exposures shall also be conducted and shall be determined on the basis of one or more samples representing 30 minute exposures associated with operations that are most likely to produce exposures above the excursion limit for employees in each Regulated Abatement Work Area as per OSHA 1926.1101(f)(1)(iii). Documentation regarding the sample numbers, specific shift when the sampling was conducted, the Work tasks that were sampled, the dates of sampling, the employee hours that were worked during the shift, and the total sampling times, shall accompany each laboratory COC form.
 - b. Complete documentation of all Exposure Monitoring activities shall be in accordance with this Article.
 - c. The Contractor shall submit all Exposure Monitoring results (along with documentation regarding the type of respiratory protection that was worn during the Exposure Monitoring) to the DEP within 24-hours from when the air samples were collected.
 - d. If at any time, PCM analysis of any air sample (i.e., from Exposure Monitoring performed by the Contractor) in any phase of the Asbestos Project (i.e., pre-abatement, Abatement, cleanup, or clearance) indicates that the filter was “overloaded” and a fiber count cannot be obtained, the sample shall immediately undergo TEM analysis. All costs of the additional TEM analysis will be at the Contractor’s expense.
2. Area Monitoring: Air monitoring for airborne concentrations of asbestos fibers shall be conducted by the DEP. The Contractor shall assume that area monitoring will be conducted on all Asbestos Projects (regardless of the project type, the project size, or any conflicting applicable Variance) unless the DEP makes a determination that area monitoring for a specific project is not necessary.

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- a. All Clearance Air Monitoring results shall meet or be below background ambient air levels or 0.01 f/cc of air (whichever is greater), prior to the breakdown of the Containment. If Clearance Air Monitoring results indicate a fiber count greater than background ambient air levels or 0.01 f/cc of air in any area, the Contractor will be required to re-clean that area. For projects conducted outside of the five boroughs, the clearance and action criteria is less than 0.01 f/cc; of air, or background levels (whichever is greater). Repeated cycles of cleaning and Clearance Air Monitoring will be performed until a fiber count is achieved that meets or is below background ambient air levels or 0.01 f/cc of air within the area. All costs of re-cleaning and additional Clearance Air Monitoring will be at the Contractor's expense.

3.04 **STARTUP / DEMONSTRATION**

- A. Not Used

3.05 **ADJUSTING / PROTECTION / CLEANUP**

- A. Bulk Removal

- 1. Protection of Existing Work to Remain: All Work involving the Abatement or Disturbance of ACM or Asbestos-Containing Waste Materials, must be conducted without damage to, or contamination of equipment or surfaces within the Regulated Abatement Work Areas, Restricted Areas, or other areas adjacent to these areas. All such damage or contamination shall be immediately corrected and cleaned up by the Contractor at the Contractor's expense.
- 2. Containments and Negative Air Pressure Equipment: Pressure differential readings for each workday shall be obtained and reviewed by the Asbestos Handler Supervisor on a daily basis. All readings shall be documented and kept in the Contractor's Project Record, as required in this Section. The Asbestos Handler Supervisor shall notify the Engineer and the DEP immediately, if any variations in the pressure differential readings may have led to the migration of asbestos fibers outside of a Regulated Abatement Work Area. Corrective actions shall be implemented immediately to ensure that negative pressure is restored.
- 3. Personal Decontamination Enclosure System: The Contractor shall ensure that employees do not leave a Regulated Abatement Work Area wearing any potentially contaminated protective work clothing or PPE. Employees are required to shower prior to leaving the Regulated Abatement Work Area.

- B. Clean-up and Disposal

- 1. Cleanup: All cleaning Work shall progress from the point most remote from the intakes of the Negative Air Pressure Equipment, towards the intakes of

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the equipment, as well as from the highest point of the surfaces to be cleaned towards the lowest point of the surfaces. The Contractor shall maintain all surfaces, including protective tarps, polyethylene sheeting, and coverings within each Regulated Abatement Work Area and each Restricted Area, free of accumulations of dusts, wastes, and debris. The Contractor shall perform housekeeping activities daily throughout each Work shift and at the end of each Work shift, in order to prevent any accumulation of dusts, wastes, and debris in these areas. Dry sweeping and using compressed air to cleanup a Regulated Abatement Work Area or a Restricted Area is strictly prohibited. HEPA-filtered vacuums and Wet Cleaning methods shall be used to ensure that these areas remain free of visible dust and debris. In addition, only cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the materials or as approved by the DEP, shall be used.

2. Collection, Containerization, and Filtration of Wastes: The Contractor shall collect and containerize asbestos waste (solid and liquid), debris, PPE, and Containment materials on a daily basis in accordance with the Asbestos Work Plan. Using chutes to move construction debris or waste (bagged or not bagged) will not be permitted at any time.
 - a. Prior to containerizing Asbestos-Containing Waste Materials, the wastes shall be “Adequately Wetted,” in accordance with this Section, and wrapped in 6-mil (0.006”) polyethylene sheeting, or double-bagged in 6-mil polyethylene bags. The bags shall be “goose necked” and sealed air tight with duct tape, and each bag (or wrapped item) shall be labeled in accordance with this Section before being placed in an appropriate container (i.e., dumpster, trailer, or roll-off) for disposal.
 - b. Corrugated cartons or drums may be used in conjunction with polyethylene bags and sheeting for the disposal of Asbestos-Containing Waste Materials that have sharp-edged components (e.g., nails, screws, or tin sheeting) which may tear the bags or sheeting. The waste within these drums or cartons must be wrapped or double-bagged in accordance with this Section. In addition, the cartons/drums must be labeled in accordance with this Section.
 - c. Wastewater derived from the Asbestos Project shall be collected and filtered through a system with at least a 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid the rapid clogging of the filtration system by large particles. Contaminated filters shall be disposed of as asbestos waste. Filtered wastewater shall be discharged in accordance with all applicable federal, state, and local regulations.

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- 1) Discharging filtered asbestos decontamination water to a DEP Wastewater Treatment Plant (WWTP) will require written permission from the DEP Bureau of Wastewater Treatment (BWT) and the submission of analytical testing results for asbestos to the BWT for review and approval prior to discharge. This procedure only applies to Asbestos Projects being conducted at a DEP WWTP. The disposal requirements for filtered asbestos decontamination water generated on other DEP properties (e.g., drinking water shafts) may be more stringent or prohibited.
- d. The Contractor shall store all bagged Asbestos-Containing Waste Materials in DOT-approved container systems (e.g., a roll-off or trailer). No container shall be filled in excess of the capacity marked on the container, and all containers shall be lined with 6-mil (0.006”) polyethylene sheeting, have a hard top, and shall be locking in addition to meeting any other federal, state, and local asbestos waste storage requirements. In addition, all containers shall have an intact and legible label affixed to it in accordance with this Section. No bagged asbestos waste shall be stored in a Regulated Abatement Work Area or decontamination enclosure system for longer than the current Work shift that generated the waste.
- e. Non Asbestos Waste: The Contractor shall store non Asbestos-Containing Waste Materials separately from Asbestos-Containing Waste Materials, shall provide all non-asbestos waste containers, and shall make all transportation and disposal arrangements for non-Asbestos-Containing Waste Materials in accordance with federal, state, and local regulations.
3. Labeling: The Contractor shall affix warning labels to all asbestos waste disposal bags, wrapped items, and containers (i.e., drums, dumpsters, trailers, or roll-offs). Labels shall comply with the requirements of federal, state, and local regulations. At a minimum, each label on disposal containers/bags/items shall bear the following information in English:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

[Generator Name, Address, and Telephone Number]

4. Final Visual Inspection and Clearance Air Monitoring: The Independent Third Party Monitor shall not conduct Clearance Air Monitoring until the Regulated Abatement Work Area has been inspected by the Asbestos

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Handler Supervisor and the Project Monitor has performed the Final Visual Inspection. During this inspection, the Asbestos Handler Supervisor and the Project Monitor shall determine if the following has been achieved: (a) all ACM and Asbestos-Containing Waste Materials have been abated and removed from the area; (b) the area is clean and dry; (c) Critical Barriers and Isolation Barriers are intact; (d) Negative Air Pressure Equipment is turned on and functioning. If any of these items have not been achieved, the Contractor shall perform the necessary corrective actions to achieve compliance before conducting the Clearance Air Monitoring.

5. Breakdown of the Regulated Abatement Work Area: Critical Barriers shall not be removed and Negative Air Pressure Equipment shall not be turned off until Clearance Air Monitoring results meet the criteria specified in this Section and RCNY Title 15, Chapter 1 or 12 NYCRR 56.
6. Asbestos Project Completion (Form ACP-21)/ Asbestos Project Conditional Completion (Form ACP-20): Upon successful completion of an Asbestos Project performed in the five boroughs, a copy of the ACP-21 or ACP-20 issued by the DEP shall be submitted to the Engineer.
7. Disposal of Wastes: The Contractor shall notify the DEP at least five business days prior to the removal of any waste containers, so that the DEP can inspect the containers and review and approve the advance copies of all waste manifests. Asbestos-Containing Waste Materials shall be disposed of to ensure that containers do not remain on the job site for longer than necessary. Containers that have reached their storage capacity shall not remain on site and transportation arrangements shall be made for their Removal.
8. Disposal Documentation: The Contractor shall submit written evidence that the landfill receiving Asbestos-Containing Waste Materials is approved by federal, state, and local regulatory agencies to receive the wastes. If regulated PCBs (as defined in Section 02 84 05 - PCBs Management) were detected in the wastes, the Contractor will also ensure that the landfill is approved by federal, state, and local regulatory agencies to receive PCB-regulated wastes. On the date of disposal the Contractor shall submit one (1) copy of the completed manifest that has been signed and dated by the initial transporter in accordance with 6 NYCRR 372 and 40 CFR 262, to the DEP for signature as Generator. All manifests and Land Disposal Restrictions (LDRs) must be signed by a DEP employee per Section 01 35 44 - Hazardous Materials Control.

END OF SECTION

SECTION 02 83 05 – LEAD MANAGEMENT
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section details the requirements for construction and demolition activities affecting materials and structures coated with or containing Lead or other heavy metals as shown on the Drawings, specified herein, or required to complete the Work, including all affected coatings identified and impacted by the Work. All Work to be performed under this Section shall be performed using methods, tools, and equipment that have demonstrated effectiveness in preventing airborne emissions from migrating outside of Work areas.
 - 1. Coated material and structures may contain other heavy metals in addition to Lead. Where Lead is discussed in this Section the Contractor shall consider other heavy metals (i.e., arsenic, cadmium, chromium, etc.)
- B. All Work under this Section shall be performed to minimize the creation of airborne emissions; minimize the quantity of hazardous waste generated; protect the health and safety of all site personnel and the welfare of the public; and avoid adverse environmental impacts.
- C. Unless otherwise specified, the Work of this Section shall also be performed in accordance with the most current New York City Department of Environmental Protection (DEP) Environmental Health and Safety (EHS) Policies and Procedures (including Lead Management, Hazardous Waste Management, and Spill Prevention, Environmental Release Reporting and Investigation), and applicable federal, state, and local regulations.
- D. In the absence of analytical testing results for a specific painted/coated material, air monitoring and worker Personal Protective Equipment (PPE) requirements, including respiratory protection, shall address the potential presence of PCBs, Lead and heavy metals. Any unforeseen PCB or heavy metal-containing paints/coatings discovered during the Work to be performed under this Section shall be remediated as necessary to complete the Work in accordance with this Section.
- E. The Contractor shall perform all Work under this Section without damaging or contaminating adjacent areas to where the Work is being performed. Where such areas are damaged or contaminated, as determined by the DEP, the Contractor shall restore the areas to their original condition at no additional cost to the DEP.
- F. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.
- B. Payment for the disposal of lead wastes (with the exception of painted/coated scrap metal) will not be made until a signed copy of the manifest from the Treatment, Storage, and Disposal Facility (TSDF), certifying the amount of lead wastes delivered is returned with complete chain-of-custody (COC) documentation to the NYCDEP.

1.03 RELATED SECTIONS

- A. Section 01 27 00 -- Measurement and Payment
- B. Section 01 35 27 -- Environmental Health and Safety Requirements
- C. Section 01 35 45 -- Hazardous Materials Control
- D. Section 02 84 05 -- PCBs Management

1.04 REFERENCES

- A. Definitions

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1. **Abatement:** Defined by the EPA (40 CFR 745.223) as any measures or set of measures designed to permanently eliminate Lead Paint hazards. Abatement includes, but is not limited to, the removal of Lead Paint and dust, the permanent enclosure or encapsulation of Lead Paint, or the replacement of Lead-painted surfaces or fixtures. Abatement does not include renovation, remodeling, landscaping, or other activities, when such activities are not designed to permanently eliminate Lead Paint hazards, but instead, are designed to repair, restore, or remodel a given structure or dwelling, even though these activities may incidentally result in a reduction or elimination of Lead Paint hazards. Furthermore, Abatement does not include interim controls (e.g., the spot removal of Lead Paint on a surface in order to perform torch cutting at that location), operations and maintenance activities, or other measures and activities designed to temporarily, but not permanently, reduce Lead Paint hazards.
2. **Action Level:** Defined by OSHA as individual exposure, without regard to the use of respirators, to a specific airborne concentration of a contaminant expressed in micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$) calculated as an 8-hour Time-Weighted Average (TWA). Once an Action Level is met or exceeded, the Contractor is responsible for meeting specific requirements outlined in the applicable OSHA standard, which may include additional worker Exposure Monitoring, the use of PPE including respiratory protection, the use of Hygiene Facilities, medical surveillance, or training for workers. The following Action Levels are pertinent to the disturbance, removal, construction/demolition, and disposal activities associated with painted/coated materials and structures: (a) cadmium – $2.5 \mu\text{g}/\text{m}^3$ per 29 CFR 1926.1127; (b) hexavalent chromium - $2.5 \mu\text{g}/\text{m}^3$ per 29 CFR 1926.1126; (c) inorganic arsenic - $5 \mu\text{g}/\text{m}^3$ per 29 CFR 1926.1118; (d) Lead - $30 \mu\text{g}/\text{m}^3$ per 29 CFR 1926.62.
3. **Area Monitoring:** Stationary air sampling outside of a Lead Control Area for the purpose of determining compliance with OSHA’s Lead in Construction Standard (29 CFR 1926.62), and for the purpose of ensuring that airborne Lead concentrations remain below $30 \mu\text{g}/\text{m}^3$ outside of the Lead Control Area during all work activities that have the potential to disturb Lead-Containing Materials or Lead Wastes. Area Monitoring for PCBs or other heavy metals will be required if Exposure Monitoring results exceed corresponding Action Levels, Permissible Exposure Limits (PELs), or Recommended Exposure Limits (RELs). All Area Monitoring shall follow pertinent NIOSH or ASTM sampling methodologies.
4. **C-3/C-5 Supervisor Competent Person Training for Deleading of Industrial Structures:** A training course administered by the SSPC or a company that has been approved by the SSPC as a “trainer,” which includes discussions of the following: (a) background information on Lead and other toxic metals; (b) a legal and regulatory overview; (c) worker protection from Lead and other toxic metals; (d) compliance with air, soil, water, sediment, and dust regulations; (e) management of solid and hazardous wastes; (f) sources

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- of Lead exposure; (g) control of environmental releases; (h) specifications and Site-specific compliance plans; (i) Work Site preparation; (j) insurance and bonding issues; (k) other safety and health hazards.
5. Certified Industrial Hygienist (CIH): Refers to an individual employed by the Contractor who is currently certified by the American Board of Industrial Hygiene (ABIH).
 6. Competent Person: Defined in the OSHA Lead in Construction Standard (29 CFR 1926.62) as one who is capable of identifying existing and predictable hazards in the surroundings or working conditions, and who has authorization to take prompt corrective measures to eliminate them. Duties of the Competent Person include the following: (a) determining prior to the performance of the Work, whether Lead, PCBs, or other heavy metals are present in the workplace; (b) establishing Lead Control Areas and assuring that access to and from those areas is limited to authorized personnel; (c) assuring the adequacy of any employee Exposure Monitoring required by OSHA; (d) assuring that all employees exposed to airborne contaminant levels above Action Levels, PELs, or RELs wear appropriate PPE, respiratory protection, and are trained in the use of appropriate methods of exposure control for all of the contaminants present; (e) assuring that proper Hygiene Facilities are provided and that workers are trained to use those facilities; (f) assuring that engineering controls specific to the contaminants present are implemented, maintained in proper operating condition, and functioning properly.
 7. Decontamination Area: Designated area within the Hygiene Facilities for removing gross contamination from PPE (using a HEPA vacuum), washing away contamination that has accumulated on the skin and hair (using soap and water), removing and disposing/washing of contaminated PPE, and donning clean clothing that will not potentially contaminate areas outside of a Lead Control Area's Physical Boundary.
 8. DOT Hazardous Materials Transportation Training: Training that meets the criteria outlined in 49 CFR 172.704. This training shall include discussions of the following: (a) hazardous materials tables within 49 CFR 172; (b) material packaging and labeling; (c) shipping papers and placards; (d) material loading and segregation.
 9. Exclusion Zone: (See definition of "Lead Control Area").
 10. Exposure Monitoring: Personal air sampling performed outside the respirator within the breathing zone of individuals, for the purpose of determining compliance with OSHA's Limits for Air Contaminants Table (29 CFR 1910.1000, Table Z-1), OSHA's Cadmium in Construction Standard (29 CFR 1926.1127), Hexavalent Chromium in Construction Standard (29 CFR 1926.1126), Inorganic Arsenic in Construction Standard (29 CFR 1926.1118), and Lead in Construction Standard (29 CFR 1926.62). Analytical results obtained from Exposure Monitoring will be used to select

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appropriate respiratory protection and PPE for individuals within a work area. For the purpose of this Section, Exposure Monitoring samples shall be collected from individuals who are representative of each type work task being conducted by the Contractor, and all Exposure Monitoring shall follow pertinent NIOSH or ASTM sampling methodologies.

11. Hazardous Waste Operations (HAZWOPER) Training: Training that meets the criteria outlined in the OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). A minimum of 24-hour HAZWOPER Training will be required for abatement work being performed under this Section. However, certain types of work may require 40-hour HAZWOPER Training. All decisions regarding the specific HAZWOPER Training that will be required for each work task shall be made by the Engineer.
12. High-Efficiency Particulate Air (HEPA) Filter: A filter designed to remove 99.97% of all particles greater than 0.3 micrometers (μm) in diameter. For the purpose of this Section, HEPA vacuum and local exhaust filtration equipment used by the Contractor shall meet the Standard for Safety High-Efficiency, Particulate, Air Filter Units (UL 586) developed by Underwriters Laboratories.
13. Homogenous Materials: Lead-Containing Materials which are similar in appearance, color, texture, and substrate type.
14. Hygiene Facilities: Facilities within the Physical Boundary of a work area that are set up to prevent cross contamination and are equipped with change areas and separate storage facilities for PPE and clean clothing. Hygiene Facilities shall include adequately supplied hand washing station(s) (i.e., running water, soap, and clean towels) or shower(s) (hot and cold water that is controllable at the tap, soap, shampoo, and clean towels).
15. Lead: Defined in the OSHA Lead in Construction Standard (29 CFR 1926.62) as metallic Lead, all inorganic Lead compounds, and organic Lead soaps. Excluded from this definition are all other organic Lead compounds.
16. Lead Awareness Training: Training that meets the criteria outlined in the OSHA Lead in Construction Standard (29 CFR 1926.62) for individuals that have the potential to be exposed to Lead-Containing Materials or Lead Wastes. This training shall include discussions of the following: (a) current federal, state, and local regulations pertaining to Lead (including 29 CFR 1926.62) and other heavy metals that may be disturbed during the Work; (b) the health effects of Lead and other heavy metal exposure; (c) state-of-the-art work practices, engineering controls, and procedures for Abatement, removal, construction/demolition, materials handling, waste management, and housekeeping activities that involve Lead-Containing Materials and Lead Wastes; (d) the use and maintenance of PPE and the use and maintenance of respirators in accordance with 29 CFR 1910.134; (e) medical surveillance programs and the medical removal protection

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- program; (f) requirements regarding warning signs, labeling, and Safety Data Sheets (SDSs) in accordance with 29 CFR 1910.1200; (g) responsibilities of the Competent Person.
17. **Lead-Based Paint (LBP):** A term used by Department of Housing and Urban Development (HUD) and the EPA to define paint or other surface coatings (e.g., glazes) with Lead levels equal to or exceeding 1.0 milligram per square centimeter (1.0 mg/cm²) or 0.5 % by dry weight. LBP is subject to the requirements set forth in the OSHA Lead in Construction Standard (29 CFR 1926.62). In the absence of analytical testing, LBP shall be considered PCB and heavy metal-containing.
 18. **Lead-Containing Material:** Any material that contains, or is coated with, a detectable concentration of Lead. In the absence of analytical testing, a Lead-Containing Material shall be considered PCB and heavy metal-containing.
 19. **Lead-Containing Paint (LCP):** A term used to define paint or other surface coatings (e.g., glazes) with any detectable amount of Lead less than 1.0 milligram per square centimeter (1.0 mg/cm²) or 0.5 % by dry weight. LCP is subject to the requirements set forth in the OSHA Lead in Construction Standard (29 CFR 1926.62). In the absence of analytical testing, LCP shall be considered PCB and heavy metal-containing.
 20. **Lead Control Area:** The area within the Physical Boundary where worker Hygiene Facilities are located and where all Work activities take place that involve the disturbance of Lead-Containing Materials and Lead Wastes.
 21. **Lead Paint:** A generic term that refers to both LBP and LCP.
 22. **Lead Waste:** Non-specific liquid or solid waste generated during the Abatement, removal, construction/demolition, handling, or cleanup of a Lead-Containing Material.
 23. **Organic Vapor Cartridge:** A NIOSH approved respirator filter typically containing 25 to 40 grams of sorption media such as activated charcoal.
 24. **OSHA Cadmium in Construction Standard (29 CFR 1926.1127):** A federal standard that applies to all construction work where an employee may be occupationally exposed to cadmium. In this standard, “construction work” is defined as work involving construction, alteration, or repair, including, but not limited to, the following: (a) wrecking, demolition, or salvage of structures where cadmium or materials containing cadmium are present; (b) the use of cadmium-containing paints, and cutting, brazing, burning, grinding, or welding on surfaces that were painted with cadmium-containing paints; (c) construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain cadmium, or materials containing cadmium; (d) cadmium welding, cutting and welding cadmium-plated steel, brazing or welding with cadmium alloys; (e) the installation of products containing cadmium; (f) electrical grounding with cadmium welding, or electrical work using cadmium-coated

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- conduit; (g) maintaining or retrofitting cadmium-coated equipment; (h) cadmium contamination/emergency cleanup; (i) transportation, disposal, storage, or containment of cadmium or materials containing cadmium on the site or location at which construction activities are performed.
25. OSHA Hexavalent Chromium in Construction Standard (29 CFR 1926.1126): A federal standard that applies to occupational exposures to chromium (VI) in all forms and compounds in construction except the following: (a) exposures that occur in the application of pesticides regulated by the EPA or another federal government agency (e.g., the treatment of wood with preservatives); (b) exposures to Portland cement; (c) exposures where the employer has objective data demonstrating that a material containing chromium or a specific process, operation, or activity involving chromium cannot release dusts, fumes, or mists of chromium (VI) in concentrations at or above the PEL of 5 $\mu\text{g}/\text{m}^3$ as an 8-hour TWA under any expected conditions of use.
26. OSHA Inorganic Arsenic in Construction Standard (29 CFR 1926.1118): A federal standard that applies to all occupational exposures to inorganic arsenic except the following: (a) employee exposures in agriculture; (b) exposures resulting from pesticide application; (c) exposures resulting from the treatment of wood with preservatives or the utilization of arsenic-preserved wood.
27. OSHA Lead in Construction Standard (29 CFR 1926.62): A federal standard that applies to all construction work where an employee may be occupationally exposed to Lead. In this standard, “construction work” is defined as work for construction, alteration, or repair, including painting and decorating. It also includes, but is not limited to, the following: (a) the demolition or salvage of structures where Lead or materials containing Lead are present; (b) the removal or encapsulation of materials containing Lead; (c) new construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain Lead, or materials containing Lead; (d) the installation of products containing Lead; (e) Lead contamination/emergency cleanup; (f) the transportation, disposal, storage, or containment of Lead or materials containing Lead on the site or location at which construction activities are performed; (g) maintenance operations associated with any of the construction activities described in this definition.
28. OSHA Monitoring: (See definition of “Exposure Monitoring”).
29. P-100 Filter: (See definition of: “High-Efficiency Particulate Air (HEPA) Filter”).
30. Perimeter Monitoring: (See definition of “Area Monitoring”).
31. PEL: Defined by OSHA as employee exposure, without regard to the use of respirators, to a specific airborne concentration of a contaminant expressed in micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$) calculated as an 8-hour TWA.

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Once a PEL is met or exceeded for a particular contaminant, the Contractor is responsible for meeting specific requirements outlined in the applicable OSHA standard, which may include worker Exposure Monitoring, the use of PPE including respiratory protection, the use of Hygiene Facilities, medical surveillance, or training for workers. The following PELs are pertinent to removal, demolition, and disposal activities associated with Lead-Containing Materials and Lead Wastes: (a) cadmium – 5 µg/m³ per 29 CFR 1926.1127; (b) hexavalent chromium - 5 µg/m³ per 29 CFR 1926.1126; (c) inorganic arsenic - 10 µg/m³ per 29 CFR 1926.1118; (d) Lead - 50 µg/m³ per 29 CFR 1926.62.

32. Personal Monitoring: (See definition of “Exposure Monitoring”).
33. Physical Boundary: A physical barrier designated with ropes, “caution tape,” or a partition that surrounds a work area in order to limit the entry of unauthorized personnel and delineate “clean areas” from areas that may meet or exceed an Action Level, PEL, or REL.
34. Recommended Exposure Limit (REL): An exposure limit recommended by the NIOSH that can be expressed as a TWA, Ceiling Limit, or Short-Term Exposure Limit (STEL). Once an REL is met or exceeded for a particular contaminant, the Contractor is responsible for ensuring that workers receive appropriate Exposure Monitoring, PPE, including respiratory protection, Hygiene Facilities, medical surveillance, and training.
35. Regulated Area: (See definition of “Lead Control Area”).
36. Resource Conservation and Recovery Act (RCRA) Training: Training that meets the criteria outlined in 40 CFR 265.16. This Training shall include Site-specific discussions of the following: (a) hazardous waste identification; (b) waste storage container use and labeling; (c) waste storage area management; (d) personal health and safety, including fire safety; (e) manifesting and the off-site transportation of wastes; (f) procedures for using, inspecting, repairing, and replacing emergency equipment and monitoring equipment; (g) procedures for communicating with other employees and outside emergency response personnel; (h) responses to fires or explosions; (i) responses to leaks, spills, and potential groundwater contamination incidents ; (j) the shutdown of operations.
37. TWA: The average time over a given work period (e.g., an 8-hour workday) of a person’s exposure to a chemical or agent. The average is determined by sampling for the chemical or agent throughout the time period.
38. Trigger Activities: Certain activities that involve a disturbance of Lead-Containing Materials or Lead Wastes. Depending upon whether the performance of these activities exceeds an Action Level, PEL, or REL, the requirements may include additional worker Exposure Monitoring, the use of PPE including respiratory protection, the use of Hygiene Facilities, medical surveillance, or training for workers. Examples of Trigger Activities include, but are not limited to, the following: abrasive blasting,

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welding, torch cutting/burning, heat gun usage, needle gunning/scaling, rivet busting, using a rotopeen, mechanical sanding/grinding, using mechanical shears, hand scraping/sanding, chemical stripping, and the manual demolition of Lead-Containing Materials.

39. X-Ray Fluorescence (XRF): An analytical method that can be used in the field for determining the Lead content of paints/coatings on a building component or material surface.

B. Reference Standards

1. The Contractor shall comply with all applicable regulations, standards, and guidelines of federal, state, and local environmental and occupational safety and health agencies regarding Lead-Containing Materials and Lead Wastes. These regulations, standards, and guidelines include, but are not limited to the following:

a. U.S. Department of Transportation (DOT):

- 1) 49 CFR 171 - General Information, Regulations, and Definitions;
- 2) 49 CFR 172 – Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements;
- 3) 49 CFR 173 – Shippers: General Requirements for Shipments and Packaging’s;
- 4) 49 CFR 178 – Specifications for Packaging’s.

b. U.S. Environmental Protection Agency (EPA):

- 1) 40 CFR 50 – National Primary and Secondary Ambient Air Quality Standards;
- 2) 40 CFR 116 – Designation of Hazardous Substances;
- 3) 40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances;
- 4) 40 CFR 260 – Hazardous Waste Management Systems: General;
- 5) 40 CFR 261 – Identification and Listing of Hazardous Waste;
- 6) 40 CFR 262 – Standards Applicable to Generators of Hazardous Waste;
- 7) 40 CFR 263 – Standards Applicable to Transporters of Hazardous Waste;

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- 8) 40 CFR 264 – Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;
 - 9) 40 CFR 265 – Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;
 - 10) 40 CFR 268 – Land Disposal Restrictions;
 - 11) 40 CFR 302 – Designation, Reportable Quantities, and Notification;
 - 12) 40 CFR 745 – Lead-Based Paint Poisoning Prevention in Certain Residential Structures.
- c. National Institute for Occupational Safety and Health (NIOSH):
- 1) Method 5503 – Polychlorobiphenyls;
 - 2) Method 7048 – Cadmium and Compounds, as Cd;
 - 3) Method 7082 – Lead by FAAS;
 - 4) Method 7105 – Lead by GFAAS;
 - 5) Method 7300 – Elements by ICP;
 - 6) Method 7600 – Chromium, Hexavalent;
 - 7) Method 7604 – Chromium, Hexavalent;
 - 8) Method 7900 – Arsenic and Compounds, as;
 - 9) NIOSH Pocket Guide to Chemical Hazards.
- d. DEP:
- 1) Environmental Health and Safety Policies and Procedures – Vol. I, Paint Management;
 - 2) Environmental Health and Safety Policies and Procedures – Vol. II, Spill Prevention, Environmental Release Reporting and Investigation;
 - 3) Environmental Health and Safety Policies and Procedures – Vol. III, Lead Management;
 - 4) Environmental Health and Safety Policies and Procedures – Vol. IV, Hazardous Waste Management;
 - 5) RCNY Title 15, Chapter 19 – Discharges of Wastewater and Other Materials to Public Sewers.
- e. New York State Department of Environmental Conservation (NYSDEC):
- 1) 6 NYCRR 364 – Waste Transporter Permits;

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- 2) 6 NYCRR 370 – Hazardous Waste Management Regulations;
 - 3) 6 NYCRR 371 – Identification and Listing of Hazardous Waste;
 - 4) 6 NYCRR 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities;
 - 5) 6 NYCRR 373 – Hazardous Waste Management Facilities;
 - 6) 6 NYCRR 376 – Land Disposal Restrictions.
- f. Occupational Safety and Health Administration (OSHA):
- 1) 29 CFR 1910 – Occupational Safety and Health Standards;
 - 2) 29 CFR 1910.28 – Safety Requirements for Scaffolding;
 - 3) 29 CFR 1910.120 – Hazardous Waste Operations and Emergency Response;
 - 4) 29 CFR 1910.134 – Respiratory Protection Standard;
 - 5) 29 CFR 1910.1200 - Hazard Communication Standard;
 - 6) 29 CFR 1926 – Safety and Health Regulations for Construction;
 - 7) 29 CFR 1926.62 – Lead in Construction Standard;
 - 8) 29 CFR 1926.1118 – Inorganic Arsenic in Construction Standard;
 - 9) 29 CFR 1926.1126– Hexavalent Chromium in Construction Standard
 - 10) 29 CFR 1926.1127 – Cadmium in Construction Standard.
- g. Society for Protective Coatings (SSPC):
- 1) SSPC-Guide 6, Guide for Containing Debris Generated During Paint Removal Operations;
 - 2) SSPC-Guide 7, Guide for the Disposal of Lead-Contaminated Surface Preparation Debris;
 - 3) SSPC-SP COM, Surface Preparation Commentary for Steel and Concrete Substrates;
 - 4) SSPC-SP 1, Solvent Cleaning;
 - 5) SSPC-SP 2, Hand Tool Cleaning;
 - 6) SSPC-SP 3, Power Tool Cleaning;
 - 7) SSPC-SP 11, Power Tool Cleaning to Bare Metal;
 - 8) SSPC-SP 13/ NACE No.6, Surface Preparation of Concrete;

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- 9) SSPC-SP 15, Commercial Grade Power Tool Cleaning.
- h. Underwriters Laboratories, Inc. (UL):
 - 1) UL 586 – Standard for Safety High Efficiency, Particulate, Air Filter Units.

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Scheduling: The Contractor shall coordinate and schedule all phases of the Work to be performed under this Section with the DEP, Subcontractors, material suppliers, and other parties as necessary to ensure the proper execution of the Work.
- B. Compliance: In addition to the detailed requirements of this Section and DEP EHS Policies and Procedures, the Contractor shall comply with all applicable regulations of federal, state, and local authorities pertaining to the disturbance, Abatement, removal, construction/demolition, handling, storage, transportation, and disposal of Lead-Containing Materials and Lead Wastes. All matters regarding the interpretation of any regulations, standards, or policies shall be submitted to the Engineer for resolution before starting the Work. Where the requirements of this Section, DEP EHS Policies and Procedures, or federal, state, or local regulations conflict or vary, the most stringent requirements or regulations shall apply.
- C. Rejection of Non-Complying Items: The DEP reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements. The DEP also reserves the right to reject Contractor submittal items that are deemed inappropriate or unacceptable by the Engineer or DEP. Submittal items that may be deemed inappropriate or unacceptable include proposed vendors or Subcontractors with previous regulatory citations/violations. The DEP further reserves the right, and without prejudice to other recourse, to accept non-complying items subject to an adjustment in the Contract amount, as approved by the DEP.
- D. Suspect Material Characterization: In order to classify a paint or coating as non-PCB or non-heavy metal containing, a paint chip/coating sample or an XRF reading must be collected. The bulk samples shall be sent to an analytical laboratory meeting the requirements of this Section.
 - 1. Suspect PCB or Heavy Metal-Containing Paints: Although there are no certification requirements pertaining to an individual that collects paint chip/coating samples in an industrial or commercial setting, this Section requires paint chip/coating sampling to be performed by an individual who has successfully completed a PCB awareness course and HAZWOPER Training course (as defined in this Section) within the past year. In addition, the individual shall possess a current EPA Lead Inspector or EPA Risk Assessor certification, or shall have successfully completed a Lead Awareness Training course (within the past year) as defined in this Section and have documented experience in collecting paint chip samples.

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2. The qualifications of individuals who will collect paint chip/coating samples or XRF readings must be approved by the Engineer prior to sample/reading collection. Analytical results for paint chip/coating samples or XRF readings that are collected by individuals not approved by the Engineer will not be recognized or accepted as valid by the DEP.
- E. Qualifications:
1. The Paint Removal Company shall have successfully completed at least two (2) projects of comparable scope and methodologies to the Work being performed under this Section within the past three (3) years. This experience shall be documented by identifying the following: (a) the name, address, and phone number of each facility where the Work was performed; (b) the name of the individual representing the owner who supervised the work at each facility; (c) the types of facilities where the work was performed; (d) the volume and type of each material that was abated/removed; (e) the specific methods of Abatement/removal used at each facility (including the tools, technologies, and engineering controls employed).
 2. Competent Person: The Contractor shall have on staff and assigned to this Contract a Competent Person who has successfully completed DOT Hazardous Materials Transportation Training and RCRA Training courses as defined in this Section. In addition, the Competent Person shall have successfully completed both HAZWOPER Training and Lead Awareness Training courses as defined in this Section, or C-3/C-5 Supervisor Competent Person Training for Deleading of Industrial Structures as defined in this Section, or training as an EPA Lead Supervisor in accordance with 40 CFR 745.225 (b)(7)(vi). Each training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, the Competent Person shall be able to fulfill the duties defined in this Section, and have a minimum of two (2) years' experience on projects involving Lead, and has served as the Competent Person on at least three (3) projects of comparable scope and methodologies to the work being conducted under this Section.
 - a. DEP EHS Policies and Procedures require EPA-certified Lead Training for all Lead Abatement activities. HAZWOPER and Lead Awareness Training or C-3/C-5 Supervisor Competent Person Training satisfies the training requirement for all other Lead removal activities (e.g., spot removal and demolition work).
 3. Waste Manager: The Contractor shall have on staff and assigned to this Contract a waste manager who has successfully completed DOT Hazardous Materials Transportation Training, HAZWOPER Training, Lead Awareness Training, and RCRA Training courses as defined in this Section. Each training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, the waste manager shall have a minimum of two (2) years' experience on projects involving hazardous wastes (including Lead). It is acceptable for an

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individual who meets the criteria of the Competent Person, to also serve as the waste manager for this Contract as long as the individual fulfills all of the requirements of this paragraph.

4. Lead Worker: The Contractor shall have on staff and assigned to this Contract a sufficient number of lead workers who have successfully completed DOT Hazardous Materials Transportation Training and Lead Awareness Training courses as defined in this Section. Each training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, each lead worker shall have a minimum of one (1) year of experience on projects involving Lead, and have worked on at least three (3) projects of comparable scope and methodologies to the work being conducted under this Section.
 - a. DEP EHS Policies and Procedures require EPA-certified Lead training for all Lead Abatement activities. Lead Awareness Training satisfies the training requirement for all other lead removal activities (e.g., spot removal and demolition work).
5. Air Monitor: The Contractor shall have an Air Monitor assigned to this Contract who has successfully completed Lead Awareness Training course as defined in this Section. This training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, the Air Monitor shall have a minimum of two (2) years' experience in conducting Area Monitoring and Exposure Monitoring on projects involving hazardous wastes (including Lead). It is acceptable for an individual who meets the criteria of the Competent Person (as defined in this Section) or waste manager (as defined in this Section), to also serve as the Air Monitor for this Contract as long as the individual satisfies all of the requirements of this paragraph.

1.07 SUBMITTALS

- A. Thirty business days prior to the Work of this Section or as directed by the Engineer, the Contractor shall submit the following to the Engineer:
 1. Lead Inspection and Sampling Plan: The Contractor shall provide a Lead Inspection and Sampling Plan to identify suspect lead-containing materials and collect confirmatory samples, as appropriate during the inspection. The Lead Inspection and Sampling Plan shall include at a minimum:
 - a. Credentials of the individual responsible for inspection and sampling. At a minimum, the inspection shall be performed by an Environmental Professional, as defined within this Section, who has current HAZWOPER, Lead Awareness, OSHA 10-hour, and confined space trainings, as applicable to the location of the work, and has performed inspection work on at least three (3) projects of comparable scope.
 - b. Credentials of the laboratory providing sample analysis. The credentials shall include current certification by the New York State

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Department of Health's (NYSDOH) Environmental Laboratory Approval Program (ELAP).

- c. Sample collection, analysis and reporting protocol.
 - d. Health and safety protocol for all investigative activities.
2. Lead Inspection Report: The Contractor shall provide a Lead Inspection Report prepared by the Environmental Professional summarizing the results of all inspection activities, and as applicable, a sampling narrative, laboratory data packages and inventory of all identified suspect and confirmed lead-containing materials.
 3. Lead Management Plan(s): Each Contractor that will disturb Lead or other heavy metals during the course of Work to be performed under this Section shall submit a detailed, project-specific Lead Management Plan that addresses Work procedures and equipment to be used during the disturbance, removal, handling, collection, and disposal of Lead-Containing Materials and Lead Wastes. Work requiring a Lead Management Plan includes, but is not limited to, Abatement, spot removal, and construction/demolition activities. The Lead Management Plan shall be prepared in accordance with OSHA Construction Standards and all other pertinent federal, state, and local regulations. In addition, the Lead Management Plan shall follow all DEP EHS Policies and Procedures (referenced in this Section), and shall be coordinated with BEDC. The Lead Management Plan shall also be signed and dated by a CIH meeting the definition in this Section.
 - a. Lead Control:
 - 1) Drawings showing the location and details of the following: (a) each Lead Control Area; (b) each Hygiene Facility; (c) proposed electrical hookups; (d) proposed water hookups; (e) each waste storage area; (f) restroom areas; (g) areas designated for eating, drinking, and smoking;
 - 2) A detailed discussion regarding the interfacing of trades (i.e., how the Contractor will coordinate the Work with other contractors or DEP employees working at the Site) and the sequencing of Lead-related Work;
 - 3) A detailed discussion regarding the collection, handling procedures, and disposal of Lead-Containing Materials and Lead Wastes (including the collection, filtering, and disposal of wastewater);
 - 4) A detailed discussion regarding the procedures and methodologies that will be used to conduct Exposure Monitoring and Area Monitoring for particulates. Also, provide the name and qualifications (i.e., training and experience documentation) of the Air Monitor who will be

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responsible for conducting the air monitoring activities. The Air Monitor shall at a minimum, satisfy the qualification requirements set forth in this Section;

- 5) A detailed discussion regarding housekeeping procedures to be used for maintaining clean work areas and clean Hygiene Facilities;
- 6) A detailed discussion regarding the specific methods and procedures of emissions control that will be used to ensure that airborne contaminant levels do not meet or exceed an OSHA Action Level outside of each Lead Control Area. It should be noted that even after paint/coating removal, the DEP has found that demolition activities (e.g., torch-cutting abated steel) still have the potential to generate elevated airborne levels of Lead. Therefore, the Contractor shall provide engineering controls to capture potential Lead dusts or fumes emitted during demolition work that involves the cutting or burning of steel structures that have already been abated;
- 7) A detailed task analysis for each Work activity that has the potential to disturb Lead-Containing Materials or Lead Wastes. Each task analysis shall include, but is not limited to, the following information: (a) the type of work activity; (b) the tools/equipment that will be used; (c) operation and maintenance practices and procedures that will be used for the tools/equipment; (d) the types of Lead-Containing Materials that may be disturbed or Lead Wastes that may be generated when performing the activity; (e) the engineering controls that will be used to control the spread of contamination during the activity; (f) the proposed crew size for the activity and individual employee responsibilities during the activity; (g) housekeeping procedures that will be used during the activity; (h) PPE and proposed respiratory protection that will be used for the activity;
- 8) Equipment and Supplies: Identify the equipment and supplies that will be used to perform the Work;
- 9) Rental Equipment Notification: If rental equipment is to be used during the Work, the Contractor shall notify the rental agency in writing concerning the intended use of the equipment. Rental equipment data demonstrating compliance with the performance requirements of this Section must be presented to and approved by the Engineer prior to use;

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- 10) SDSs: Provide SDSs for all chemical products (including chemical stripping products) to be used for the Work;
- 11) The name and qualifications (i.e., experience and training documentation) of the Competent Person who will be responsible for the oversight and execution of the Lead Management Plan during all activities affecting Lead-Containing Materials and Lead Wastes. At a minimum, the Competent Person shall satisfy the qualification requirements set forth in this Section and be present whenever Work of this Section is being performed.

b. Waste Management:

- 1) The identification of Lead-Containing Materials, Lead Wastes, and hazardous wastes (as defined in 40 CFR 261 and 6 NYCRR 371) associated with the Work;
- 2) The estimated quantity of each waste stream (regulated and non-regulated) that will be generated and disposed of/recycled;
- 3) The name, address, phone number, and qualifications for each vendor and facility that will be transporting, storing, testing, or disposing of the wastes. The Contractor shall verify the permit status of the facility as well as check for outstanding violations and enforcement actions. Include a 24-hour phone contact for each vendor and facility;
- 4) Current permit documentation for each recycling facility or TSDf indicating that the facility is approved by federal, state, and local regulatory agencies to receive Lead-Containing Materials and Lead Wastes. The documentation shall include an “acceptance letter” from each TSDf indicating its ability to accept the specific waste streams that will be generated during Work performed under this Section;
- 5) Current 6 NYCRR 364 permit documentation for the waste transporter that will transport Lead-Containing Materials and Lead Wastes from the Work Site to the TSDf. The documentation shall clearly indicate the transporter’s ability to deliver the Lead-Containing Materials and Lead Wastes to the chosen TSDf;
- 6) Spill prevention, containment, and cleanup contingency measures to be implemented during the Work, as well as procedures to be followed during a suspected Lead emissions/bulk material release or emergency situation. All measures and procedures shall be in accordance with the standards referenced in this Section;

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- 7) A detailed discussion of the on-site handling, storage, removal, and disposal of waste materials. This discussion shall include, but is not limited to, the following: (a) specifications for a secondary containment system for each drum storage area; (b) the methods of demarcation that will be used to identify the waste storage areas and each waste container; (c) the methods and procedures that will be used to collect and containerize wastes on a daily basis; (d) the types of containers that will be used to containerize the wastes; (e) the submittal of weekly regulated waste inspection and inventory records as required in this Section;
 - 8) The name and qualifications (i.e., experience and training documentation) of the waste manager who will be responsible for the oversight and execution of the Lead Management Plan during waste management activities involving Lead-Containing Materials and Lead Wastes. At a minimum, the waste manager shall satisfy the qualification requirements set forth in this Section.
- c. A detailed schedule for the implementation of the Lead Management Plan elements. The schedule shall clearly indicate the starting and completion dates for the work, and shall allow adequate time for cleanup, inspections, and air monitoring activities.
 - d. Medical Surveillance: For all activities that result in airborne Lead concentrations equal to, or in excess of the Action Level (as defined in 29 CFR 1926.62), or for those activities that take place within a Lead Control Area, the Contractor shall submit for this Contract a sufficient number of properly trained and experienced workers, each of whom shall: (a) have completed initial blood testing (including Zinc Protoporphyrin (ZPP) testing), and have a Blood Lead Level (BLL) below 35 micrograms per deciliter ($\mu\text{g}/\text{dl}$)(if the worker's BLL is in excess of 35 $\mu\text{g}/\text{dl}$, the worker shall show medical approval for this Work); (b) have received a medical exam that included a Pulmonary Function Test (PFT) within the past year; (c) have received written medical clearance within the past year, by a licensed health care professional, to wear a respirator; (d) have received a qualitative or quantitative respirator fit-test for the specific respirator the employee will be using for this Work within the past year.
 - e. Employee Documentation: For all activities that result in airborne contaminant concentrations (i.e., heavy metals or PCBs) equal to, or in excess of an Action Level, PEL, or REL, or for those activities that take place within a Lead Control Area, the Contractor shall provide a sufficient number of properly trained and experienced workers, each of whom shall: (a) have written proof of training (e.g.,

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certificates) in accordance with the qualification requirements of this Section for lead workers, Competent Persons, waste managers, and Air Monitors that will be used for the Work; (b) copies of resumes for lead workers, Competent Persons, waste managers, and Air Monitors that will be used for the Work, indicating work experience as required in this Section; (c) dates and written proof of initial medical surveillance by the Contractor or other employer within the past year, and proof that the employee is currently participating in the employer's ongoing medical surveillance program in accordance with this Section; (d) dates and written proof of respiratory clearance and a medical exam in accordance with this Section; (e) dates and written proof of a respirator fit-test in accordance with this Section.

- f. A current (i.e., within the last month) signed and notarized statement disclosing all of the Contractor's OSHA, EPA, and DOT citations/violations on projects involving Lead within the past three (3) years. If the Contractor will be using a subcontractor, a current signed and notarized statement disclosing all of the subcontractor's OSHA, EPA, and DOT citations/violations on projects involving Lead within the past three (3) years will also be required.
4. Analytical Laboratory Qualifications for Analyzing Suspect Lead-Containing Materials and Wastes: Submit the name, address, and telephone number of each analytical laboratory selected to perform the analyses of waste samples (solid and liquid), air samples collected for Area Monitoring and Exposure Monitoring purposes, and paint/coating samples collected to classify building components. The analytical laboratory shall be currently accredited by the American Industrial Hygiene Association (AIHA) and the NYSDOH ELAP. Provide copies of current AIHA and ELAP certificates along with dates of accreditation/reaccreditation. ELAP certificates must show evidence of certification for the specific analytical methods that will be used to analyze each type of sample that will be collected.
- B. Field Reports and Recordkeeping: During all Work performed under this Section, the Contractor shall maintain and provide the following documentation:
- 1. Air Monitoring Documentation: All air monitoring results and daily air monitoring reports shall be provided to the DEP within 24-hours from the date the samples are collected. The results shall be signed by the laboratory employee who analyzed or supervised the analysis of the samples, as well as the Air Monitor that physically performed the air monitoring activities at the Work Site. All laboratory analytical results shall be accompanied by complete COC documentation.
 - a. Each daily air monitoring report shall be signed by the Contractor's employee who generated the report. The content of these reports shall include, but is not limited to, the following information: (a) sample "start" and "stop" times; (b) flow rates (initial and final) for

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each sample; (c) the total volume of air collected for each sample; (d) sample location descriptions/sample location drawings/names of individuals being sampled; (e) types (i.e., makes and models) of sampling equipment used; (f) types of sample media (i.e., filters and cassettes) used; (g) the most recent calibration dates, along with the calibration results, for the sampling equipment used; (h) the name of the Air Monitor that conducted the air monitoring; (i) dates that the air monitoring was conducted; (j) work tasks being performed during the air monitoring; (k) unique sample numbers used to identify each sample.

2. Waste Documentation: Completed and signed waste manifests from TSDFs shall be provided to the DEP as soon as possible but no later than 30 days of disposal. In addition, on-site waste storage areas shall be inspected weekly by the waste manager, who at a minimum shall satisfy the qualification requirements of this Section.
 - a. Each waste storage area inspection shall be coordinated with the applicable Bureau EHS, documented in the form of a written report, and each report shall be signed by the Contractor's employee who generated the report. All reports shall be provided to the DEP within 24-hours of the date the inspection is completed. The content of these reports shall include, but is not limited to, the following information: (a) the name of the individual that conducted the inspection; (b) descriptions of waste streams being stored; (c) types and quantities of waste containers being used; (d) the current disposal status (i.e., when each waste container is scheduled to be removed from the Work Site) and physical condition of each waste container; (e) the presence/absence of proper labeling for each waste container in accordance with this Section and federal, state, and local regulations; (f) secondary containment systems being used; (g) the methods being used to secure/lock each waste storage area to prevent any unauthorized entry; (h) the presence of any waste containers on site generated during the Work performed under this Section that violate RCRA generator storage time limitations, as defined in 40 CFR 262.
 - b. In addition to performing weekly waste storage area inspections, the waste manager shall also maintain an ongoing waste inventory. The waste inventory shall be coordinated with the applicable Bureau EHS, and the content of the inventory record shall include, but is not limited to, the following information: (a) specific dates that each waste container was added/removed from the waste storage area; (b) the full name (printed) and signature of the individual responsible for adding/removing each waste container from the waste storage area.

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3. Lead Control Area Inspection Documentation: Lead Control Areas shall be inspected daily by the Competent Person.
 - a. Each daily Lead Control Area inspection shall be documented in the form of a written report, and each report shall be signed by the Contractor's employee who generated the report. All reports shall be provided to the DEP no later than 24-hours after the inspection is completed. The content of these reports shall include, but is not limited to, the following information: (a) the types of Work being performed; (b) the names of the lead workers, Competent Person, waste manager, and Air Monitor on site, as well as the name of the company each individual is representing; (c) the types of air monitoring (i.e., Exposure Monitoring or Area Monitoring) being conducted, and the number of samples being collected for each type of air monitoring activity; (d) any non-compliance issues observed (i.e., observations that conflict with the requirements of the Contractor's Lead Management Plan, this Section, DEP EHS Policies and Procedures, or federal, state, and local regulations) along with the corrective actions that were taken to achieve compliance.

4. Contractor Project Record: The Contractor's Competent Person shall maintain a project record at the Work Site. The Contractor project record shall be made available to the Engineer or DEP for review at any time during the Work, and shall be submitted to the DEP within 24-hours after the completion of the Work.
 - a. At a minimum, the Contractor project record shall contain the following information: (a) copies of training certificates for all individuals involved with the Work; (b) copies of all air monitoring results generated during the Work; (c) copies of all available paint chip/coating sample analytical data and XRF analyzer data, as well as paint/coating survey reports related to the Work; (d) copies of all daily sign-in sheets as required in this Article; (e) a list of emergency phone numbers, including the local fire department, local police department, nearest hospital, as well as phone numbers for the Engineer and DEP personnel responsible for administering the Work; (f) a copy of the OSHA Lead in Construction Standard (29 CFR 1926.62); (g) copies of all SDSs pertaining to all chemicals being used during the Work; (h) a copy of this Section and the related Drawings; (i) a copy of the Contractor's Lead Management Plan; (j) copies of all daily Lead Control Area inspection records; (k) copies of all weekly waste storage area inspection records; (l) a copy of the waste inventory; (m) copies of all DEP EHS Policies and Procedures referenced in this Section (n) a copy of the Contractor's Hazard Communication (HAZCOM) program.

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- b. If it is determined that arsenic, cadmium, or chromium is present in addition to Lead, the Contractor project record shall also include copies of each applicable OSHA Standard (i.e., Inorganic Arsenic in Construction Standard (29 CFR 1926.1118), Hexavalent Chromium in Construction Standard (29 CFR 1926.1126), or Cadmium in Construction Standard (29 CFR 1926.1127).
5. Daily Sign-In Sheets: The Contractor shall generate daily sign-in sheets for all individuals entering and exiting each Lead Control Area for the duration of the Work. The daily sign-in sheets shall be maintained by the Competent Person, and shall be made available to the Engineer or DEP for review at any time during the Work. All daily sign-in sheets shall be submitted to the DEP within 24-hours after the completion of the Work.
 - a. At a minimum, each daily sign-in sheet shall include: (a) the individual's full name (printed); (b) the individual's signature; (c) the name of the company the individual is representing; (d) the time of entry and exit from each Lead Control Area; and (e) verification by the Competent Person that the individual meets the applicable training requirements, if the individual intends to enter a Lead Control Area.
6. HAZCOM Program: The Contractor's HAZCOM program shall be made available to the Engineer or DEP for review at any time during the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Respirators: The Contractor shall select respirators approved by the NIOSH for use in areas where paints/coatings, dusts, materials, or wastes containing contaminants may be disturbed. At a minimum, the Contractor shall provide each individual with a half-face, negative pressure, air purifying respirator equipped with HEPA/P-100 Filter cartridges (and Organic Vapor Cartridges if PCBs are present), until Exposure Monitoring results indicate that respiratory protection can be modified. The Contractor's CIH shall make all determinations regarding respiratory protection modifications that will be implemented for the Work. All modifications

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shall be in accordance with the OSHA Lead in Construction Standard (29 CFR 1926.62), Inorganic Arsenic in Construction Standard (29 CFR 1926.1118), Hexavalent Chromium in Construction Standard (29 CFR 1926.1126), Cadmium in Construction Standard (29 CFR 1926.1127), and the Contractor's Lead Management Plan.

- B. PPE: The Contractor shall provide personnel who have a potential to be exposed to materials or wastes containing contaminants, with appropriate PPE as prescribed by the Contractor's CIH.
- C. HEPA Filters: HEPA/P-100 Filters used in vacuuming equipment, power tools, and local exhaust equipment must meet or exceed any manufacturer's specifications and recommendations, as well as specifications presented in the Standard for Safety High Efficiency, Particulate, Air Filter Units (UL 586).
- D. Waste Containers: Containers for the storage of all wastes shall be DOT-approved, and shall be provided by the Contractor.
- E. Abrasives: Mechanical paint/coating removal equipment shall not use any products containing crystalline silica, and the equipment shall not utilize any non-recoverable materials or any cutting materials which introduce toxic or hazardous materials into the environment.
- F. Chemical Strippers: The Contractor shall utilize an environmentally safe chemical paint stripping system, with demonstrated suitability and efficiency in preparing cast-in-place concrete, cement, and plaster surfaces that are free of any visible residues of paints/coatings. The system shall include non-alkaline or alkaline strippers that provide the lowest possible level of toxicity consistent with the types of paints/coatings to be removed. Neutralization products and procedures shall be provided for all alkaline stripping systems, no stripping system shall contain methylene chloride, and the stripping system shall be low in volatile organic compounds (VOCs).

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Hygiene Facilities: The Contractor shall provide functional Hygiene Facilities as defined in this Section that are appropriate for the types of Work to be performed under this Section. The Contractor shall ensure that employees do not leave a Lead Control Area wearing any potentially contaminated PPE. Using compressed air to dislodge dust from clothing/PPE shall be strictly prohibited. The Contractor shall collect, test, and properly dispose of all wastewater generated from Hygiene Facilities.

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1. Handwash Stations: The Contractor shall provide functioning handwash stations on all projects that disturb Lead-Containing Materials or Lead Wastes. Handwash stations shall have running water at the tap, clean towels, and soap per 29 CFR 1926.51. Substituting “hand wipes” in place of soap and running water will not be acceptable.
 2. Showers: The Contractor shall provide shower facilities in accordance with 29 CFR 1926.62, for use by employees whose airborne exposure to Lead is above the PEL. When shower facilities are necessary, employees are required to shower at the end of the work shift each day prior to leaving the Lead Control Area that they are working in.
- B. Utilities: The temporary use of any on-site utilities shall be subject to the approval of the DEP. The Contractor shall furnish all water and hoses needed for the Work, as well as any temporary hookups. Also, the Contractor shall supply all heating equipment and water filtration devices needed for the Work. In addition, all temporary lighting and temporary electrical service to a Lead Control Area shall be provided by the Contractor, and shall be in weather-proof enclosures and be ground fault protected.
- C. Signs: The Contractor shall post conspicuous warning signs at all approaches to work areas and waste storage areas. The signs shall be located at such a distance so that personnel may read the sign and take the necessary precautions before entering a work area or waste storage area. Signs shall comply with federal, state, and local regulations, including the requirements of OSHA. Signs shall not be removed until all Abatement, removal, and construction/demolition activities have been completed. At a minimum, each sign shall bear the following information in English and the predominant language that is spoken by the Contractor’s employees if English is not spoken:

DANGER
LEAD WORK AREA
MAY DAMAGE FERTILITY OR THE UNBORN CHILD
CAUSES DAMAGE TO THE CENTRAL NERVOUS
SYSTEM
DO NOT EAT, DRINK OR SMOKE IN THIS AREA

1. Each sign shall be appropriately modified to include additional warnings for other contaminants that are identified during Exposure Monitoring.
- D. Physical Boundary Delineation: The Contractor shall clearly delineate each Work area and waste storage area with a Physical Boundary as defined in this Section.
- E. Work Area Preparation: The Contractor shall utilize HEPA-filtered vacuums, and wet methods during the initial cleaning of each work area. Prior to removal from each work area, all movable objects and mounted objects that can be removed shall be pre-cleaned using HEPA-vacuums and wet methods. Fixed objects that must

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remain within each work area shall be pre-cleaned using HEPA vacuums and wet methods, and subsequently covered with 6-mil polyethylene sheeting.

3.02 IMPLEMENTATION

A. Special Requirements

1. Commencement of Work: Five (5) business days prior to the proposed start of the Work required under this Section at each separate location, the Contractor shall notify the Engineer and the onsite safety staff. No Work may proceed at any location until authorized by the Engineer.
2. The Contractor shall coordinate any required equipment shutdowns with the Engineer prior to starting the Work.
3. Access Restrictions: The Contractor shall inform the Engineer of proposed access restrictions (i.e., areas or items of equipment which will not be accessible during the proposed work), and provide estimated time frames (including specific dates) of such proposed access restrictions. The Contractor shall be aware that other contractors may be at any of the Work sites associated with this Contract. As a result, the Contractor shall not have exclusive rights to any Work Site, and shall fully cooperate and coordinate this Work with the work of other contractors who may be on Site. Therefore, the Contractor shall notify other contractors in advance of the disturbance, Abatement, removal, construction/demolition, and disposal Work included herein, to provide them with sufficient time for coordination of interrelated items that are included in their contracts and that must be performed before, after, or in conjunction with the Work included under this Section.
4. Unexpected Entry into a Lead Control Area: In the event that DEP personnel must enter a Lead Control Area for reasons unrelated to the supervision or inspection of Work being performed under this Section (e.g., under emergency conditions), the Contractor shall immediately stop work and cleanup any loose debris, so as to permit the safe entry by DEP personnel. Any disturbance of paints/coatings, dusts, materials, or wastes that may potentially generate airborne concentrations of contaminants equal to or above an OSHA Action Level shall not proceed until all DEP personnel have exited from the Lead Control Area.
5. Meetings: The Contractor shall visit and investigate the Site, review the Drawings, review this Section, review DEP EHS Policies and Procedures, and become familiar with any conditions which may affect the Work, as part of the pre-construction meeting and Site walk-through. The Contractor shall hold all meetings with appropriate parties as scheduled and as otherwise necessary to accomplish the Work to be performed under this Section. In addition to the pre-construction meeting and Site walk-through, other meetings may be required or may be requested by the Engineer, including briefings with Site operations personnel. Written documentation (i.e., “minutes”) of all meetings shall be generated by the Contractor, and

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copies shall be provided to the DEP within three (3) business days following each meeting.

6. Payment for the disposal of Lead Wastes (with the exception of painted/coated scrap metal) will not be made until a signed copy of the manifest from the Treatment, Storage, and Disposal Facility (TSDF), certifying the amount of Lead Wastes delivered is returned with complete chain-of-custody (COC) documentation to the DEP.

B. Bulk Removal

1. Protection of Existing Work to Remain: All Work involving the disturbance of Lead-Containing Materials or Lead Wastes must be conducted without damage to, or contamination of equipment or surfaces within the work areas or other areas adjacent to the work areas. All such damage or contamination shall be immediately corrected and cleaned up by the Contractor at the Contractor's expense.
2. Prohibited Activities: Contractors shall not conduct activities that are prohibited by OSHA and EPA regulations. The following activities are prohibited, regardless of whether they are conducted subject to an exposure assessment and written compliance program: (a) burning-off paints/coatings; (b) using heat guns operating above 1100oF; (c) dry machine sanding, grinding, or blasting paint without a HEPA vacuum exhaust tool; (d) uncontained hydroblasting or high-pressure washing; (e) welding painted/coated surfaces unless the paint/coating is removed at least 4-inches from area of heat application (per 29 CFR 1926.345(c)(1)), and local exhaust ventilation is used.
3. Test Patches: Prior to choosing the paint removal method(s) for paints/coatings, the Contractor shall perform test patches on surfaces subject to Abatement, to determine if the method(s) meet the requirements of this Section.
4. Mechanical Removal Equipment: When removing paints/coatings from metal surfaces, the paints/coatings must be removed to the extent that only the bare metal remains (i.e., no mill scale remains). In the case of substrates other than metal (e.g., concrete, brick, and block), paints/coatings shall be removed from the surface of the substrate. Acceptance of the Work shall be contingent upon inspection of the substrate surfaces by the Engineer, and must demonstrate the absence of residual paint/coating layers that can be physically measured, pried loose, or peeled away using a scraping device. The Contractor may only use products and tools meeting the performance specifications outlined below:
 - a. Contractor shall utilize a vacuum-assisted power tool system with demonstrated suitability and efficiency in preparing metal surfaces to the SSPC SP-11 standard, and with demonstrated effectiveness in maintaining Lead emissions below OSHA exposure limits during the disturbance of paints/coatings. Such systems may include

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- dustless needle guns, dustless rotopeens, and dustless right angle grinders, all of which capture dust and debris at the cutting tool edge, and transport the material under vacuum conditions to an air-tight disposal container. Dustless needle guns shall only be utilized on metal surfaces.
- b. The vacuum-assisted power tool system shall also be designed to permit the removal and replacement of collection containers under negative pressure in order to prevent the release of dusts. The system shall be equipped with an automatic “shut-off” in the event of vacuum failure.
 - c. Abrasive/recovery tools shall be monitored at all times by a device capable of determining recovery at the face of each tool, and capable of automatically disabling the tool in the event that recovery levels are insufficient. The monitor, at a minimum, shall have the following features: (a) a remote warning light; (b) an adjustable recovery set point; (c) automatic equipment disabling capabilities; (d) a sensing range of 0 - 5 pounds per square inch (psi); (e) solid state photohelic instrumentation; (f) remote sensing at the face of the tool.
 - d. The safe recovery point shall be calibrated each day before start-up, or each time a new tool or vacuum source is used. All manufacturer recommendations shall be followed with respect to the set up and use of the monitor, and the manufacturer's operations manual shall be kept on site at all times. A daily log shall be maintained by the Contractor, identifying all calibrations of recovery levels, as well as any “down time” as a result of insufficient recovery levels.
 - e. The cutting head of the vacuum-assisted power tool system that is used on flat surfaces shall be capable of cutting to within 1-1/2" of any inside corner, molding, or edge, and may include dustless rotopeens or dustless needle guns. Tools for corners and moldings shall be specifically designed for that purpose, and conform to all inside corners, outside corners, curved, flat, and angled surfaces that are to be abated under this Section. These tools shall also maintain vacuum control at the work surface/cutting head interface at all times. HEPA vacuum-shrouded needle guns may be used for non-flat surfaces in accordance with manufacturer recommendations. Vacuum-assisted finishing tools, such as right angle grinders, may be used to achieve the SSPC SP 11 standard, but may not be used for primary removal.
 - f. Vacuum-assisted power tool systems meeting all of the specifications outlined herein, may be used pending the submittal of all required performance documentation, and their acceptance by the Engineer. Any tools which do not meet all of the specifications outlined herein, shall be removed from the project Site immediately,

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and shall not be used for the Work to be performed under this Section.

5. Chemical Strippers: Acceptance of the Work shall be contingent upon inspection of the abated substrate surfaces by the Engineer, and must demonstrate the absence of residual paint/coating layers that can be physically measured, pried loose, or peeled away using a scraping device. The Contractor may only use products and paint stripping systems meeting the performance specifications outlined below:
 - a. The Contractor shall utilize a chemical paint stripping system with a demonstrated effectiveness in maintaining Lead emissions below OSHA exposure limits during the disturbance of paints/coatings. The Contractor shall utilize a mechanical ventilation system during the Work that exhausts away from occupied areas. The application of all paint stripping systems shall be in accordance with manufacturer recommendations.
 - b. The Contractor should note that more than one product may be required to strip LCP/coatings. The use of multiple products shall be in accordance with Work practices approved by the individual manufacturer of each chemical paint stripping compound.
 - c. All chemical paint stripping products shall be presented to the Engineer for approval prior to the start of any Work to be performed under this Section. When presenting the products to the Engineer, they shall be in the manufacturer's unopened, original containers bearing accurate information regarding the products. Also, the manufacturer's labels on each container shall be intact and legible.
 - d. Chemical paint stripping systems meeting all of the requirements outlined herein, may be used pending the submittal of all required performance documentation, and its acceptance by the Engineer. Any products which do not meet all of the specifications outlined herein, shall be removed from the project site immediately, and shall not be used for the Work to be performed under this Section.

3.03 FIELD TESTING / QUALITY CONTROL

A. Air Monitoring

1. Air monitoring for airborne concentrations of Lead and other heavy metals shall be conducted by the Air Monitor in accordance with OSHA and as defined in this Section.
 - a. Exposure Monitoring: For Work involving the disturbance of any detectable concentration of Lead or other heavy metals the Contractor shall collect personal air samples from employees who are anticipated to have the greatest risk of exposure, as determined by the Contractor's CIH or Competent Person. Personal air samples shall be collected during every work shift from at least one (1)

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employee that is representative of each type of work task that is being performed. Each personal air sample shall “run” for the employee’s entire work shift in order to ensure that enough volume (of air) is collected and an accurate 8-hour TWA can be calculated. Documentation regarding the sample numbers, specific shift when the sampling was conducted, the work tasks that were sampled, the dates of sampling, the employee hours that were worked during the shift, and the total sampling times, shall accompany each laboratory COC form.

- 1) Exposure Monitoring for other heavy metals may be discontinued following a complete negative exposure assessment and approval from the Engineer and the Contractor’s CIH. However, daily Exposure Monitoring for Lead shall remain, regardless of the negative exposure assessment results.
2. Area Monitoring: The Contractor shall collect a minimum of two (2) area air samples outside of each Lead Control Area on a daily basis for the duration of the Abatement, removal, or construction/demolition Work, as well as any other Work involving the disturbance of Lead-Containing Materials or Lead Wastes. During sampling activities, all air sample filter cassettes shall be positioned approximately five to six feet above the ground (in order to simulate an individual’s breathing zone), and shall not be placed immediately adjacent to obstructions (e.g., walls or columns) which may restrict the flow of air to the filter cassettes. Each air sample shall be analyzed for all contaminants identified during the exposure assessment. If area air monitoring indicates an emission level in excess of an OSHA Action Level outside of a Lead Control Area, all Work in that area shall be stopped immediately. The Contractor shall then take immediate corrective actions to reduce emission levels to below the Action Level(s), and the Contractor shall clean all adjacent areas that may have become contaminated due to the emissions. Documentation regarding the sample numbers, sample locations, the dates of sampling, the employee hours that were worked during the shift, and the total sampling times, shall accompany each laboratory COC form.
3. Documentation: Complete documentation of all air monitoring activities shall be in accordance with this Section.
4. The Contractor shall submit all air monitoring results to the DEP as soon as possible, but no later than five (5) days from when the air samples were collected.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

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3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Cleanup: The Contractor shall maintain all surfaces, including protective coverings (polyethylene sheeting) within each work area, free of accumulations of paint chips/coating debris, dusts, and wastes. The Contractor shall perform housekeeping activities daily throughout each work shift and at the end of each work shift, in order to prevent any accumulation of paint chips/coating debris, dusts, and wastes in the work areas. Dry sweeping and using compressed air to cleanup a Work area shall be strictly prohibited. HEPA-filtered vacuums and wet methods shall be used to ensure that each Work area remains free of visible paint chips/coating debris, dusts, and wastes.
- B. Sampling and Laboratory Analysis of Paint Removal Wastes: For hazardous waste characterization, the waste manager shall sample all potential heavy metal and PCB-containing waste streams in accordance with 40 CFR 261 and 6 NYCRR Part 371. All waste samples shall be collected in the presence of the Engineer using the following procedure:
1. One (1) composite waste sample shall be collected for laboratory analysis from each waste drum that is generated. Each composite sample shall be a mixture of four (4) grab samples. Each composite sample shall be labeled and submitted to a laboratory that satisfies the requirements of this Section. Each composite sample shall undergo Toxicity Characteristic Leaching Procedure (TCLP) analysis for the eight (8) RCRA metals.
 2. The Contractor shall also direct the laboratory to analyze each sample for any additional parameters that are required by the specific TSDF being used. In addition, if the waste stream is associated with the use of a chemical paint stripping system, the Contractor shall have the laboratory analyze each sample for pH and any other RCRA characteristic that may fail due to the chemical composition of the waste. Furthermore, if the waste stream may contain PCB-containing paint/coating chips, the Contractor shall collect samples in accordance with Section 02 84 05 - PCBs Management. The Contractor shall ensure that the laboratory being used to satisfy the requirements of this Section is also capable of performing these additional analytical tests.
 3. One (1) representative wastewater sample shall be collected for laboratory analysis from each drum that generated. Each sample shall be collected using appropriate field sampling equipment (e.g., a pipette or bailer), and shall be labeled and submitted to a laboratory that satisfies the requirements of this Section.
- C. Sampling and Laboratory Analysis of Painted Demolition Debris: The Contractor shall collect representative bulk samples of demolition wastes to determine proper disposal. All bulk samples shall undergo TCLP analysis for the eight (8) RCRA metals. Furthermore, if the waste stream may contain PCB-containing paint/coating chips, the Contractor shall collect samples in accordance with Section 02 84 05 - PCBs Management.

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1. Scrap Metal Exemption for Recycling: Under 6 NYCRR 371.1(c)(7), painted scrap metal can be sent to a recycling facility, rather than be discarded as hazardous waste. In order for the DEP to submit a “c7 notification” to the NYSDEC and claim the “scrap metal exemption,” the Contractor must first submit notification to their recycling facility indicating that Lead is present on the scrap metal. If PCBs or other heavy metals are detected in the paints/coatings on the scrap metal, the Contractor shall also disclose this information to the recycling facility. The Contractor shall receive written permission from the recycling facility indicating that the facility will accept the Lead, heavy metal, and PCB paint/coated scrap metal generated during the Work to be performed under this Section. The Contractor shall submit this documentation to the Engineer for approval prior to disposal.
- D. Collection, Separation, and Containerization of Wastes: The Contractor shall collect, separate (by waste stream/waste type), and containerize Lead Wastes (solid and liquid), debris, PPE, and containment materials on a daily basis in accordance with the Lead Management Plan. Where the TCLP analysis for the eight (8) RCRA metals are below hazardous waste standards, all PPE, poly and paint/coating waste will be characterized as lead-containing non-hazardous, contaminated waste, and should not be managed as construction and demolition (C&D) debris.
1. The Contractor shall store all wastes in DOT-approved container systems. No drum/container shall be filled in excess of the capacity marked on the drum/container. All drums/containers shall be sealed and covered immediately after filling, and each drum/container shall have a label affixed to it in accordance with the requirements of this Section. All labels shall remain intact and legible at all times.
 2. No water mixed with or contaminated by hazardous waste may be released onto the ground or into any drain or sewer. It should be noted that a discharge of more than 10 lb of Lead (this includes 10 lb of debris containing Lead) onto the ground or into the water within a 24-hour period, shall be considered a violation of the Clean Water Act and shall be treated as a “reportable quantity” in accordance with 40 CFR 117. Such a release shall be grounds for immediate termination of this Contract, and the Contractor shall be liable for any fines, penalties, or remediation costs.
 3. The Contractor shall store non-hazardous wastes separately from hazardous wastes, shall provide all non-hazardous waste containers, and shall make all transportation and disposal arrangements for non-hazardous wastes in accordance with federal, state, and local regulations.
- E. Storage of Wastes: The Contractor shall ensure that all drummed wastes are stored in a secondary containment system, and that each waste storage area is demarcated with a Physical Boundary. In addition, the Contractor shall post weekly waste inspections and waste inventories in the regulated waste storage area, as required in this Section, as well as the following emergency information in accordance with DEP’s EHS Policies and Procedures: (a) the name and telephone number of the

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facility’s Emergency Coordinator; (b) the location of fire extinguishers and fire alarms; (c) the location of spill control materials; (d) the telephone number for the fire department (unless the facility has a direct alarm).

- F. Labeling: The Contractor shall affix warning labels to all hazardous waste drums/containers. Labels shall comply with the requirements of federal, state, and local regulations. At a minimum, all hazardous waste labels shall bear the following information in English:

HAZARDOUS WASTE
FEDERAL LAW PROHIBITS IMPROPER DISPOSAL
HANDLE WITH CARE
[Generator Name, Address, and Telephone Number]
[Specific Contents of Container]
[EPA-Issued Generator Identification Number]
[EPA Waste Identification Number]
[Accumulation Start Date]
[Accumulation End Date]

1. If waste classification is pending analysis, labels shall indicate “Hazardous Waste - Pending Analysis.”
- G. Disposal of Wastes: All hazardous waste profiles for containerized wastes must be reviewed by the Engineer and signed by the DEP as the generator of the waste streams. The Contractor shall notify the DEP at least 14 business days prior to the removal of any waste drums/containers, so that the DEP can inspect the drums/containers and the waste manifests. Wastes shall be disposed of to ensure that drums/containers do not remain on the job site for more than 90 calendar days from the initial “accumulation start date” on the label affixed to the drum/container. Containers that have reached their storage capacity shall not remain on site, and transportation arrangements shall be made for their immediate removal.
- H. Disposal Documentation: The Contractor shall submit written evidence that the TSDF receiving lead-containing wastes is approved by federal, state, and local regulatory agencies to receive the wastes. If regulated PCBs (as defined in Section 02 84 05 - PCBs Management) were detected in the wastes, the Contractor shall also ensure that the TSDF is approved by federal, state, and local regulatory agencies to receive these wastes. Once all waste profiles have been completed, the Contractor shall provide the DEP a “Letter of Acceptance” issued from the TSDF indicating that the wastes will be accepted. On the date of disposal the Contractor shall submit one (1) copy of the completed manifest that has been signed and dated by the initial transporter in accordance with 6 NYCRR 372 and 40 CFR 262, to the DEP for signature as Generator. All hazardous waste profiles, manifests, and Land Disposal Restrictions (LDRs) must be signed by a DEP employee per Section 01 35 27- Hazardous Materials Control. Non-hazardous waste manifests may be signed by a designated alternate.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

- A. This Section details the requirements for construction and demolition activities affecting materials and structures coated with or containing polychlorinated biphenyls (PCBs), as shown on the Contract Drawings, specified herein, or required to complete the Work, including all affected coatings identified and impacted by the Work. All Work to be performed under this Section shall be performed using methods, tools, and equipment that have demonstrated effectiveness in preventing airborne emissions from migrating outside of Work areas.
- B. For construction and demolition activities affecting materials and structures that are also coated with heavy-metal-containing (i.e., arsenic, cadmium, chromium, or lead) paints or coatings, refer to Section 02 83 05 - Lead Management. For construction and demolition activities affecting materials and structures that are also coated with asbestos-containing materials (ACM), refer to Section 02 82 05 - Asbestos Management.
- C. Small Capacitors and Fluorescent Light Ballasts manufactured prior to 1978 may contain PCBs in their capacitors or potting materials. Unless a Fluorescent Light Ballast is marked “No PCBs” by the manufacturer, it shall be assumed that the ballast contains PCBs. All PCB-containing light ballasts and Small Capacitors shall be removed, handled, packaged, and disposed of in accordance with this Section.
- D. All Work under this Section shall be performed to minimize the creation of airborne emissions; minimize the quantity of hazardous waste generated; protect the health and safety of all site personnel and the welfare of the public; and avoid adverse environmental impacts.
- E. Unless otherwise specified, the Work of this Section shall also be performed in accordance with the most current New York City Department of Environmental Protection (DEP) Environmental Health and Safety (EHS) Policies and Procedures (including PCB Management, Paint Management, Hazardous Waste Management, and Spill Prevention, Environmental Release Reporting and Investigation), and applicable federal, state, and local regulations.
- F. In the absence of analytical testing results for a specific painted/bitumastic-coated material, the material shall be classified as PCB-containing and lead-containing. If the material is caulking or has a bitumastic coating, the material shall also be classified as asbestos containing. Any unforeseen PCB, asbestos, or lead-containing paints/bitumastic coatings discovered during the Work to be performed under this Section shall be remediated as necessary to complete the Work in accordance with this Section.
- G. The Contractor shall perform all Work under this Section without damaging or contaminating areas adjacent to where the Work is being performed. Where such

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areas are damaged or contaminated, as determined by the DEP, the Contractor shall restore the areas to their original condition at no additional cost to the DEP.

H. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.
- B. Payment for the disposal of PCB Wastes will not be made until a signed copy of the manifest from the Treatment, Storage, and Disposal Facility (TSDF), certifying the amount of PCB Wastes delivered is returned with complete chain-of-custody (COC) documentation to the DEP.

1.03 RELATED SECTIONS

- A. Section 01 27 00 -- Measurement and Payment
- B. Section 01 35 27 -- Environmental Health and Safety Requirements
- C. Section 01 35 45 -- Hazardous Materials Control
- D. Section 01 74 17 -- Construction Waste Management

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- E. Section 02 41 10 – Demolition and Removals
- F. Section 02 82 05 - Asbestos Management
- G. Section 02 83 05 -- Lead Management
- H. Section 02 84 10 -- Mercury Management

1.04 REFERENCES

A. Definitions

1. **Abatement:** Any measures or set of measures designed to permanently eliminate PCB paint/bitumastic coating hazards. Abatement includes, but is not limited to, the removal of PCB paints/bitumastic coatings or the replacement of PCB-painted/bitumastic-coated surfaces or fixtures. Abatement also includes the removal of paints/bitumastic coatings (with a PCB concentration greater than or equal to 50 parts per million (ppm)) when the underlying substrate is to remain in place. Abatement does not include renovation, remodeling, landscaping, or other activities, when such activities are not designed to permanently eliminate PCB hazards, but instead, are designed to repair, restore, or remodel a given structure or dwelling, even though these activities may incidentally result in a reduction or elimination of PCB hazards. Furthermore, Abatement does not include interim controls (e.g., the spot removal of a PCB paint/bitumastic coating on a surface in order to perform torch cutting at that location), operations and maintenance activities, or other measures and activities designed to temporarily, but not permanently, reduce PCB hazards.
2. **Area Monitoring:** Stationary air sampling outside of a PCB Control Area for the purpose of determining compliance with OSHA’s Limits for Air Contaminants Table (29 CFR 1910.1000, Table Z-1), and for the purpose of ensuring that airborne PCB concentrations remain below 1.0 mg/m³ (Aroclor 1242) and 0.5 mg/m³ (Aroclor 1254) outside of the PCB Control Area during all Work activities that have the potential to disturb PCB-Containing Materials with PCB concentrations greater than or equal to 50 parts per million (ppm). Area Monitoring for heavy metals (i.e., arsenic, cadmium, chromium, lead, or mercury) will be required if Exposure Monitoring results exceed corresponding Action Levels, Permissible Exposure Limits (PELs), or Threshold Limit Values (TLVs). If asbestos is present, Area Monitoring shall also be conducted in accordance with DEP (RCNY Title 15, Chapter 1) or NYSDOL (12 NYCRR 56) regulations. All Area Monitoring shall follow pertinent NIOSH or ASTM sampling methodologies.
3. **Certified Industrial Hygienist (CIH):** Refers to an individual employed by the Contractor who is currently certified by the American Board of Industrial Hygiene (ABIH).

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4. **Competent Person:** Defined by OSHA as someone who is capable of identifying existing and predictable hazards in the surroundings or working conditions, and who has authorization to take prompt corrective measures to eliminate them. Duties of the Competent Person include the following: (a) determining prior to the performance of the Work, whether PCBs, asbestos, or other heavy metals (i.e., arsenic, cadmium, chromium, lead, or mercury) are present in the workplace; (b) establishing PCB Control Areas and assuring that access to and from those areas is limited to authorized personnel; (c) assuring the adequacy of any employee Exposure Monitoring required by OSHA; (d) assuring that all employees exposed to airborne contaminant levels above Action Levels, PELs, or TLVs wear appropriate Personal Protective Equipment (PPE), respiratory protection, and are trained in the use of appropriate methods of exposure control for all of the contaminants present; (e) assuring that proper Hygiene Facilities are provided and that workers are trained to use those facilities; (f) assuring that engineering controls specific to the contaminants present are implemented, maintained in proper operating condition, and functioning properly.
5. **Decontamination Area:** Designated area within the Hygiene Facilities for removing gross contamination from PPE (using a HEPA vacuum), washing away contamination that has accumulated on the skin and hair (using soap and water), removing and disposing/washing of contaminated PPE, and donning clean clothing that will not potentially contaminate areas outside of a PCB Control Area's Physical Boundary.
6. **DOT Hazardous Materials Transportation Training:** Training that meets the criteria outlined in 49 CFR 172.704. This training shall include discussions of the following: (a) hazardous materials tables within 49 CFR 172; (b) material packaging and labeling; (c) shipping papers and placards; (d) material loading and segregation.
7. **Exclusion Zone:** (See definition of "PCB Control Area").
8. **Exposure Monitoring:** Personal air sampling performed outside the respirator within the breathing zone of individuals, for the purpose of determining compliance with OSHA's Limits for Air Contaminants Table (29 CFR 1910.1000, Table Z-1), as well as the DEP EHS Policy and Procedures for PCB and Paint Management. Analytical results obtained from Exposure Monitoring will be used to select appropriate respiratory protection and PPE for individuals within a work area. For the purpose of this Section, Exposure Monitoring samples shall be collected from individuals who are representative of each type work task being conducted by the Contractor, and all Exposure Monitoring shall follow pertinent NIOSH or ASTM sampling methodologies.
9. **Fluorescent Light Ballast:** A device that electrically controls fluorescent light fixtures and includes a capacitor containing 0.1 kilograms (kg) or less of dielectric fluid.

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10. Hazardous Waste Operations (HAZWOPER) Training: Training that meets the criteria outlined in the OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). A minimum of 24-hour HAZWOPER training will be required for Work being performed under this Section. However, certain types of Work may require 40-hour HAZWOPER Training. All decisions regarding the specific HAZWOPER Training that will be required for each Work task shall be made by the Engineer.
11. High-Efficiency Particulate Air (HEPA) Filter: A filter designed to remove 99.97% of all particles greater than 0.3 micrometers (μm) in diameter. For the purpose of this Section, HEPA vacuum and local exhaust filtration equipment used by the Contractor shall meet the Standard for Safety High-Efficiency, Particulate, Air Filter Units (UL 586) developed by Underwriters Laboratories.
12. Homogenous Materials: PCB-Containing Materials which are similar in appearance, color, texture, and substrate type.
13. Hygiene Facilities: Facilities within the Physical Boundary of a work area that are set up to prevent cross contamination and are equipped with change areas and separate storage facilities for PPE and clean clothing. Hygiene Facilities shall include adequately supplied hand washing station(s) (i.e., running water, soap, and clean towels) or shower(s) (hot and cold water that is controllable at the tap, soap, shampoo, and clean towels).
14. Organic Vapor Cartridge: A respirator filter typically containing 25 to 40 grams of sorption media such as activated charcoal.
15. OSHA Monitoring: (See definition of “Exposure Monitoring”).
16. P-100 Filter: (See definition of: “High-Efficiency Particulate Air (HEPA) Filter”).
17. PCB Awareness Training: Training for individuals that have the potential to be exposed to PCB-Containing Materials or PCB Wastes. This training shall include discussions of the following: (a) sources of PCBs; (b) current federal, state, and local regulations pertaining to PCBs (including 40 CFR 761) and other contaminants that may be disturbed during the Work; (c) the health effects of PCBs and other contaminant exposures; (d) state-of-the-art work practices, engineering controls, and procedures for Abatement, removal, construction/demolition, materials handling, housekeeping, and waste management activities that involve PCB-Containing Materials and PCB Wastes; (e) the use and maintenance of PPE and the use and maintenance of respirators in accordance with 29 CFR 1910.134; (f) medical surveillance programs; (g) requirements regarding warning signs, labeling, and Safety Data Sheets (SDSs) in accordance with 29 CFR 1910.1200; (h) responsibilities of the Competent Person.

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18. PCB Bulk Product Waste: Waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where the concentration at the time of designation for disposal is greater than or equal to 50 ppm of PCBs.
19. PCB-Containing Material: Any material that contains, or is coated with, a detectable concentration of PCBs.
20. PCB Control Area: The area within the Physical Boundary where worker Hygiene Facilities are located and where all Work activities take place that involve the disturbance of PCB-Containing Materials and PCB Wastes.
21. PCB Hazardous Waste (per NYSDEC): All solid wastes containing PCB concentrations greater than or equal to 50 ppm. Refer to 6 NYCRR Part 371.4(e) for specific details and exceptions regarding the classification of PCB Wastes as “hazardous wastes” (listed waste B001-B007) in New York State.
22. PCB Waste (TSCA-regulated): Non-specific liquid or solid waste generated during the Abatement, removal, construction/demolition, handling, or cleanup of a PCB-Containing Material with a PCB concentration greater than or equal to 50 parts per million (ppm). PCB Waste also includes any waste (including remediation waste, polyethylene sheeting and PPE) that has been in contact with a material that has a PCB concentration greater than or equal to 50 ppm, regardless of whether the waste itself has a PCB concentration of less than 50 ppm. PCB Wastes are subject to the disposal requirements set forth in Toxic Substances Control Act (TSCA) (40 CFR 761, Subpart D).
23. Perimeter Monitoring: (See definition of “Area Monitoring”).
24. PEL: Defined by OSHA as individual exposure, without regard to the use of respirators, to a specific airborne concentration of a contaminant expressed in milligrams per cubic meter of air (mg/m³) calculated as an 8-hour Time-Weighted Average (TWA). Once a PEL is met or exceeded for a particular contaminant, the Contractor is responsible for meeting specific OSHA requirements, which may include worker Exposure Monitoring, the use of PPE including respiratory protection, the use of Hygiene Facilities, medical surveillance, or training for workers. The following PELs are pertinent to disturbance, removal, construction/demolition, and disposal activities associated with PCB-Containing Materials and PCB Wastes: (a) PCB Aroclor 1254 – 0.5 mg/m³ per 29 CFR 1910.1000, Table Z-1; (b) PCB Aroclor 1242 – 1.0 mg/m³ per 29 CFR 1910.1000, Table Z-1.
25. Personal Monitoring: (See definition of “Exposure Monitoring”).
26. Physical Boundary: A physical barrier designated with ropes, “caution tape,” or a partition that surrounds a work area in order to limit the entry of unauthorized personnel and delineate “clean areas” from areas that may meet or exceed an Action Level, PEL, or TLV.

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27. PCBs: Any group of chlorinated isomers of biphenyl, formerly used in the form of a toxic, colorless, odorless, viscous liquid typically added to lubricants, heat-transfer fluids, and plasticizers.
28. Regulated Area: (See definition of “PCB Control Area”).
29. Resource Conservation and Recovery Act (RCRA) Training: Training that meets the criteria outlined in 40 CFR 265.16. This training shall include site-specific discussions of the following: (a) hazardous waste identification; (b) waste storage container use and labeling; (c) waste storage area management; (d) personal health and safety, including fire safety; (e) manifesting and the off-site transportation of wastes; (f) procedures for using, inspecting, repairing, and replacing emergency equipment and monitoring equipment; (g) procedures for communicating with other employees and outside emergency response personnel; (h) responses to fires or explosions; (i) responses to leaks, spills, and potential groundwater contamination incidents ; (j) the shutdown of operations.
30. Small Capacitor: A device for accumulating and holding a charge of electricity, and consisting of conducting surfaces separated by a dielectric fluid in a quantity less than 1.36 kilograms (kg) or three pounds. If the weight of the dielectric fluid is unknown, it can be assumed that a Small Capacitor is a capacitor that has a total volume of less than 1,639 cubic centimeters (cm³) or 100 cubic inches (in³).
31. TWA: The average time over a given work period (e.g., an 8-hour workday) of a person’s exposure to a chemical or agent. The average is determined by sampling for the chemical or agent throughout the time period.
32. Trigger Activities: Certain activities that involve a disturbance of PCB-Containing Materials or PCB Wastes. Depending upon whether the performance of these activities exceeds an Action Level, PEL or TLV, the requirements may include additional worker Exposure Monitoring, the use of PPE including respiratory protection, the use of Hygiene Facilities, medical surveillance, or training for workers. Examples of Trigger Activities include, but are not limited to, the following: abrasive blasting, welding, torch cutting/burning, heat gun usage, needle gunning/scaling, rivet busting, using a rotopeen, mechanical sanding/grinding, using mechanical shears, hand scraping/sanding, chemical stripping, and the manual demolition of PCB-Containing Materials.

B. Reference Standards

1. The Contractor shall comply with all applicable regulations, standards, and guidelines of federal, state, and local environmental and occupational safety and health agencies regarding PCB-Containing Materials and PCB Wastes. These regulations, standards, and guidelines include, but are not limited to the following:
 - a. Department of Transportation (DOT):

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- 1) 49 CFR 171 - General Information, Regulations, and Definitions
- 2) 49 CFR 172 – Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
- 3) 49 CFR 173 – Shippers: General Requirements for Shipments and Packaging’s
- 4) 49 CFR 178 – Specifications for Packaging’s
- b. Environmental Protection Agency (EPA):
 - 1) 40 CFR 116 – Designation of Hazardous Substances
 - 2) 40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances
 - 3) 40 CFR 260 – Hazardous Waste Management Systems: General
 - 4) 40 CFR 261 – Identification and Listing of Hazardous Waste
 - 5) 40 CFR 262 – Standards Applicable to Generators of Hazardous Waste
 - 6) 40 CFR 263 – Standards Applicable to Transporters of Hazardous Waste
 - 7) 40 CFR 264 – Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
 - 8) 40 CFR 265 – Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
 - 9) 40 CFR 268 – Land Disposal Restrictions
 - 10) 40 CFR 302 – Designation, Reportable Quantities, and Notification
 - 11) 40 CFR 761 – Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
 - 12) Method 8082A (SW-846) – Polychlorinated Biphenyls (PCBs) (soxhlet extraction method 3540) by Gas Chromatography
- c. National Institute for Occupational Safety and Health (NIOSH):
 - 1) Method 5503 – Polychlorobiphenyls

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- d. New York City Department of Environmental Protection (DEP):
 - 1) Environmental Health and Safety Policies and Procedures – Vol. I, Paint Management
 - 2) Environmental Health and Safety Policies and Procedures – Vol. II, Spill Prevention, Environmental Release Reporting and Investigation
 - 3) Environmental Health and Safety Policies and Procedures – Vol. IV, Hazardous Waste Management
 - 4) Environmental Health and Safety Policies and Procedures – Vol. IV, PCB Management
 - 5) RCNY Title 15, Chapter 19 – Discharges of Wastewater and Other Materials to Public Sewers
- e. New York City Department of Buildings (DOB) – Building Code (Chapter 33)
- f. New York State Department of Environmental Conservation (NYSDEC):
 - 1) 6 NYCRR 364 – Waste Transporter Permits
 - 2) 6 NYCRR 370 – Hazardous Waste Management Regulations
 - 3) 6 NYCRR 371 – Identification and Listing of Hazardous Waste
 - 4) 6 NYCRR 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities
 - 5) 6 NYCRR 373 – Hazardous Waste Management Facilities
 - 6) 6 NYCRR 376 – Land Disposal Restrictions
- g. Occupational Safety and Health Administration (OSHA):
 - 1) 29 CFR 1910 – Occupational Safety and Health Standards
 - 2) 29 CFR 1910.28 – Safety Requirements for Scaffolding
 - 3) 29 CFR 1910.120 – Hazardous Waste Operations and Emergency Response
 - 4) 29 CFR 1910.134 – Respiratory Protection Standard
 - 5) 29 CFR 1910.1200 - Hazard Communication Standard
 - 6) 29 CFR 1926 – Safety and Health Regulations for Construction
 - 7) 29 CFR 1926.62 – Lead in Construction Standard

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- h. Society for Protective Coatings (SSPC):
 - 1) SSPC-Guide 6, Guide for Containing Debris Generated During Paint Removal Operations
 - 2) SSPC-Guide 7, Guide for the Disposal of Lead-Contaminated Surface Preparation Debris
 - 3) SSPC-SP COM, Surface Preparation Commentary for Steel and Concrete Substrates
 - 4) SSPC-SP 1, Solvent Cleaning
 - 5) SSPC-SP 2, Hand Tool Cleaning
 - 6) SSPC-SP 3, Power Tool Cleaning
 - 7) SSPC-SP 11, Power Tool Cleaning to Bare Metal
 - 8) SSPC-SP 13/ NACE No.6, Surface Preparation of Concrete
 - 9) SSPC-SP 15, Commercial Grade Power Tool Cleaning
- i. Underwriters Laboratories, Inc. (UL):
 - 1) UL 586 – Standard for Safety High Efficiency, Particulate, Air Filter Units.

1.05 DESCRIPTION

- A. Commencement of Work: Five (5) business days prior to the proposed start of the work of this Section at each separate location, the Contractor shall notify the Engineer and the onsite safety staff. No Work may proceed at any location until authorized by the Engineer.
- B. The Contractor shall coordinate any required equipment shutdowns with the Engineer prior to starting the Work.
- C. Access Restrictions: The Contractor shall inform the Engineer of proposed access restrictions (i.e., areas or items of equipment which will not be accessible during the proposed Work), and give them estimated time frames (including specific dates) of such proposed access restrictions. The Contractor shall be aware that other contractors may be at any of the work sites associated with this Contract. As a result, the Contractor shall not have exclusive rights to any work site, and shall fully cooperate and coordinate this Work with the work of other contractors who may be on site. Therefore, the Contractor shall notify other contractors in advance of the disturbance, Abatement, removal, construction/demolition, and disposal Work included herein, to provide them with sufficient time for coordination of interrelated items that are included in their contracts and that must be performed before, after, or in conjunction with the Work included under this Section.
- D. Unexpected Entry into a PCB Control Area: In the event that DEP personnel must enter a PCB Control Area for reasons unrelated to the supervision or inspection of Work being performed under this Section (e.g., under emergency conditions), the Contractor shall immediately stop Work and cleanup any loose debris, so as to

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permit the safe entry by DEP personnel. Any disturbance of paints/bitumastic coatings, dusts, materials, or wastes that may potentially generate airborne concentrations of contaminants equal to or above an OSHA Action Level shall not proceed until all DEP personnel have exited from the PCB Control Area.

- E. Meetings: The Contractor shall visit and investigate the site, review the Drawings, review this Section, review DEP EHS Policies and Procedures, and become familiar with any conditions which may affect the Work, as part of the pre-construction meeting and site walk-through. The Contractor shall hold all meetings with appropriate parties as scheduled and as otherwise necessary to accomplish the Work to be performed under this Section. In addition to the pre-construction meeting and site walk-through, other meetings may be required or may be requested by the Engineer, including briefings to Site Operations personnel. Written documentation (i.e., “minutes”) of all meetings shall be generated by the Contractor, and copies shall be provided to the DEP within three (3) business days following each meeting.

1.06 QUALITY ASSURANCE

- A. Scheduling: The Contractor shall coordinate and schedule all phases of the Work to be performed under this Section with the DEP, subcontractors, material suppliers, and other parties as necessary to ensure the proper execution of the Work.
- B. Compliance: In addition to the detailed requirements of this Section and DEP EHS Policies and Procedures, the Contractor shall comply with all applicable regulations of federal, state, and local authorities pertaining to the disturbance, Abatement, removal, construction/demolition, handling, storage, transportation, and disposal of PCB-Containing Materials and PCB Wastes. All matters regarding the interpretation of any regulations, standards, or policies shall be submitted to the Engineer for resolution before starting the Work. Where the requirements of this Section, DEP EHS Policies and Procedures, or federal, state, or local regulations conflict or vary, the most stringent requirements or regulations shall apply.
- C. Rejection of Non-Complying Items: The DEP reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements. The DEP also reserves the right to reject Contractor submittal items that are deemed inappropriate or unacceptable by the Engineer or DEP. Submittal items that may be deemed inappropriate or unacceptable include proposed vendors or subcontractors with previous regulatory citations/violations.
- D. Suspect Material Characterization: To classify caulking or a paint or bitumastic coating as non-PCB containing, a paint chip/coating sample must be collected as a grab sample from the source. The sample shall be sent to an analytical laboratory meeting the requirements of this Section.
1. Suspect PCB-Containing Paints/Coatings: Although there are no certification requirements pertaining to an individual that collects paint chip samples in an industrial or commercial setting, this Section requires

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paint chip sampling to be performed by an individual who has successfully completed HAZWOPER Training and PCB Awareness Training courses (within the past year) as defined in this Section. In addition, the individual shall possess a current EPA Lead Inspector or EPA Risk Assessor certification, or have documented experience in collecting paint chip samples.

2. Suspect ACM: All caulking and bitumastic coatings are considered suspect ACM. Therefore, if a sample will be collected, the sampling shall be performed by a certified DEP Asbestos Investigator or NYSDOL Asbestos Inspector.
3. The qualifications of individuals who will collect samples must be approved by the Engineer prior to sample collection. Analytical results for samples that are collected by individuals not approved by the Engineer will not be recognized or accepted as valid by the DEP.
4. Estimate an approximate number of samples to adequately characterize painted/coated surfaces. Collect grab samples that include all layers of paint/coating from different areas randomly dispersed throughout the painted surface area. Grab samples are not to be composited.
5. PCB concentrations are based on the cumulative total of the nine (9) Aroclor congeners (aka PCB compounds) analyzed by EPA Method SW 846-8082A (soxhlet extraction method 3540) by Gas Chromatography.

E. Qualifications:

1. The Contractor or their proposed PCB removal subcontractor shall have successfully completed at least two (2) projects of comparable scope and methodologies to the work being performed under this Section within the past three (3) years. This experience shall be documented by identifying the following: (a) the name, address, and phone number of each facility where the work was performed; (b) the name of the individual representing the owner who supervised the work at each facility; (c) the types of facilities where the work was performed; (d) the volume and type of each material that was abated/removed; (e) the specific methods of Abatement/removal used at each facility (including the tools, technologies, and engineering controls employed).
2. Competent Person: When disturbing materials and wastes with PCB concentrations greater than or equal to 50 ppm, the Contractor shall have on staff and assigned to this Contract a Competent Person who has successfully completed DOT Hazardous Materials Transportation Training, HAZWOPER Training, PCB Awareness Training, and RCRA Training courses as defined in this Section. Each training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, the Competent Person shall be able to fulfill the duties defined in this Section, shall have a minimum of two (2) years' experience with work involving PCBs, and shall have served as the

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Competent Person on at least three (3) projects of comparable scope and methodologies to the work being performed under this Section. The Competent Person shall be on site during all PCB-related work activities. It should be noted that depending upon the specific contaminants present during the work, additional training for the Competent Person (as described in Section 02 83 05- Lead Management) may be required.

3. PCB Waste Manager: When disturbing materials and wastes with PCB concentrations greater than or equal to 50 ppm, the Contractor shall have on staff and assigned to this Contract a PCB waste manager who has successfully completed DOT Hazardous Materials Transportation Training, HAZWOPER Training, PCB Awareness Training, and RCRA Training courses as defined in this Section. Each training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, the PCB waste manager shall have a minimum of two (2) years' experience on projects involving PCB Wastes. It is acceptable for an individual who meets the criteria of the Competent Person, to also serve as the PCB waste manager for this Contract as long as the individual fulfills all of the requirements of this paragraph.
4. PCB Worker: When disturbing materials and wastes with PCB concentrations greater than or equal to 50 ppm, the Contractor shall have on staff and assigned to this Contract a sufficient number of PCB workers who have successfully completed DOT Hazardous Materials Transportation Training and PCB Awareness Training courses as defined in this Section. Each training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, each PCB worker shall have a minimum of one (1) year of experience on projects involving PCBs, and shall have worked on at least three (3) projects of comparable scope and methodologies to the work being performed under this Section. It should be noted that depending upon the specific contaminants present during the work, additional training for PCB workers (as described in Section 02 83 05 - Lead Management) may be required.
5. Worker (low PCB concentrations): When disturbing materials and wastes with PCB concentrations less than 50 ppm, the Contractor shall have on staff and assigned to this Contract a sufficient number of workers who have successfully completed a PCB Awareness Training course as defined in this Section. Each training course shall have been completed within the past year in the form of either an initial course or a refresher course. It should be noted that until a negative exposure assessment has been established via Exposure Monitoring, workers must wear appropriate respiratory protection.
6. Air Monitor: When disturbing any detectable concentration of PCBs, the Contractor shall have an Air Monitor assigned to this Contract who has

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successfully completed a PCB Awareness Training course as defined in this Section. This training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, the Air Monitor shall have a minimum of two (2) years' experience in conducting Area Monitoring and Exposure Monitoring on projects involving PCBs. It is acceptable for an individual who meets the qualification requirements for Competent Person or PCB waste manager to also serve as the Air Monitor for this Contract, as long as the individual satisfies all of the requirements of this paragraph.

1.07 SUBMITTALS

- A. Within 30 business days of the “Notice to Proceed” or as directed by the Engineer, the Contractor shall submit the following to the Engineer:
1. PCB Inspection and Sampling Plan: The Contractor shall provide a PCB Inspection and Sampling Plan to identify suspect PCBs, not otherwise sampled during Design, and collect samples, as appropriate during the inspection. This plan shall include at a minimum:
 - a. Credentials of the individual responsible for inspection and sampling. At a minimum, the inspection shall be performed by an Environmental Professional, as defined in this Contract, who shall have current HAZWOPER training, PCB awareness training, and OSHA 10-hr certification, and shall have performed similar inspection work on at least three (3) projects of similar scope.
 - b. Credentials of the laboratory providing sample analysis. The credentials shall include current certification by the New York State Department of Health’s Environmental Laboratory Approval Program (ELAP).
 - c. Sample collection, analysis and reporting protocol.
 - d. Health and safety protocol for all investigation activities.
 2. PCB Inspection Report: The Contractor shall provide a PCB Inspection Report prepared by the Environmental Professional summarizing the results of all inspection activities, and as applicable, a sampling narrative, laboratory data packages, and inventory of all identified suspect and confirmed PCB Containing Materials.
 3. PCB Safe Work Practices: Each Contractor that will disturb PCB-Containing Materials with a PCB concentration less than 50 ppm during the course of Work to be performed under this Section shall submit detailed, project-specific PCB Safe Work Practices designed to protect their workers and control the spread of potential PCB contamination. Work requiring the development of PCB Safe Work Practices includes, but is not limited to, the mechanical disturbance of paints/coatings (e.g., drilling, sawing, or spot removal). The PCB Safe Work Practices shall be

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signed and dated by a CIH meeting the definition in this Section, and shall include the following elements:

- a. A detailed discussion regarding the procedures and methodologies that will be used to conduct Exposure Monitoring. Also, provide the name and qualifications (i.e., training and experience documentation) of the Air Monitor who will be responsible for conducting the Air Monitoring activities. The Air Monitor shall at a minimum, satisfy the qualification requirements set forth in this Section;
- b. A detailed discussion regarding housekeeping procedures to be used for maintaining clean work areas and clean Hygiene Facilities;
- c. A detailed task analysis for each Work activity that has the potential to disturb PCB-Containing Materials with a PCB concentration less than 50 ppm. Each task analysis shall include, but is not limited to, the following information: (a) the type of Work activity; (b) the tools/equipment that will be used; (c) operation and maintenance practices and procedures that will be used for the tools/equipment; (d) the types of PCB-Containing Materials that may be disturbed when performing the activity; (e) the engineering controls that will be used to control the spread of contamination during the activity; (f) housekeeping procedures that will be used during the activity; (g) PPE and proposed respiratory protection that will be used for the activity;
- d. Equipment and Supplies: Identify the equipment and supplies that will be used to perform the Work;
- e. Rental Equipment Notification: If rental equipment is to be used during the Work, the Contractor shall notify the rental agency in writing concerning the intended use of the equipment. Rental equipment data demonstrating compliance with the performance requirements of this Section must be presented to and approved by the Engineer prior to use;
- f. SDSs: Provide SDSs for all chemical products to be used for the Work;
- g. Medical Clearance for Respiratory Protection: For all activities that disturb PCB-Containing Materials with a PCB concentration less than 50 ppm, the Contractor shall provide a sufficient number of properly trained and experienced workers, each of whom shall: (a) have received a medical exam that included a Pulmonary Function Test (PFT) within the past year; (b) have received written medical clearance within the past year, by a licensed physician, to wear a respirator; (c) have received a qualitative or quantitative respirator

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- fit-test for the specific respirator the employee will be using for this Work within the past year;
- h. Employee Documentation: For all activities that may disturb PCB-Containing Materials with a PCB concentration less than 50 ppm, the Contractor shall provide a sufficient number of properly trained and experienced workers, each of whom shall: (a) have written proof of training (e.g., certificates) in accordance with the qualification requirements of this Section for workers and Air Monitors that will be used for the Work; (b) dates and written proof of respiratory clearance and a medical exam in accordance with this Article; (c) dates and written proof of a respirator fit-test in accordance with this Article.
4. PCB Management Plan: Each Contractor that will disturb PCB-Containing Materials with a concentration of PCBs greater than or equal to 50 ppm, and PCB Wastes during the course of Work to be performed under this Section shall submit a detailed, project-specific PCB Management Plan that addresses work procedures and equipment to be used during the disturbance, removal, handling, collection, and disposal of PCB-Containing Materials and PCB Wastes. Work requiring a PCB Management Plan includes, but is not limited to, Abatement, spot removal, and construction/demolition activities. The PCB Management Plan shall be prepared in accordance with OSHA Construction Standards and all other pertinent federal, state, and local regulations, including DEP (RCNY Title 15, Chapter 1) or New York State Department of Labor (NYS DOL) (12 NYCRR 56) asbestos regulations if asbestos is present. In addition, the PCB Management Plan shall follow all DEP EHS Policies and Procedures (referenced in this Section), and shall be coordinated with the Engineer. The PCB Management Plan shall also be signed and dated by a CIH meeting the definition in this Section.
- a. If the PCB-Containing Materials or PCB Wastes that will be disturbed also contain asbestos or heavy metals, it is acceptable to integrate the PCB Management Plan elements into the relevant Asbestos Work Plan (required under Section 02 82 05 - Asbestos Management) or Lead Management Plan (required under Section 02 83 05 - Lead Management). PCB Management Plan elements that are integrated into an Asbestos Work Plan or Lead Management Plan must still satisfy all of the requirements of this Section. The PCB Management Plan (or relevant Asbestos Work Plan or Lead Management Plan) shall include the following elements:
- 1) PCB Control:
 - a) Drawings showing the location and details of the following: (a) each PCB Control Area; (b) each hygiene facility; (c) proposed electrical hookups;

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- (d) proposed water hookups; (e) each waste storage area; (f) restroom areas; (g) areas designated for eating, drinking, and smoking;
- b) A detailed discussion regarding the interfacing of trades (i.e., how the Contractor will coordinate the Work with other contractors or DEP employees working at the site) and the sequencing of PCB-related Work;
- c) A detailed discussion regarding the collection, handling procedures, and disposal of PCB-Containing Materials with a PCB concentration equal to or greater than 50 ppm, and PCB Wastes (including the collection, filtering, and disposal of wastewater). If reusable equipment used during the Work will be in contact with PCB-Containing Materials or PCB Wastes, the Contractor shall submit an equipment decontamination procedure using a Performance-based Decontamination Fluid (PODF) in accordance with 40 CFR 761;
- d) A detailed discussion regarding the procedures and methodologies that will be used to conduct Exposure Monitoring and Area Monitoring. Also, provide the name and qualifications (i.e., training and experience documentation) of the Air Monitor who will be responsible for conducting the Air Monitoring activities. The Air Monitor shall at a minimum, satisfy the qualification requirements set forth in this Section;
- e) A detailed discussion regarding housekeeping procedures to be used for maintaining clean work areas and clean Hygiene Facilities;
- f) A detailed discussion regarding the specific methods and procedures of emissions control that will be used to ensure that airborne contaminant levels do not meet or exceed an OSHA PEL outside of each PCB Control Area;
- g) Detailed task analysis for each Work activity that has the potential to disturb PCB-Containing Materials with a PCB concentration equal to or greater than 50 ppm, and PCB Wastes. Each task analysis shall include, but is not limited to, the following information: (a) the type of Work activity; (b) the tools/equipment that will be used;

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- (c) operation and maintenance practices and procedures that will be used for the tools/equipment; (d) the types of PCB-Containing Materials that may be disturbed or PCB Wastes that may be generated when performing the activity; (e) the engineering controls that will be used to control the spread of contamination during the activity; (f) the proposed crew size for the activity and individual employee responsibilities during the activity; (g) housekeeping procedures that will be used during the activity; (h) PPE and proposed respiratory protection that will be used for the activity;
 - h) Equipment and Supplies: Identify the equipment and supplies that will be used to perform the Work;
 - i) Rental Equipment Notification: If rental equipment is to be used during the Work, the Contractor shall notify the rental agency in writing concerning the intended use of the equipment. Rental equipment data demonstrating compliance with the performance requirements of this Section must be presented to and approved by the Engineer prior to use;
 - j) SDSs: Provide SDSs for all chemical products (including chemical stripping products and PODFs) to be used for the Work;
 - k) The name and qualifications (i.e., experience and training documentation) of the Competent Person who will be responsible for the oversight and execution of the PCB Management Plan during all activities affecting PCB-Containing Materials with a PCB concentration equal to or greater than 50 ppm, and PCB Wastes. At a minimum, the Competent Person shall satisfy the qualification requirements set forth in this Section.
- 2) Waste Management:
- a) The identification of PCB-Containing Materials with a PCB concentrations equal to or greater than 50 ppm, and PCB Wastes associated with the Work;
 - b) The estimated quantity of each waste stream (regulated and non-regulated) that will be generated and disposed of;

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- c) The name, address, phone number, and qualifications for each vendor and facility that will be transporting, storing, testing, or disposing of the wastes. The Contractor shall verify the permit status of the facility as well as check for outstanding violations and enforcement actions. Include a 24-hour phone contact for each vendor and facility;
- d) Current permit documentation for each recycling and TSDF indicating that the facility is approved by federal, state, and local regulatory agencies to receive PCB-Containing Materials with a PCB concentration equal to or greater than 50 ppm, and PCB Wastes. The documentation shall include an “acceptance letter” from each TSDF indicating its ability to accept the specific waste streams that will be generated during Work performed under this Section;
- e) Current 6 NYCRR 364 permit documentation for the waste transporter that will transport PCB-Containing Materials with a PCB concentration equal to or greater than 50 ppm, and PCB Wastes from the work site to the TSDF. The documentation shall clearly indicate the transporter’s ability to deliver the PCB-Containing Materials and PCB Wastes to the chosen TSDF;
- f) Spill prevention, containment, and cleanup contingency measures to be implemented during the Work, as well as procedures to be followed during a suspected PCB emissions/bulk material release or emergency situation. All measures and procedures shall be in accordance with the standards referenced in this Section;
- g) A detailed discussion of the on-site handling, storage, removal, and disposal of waste materials. This discussion shall include, but is not limited to, the following: (a) specifications for a secondary containment system for each drum storage area; (b) the methods of demarcation that will be used to identify the waste storage areas and each waste container; (c) the methods and procedures that will be used to collect and containerize wastes on a daily basis; (d) the types of containers that will be used to containerize the wastes; (e) the submittal of

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weekly regulated waste inspection and inventory records as required in this Section;

- h) The name and qualifications (i.e., experience and training documentation) of the PCB waste manager who will be responsible for the oversight and execution of the PCB Management Plan during waste management activities involving PCB-Containing Materials with a PCB concentration equal to or greater than 50 ppm, and PCB Wastes. At a minimum, the PCB waste manager shall satisfy the qualification requirements set forth in this Section.
- b. A detailed schedule for the implementation of the PCB Management Plan elements. The schedule shall clearly indicate the starting and completion dates for the Work, and shall allow adequate time for cleanup, inspections, and Air Monitoring activities.
- c. Medical Surveillance: For all activities that disturb PCB Containing Materials with PCB concentrations that are greater than or equal to 50 ppm, and PCB Wastes, the Contractor shall provide a sufficient number of properly trained and experienced workers, each of whom shall: (a) have completed initial blood testing for PCBs; (b) have received a medical exam that included a PFT within the past year; (c) have received written medical clearance within the past year, by a licensed physician, to wear a respirator; (d) have received a qualitative or quantitative respirator fit-test within the past year for the specific respirator the employee will be using for this Work.
- d. Employee Documentation: For all activities that result in airborne contaminant concentrations (i.e., PCBs, asbestos, or heavy metals) equal to, or in excess of an Action Level, PEL, or TLV, or for those activities that take place within a PCB Control Area, the Contractor shall provide a sufficient number of properly trained and experienced workers, each of whom shall: (a) have written proof of training (e.g., certificates) in accordance with the qualification requirements of this Section for PCB workers, Competent Persons, PCB waste managers, and Air Monitors that will be used for the Work; (b) copies of resumes for PCB workers, Competent Persons, PCB waste managers, and Air Monitors that will be used for the Work, indicating work experience as required in this Section; (c) dates and written proof of initial medical surveillance by the Contractor or other employer within the past year, and proof that the employee is currently participating in the employer's ongoing medical surveillance program in accordance

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with this Section; (d) dates and written proof of respiratory clearance and a medical exam in accordance with this Section; (e) dates and written proof of a respirator fit-test in accordance with this Section.

- e. A current (i.e., within the last month) signed and notarized statement disclosing all OSHA, EPA, and DOT citations/violations within the past three (3) years for the company performing the PCB Abatement.
5. Analytical Laboratory Qualifications for Analyzing Suspect PCB-Containing Materials and Wastes: Submit the name, address, and telephone number of each analytical laboratory selected to perform the analyses of waste samples (solid and liquid), air samples collected for Area Monitoring and Exposure Monitoring purposes, and paint/bitumastic coating samples collected to classify painted/coated surfaces. The analytical laboratory shall be currently accredited by the American Industrial Hygiene Association (AIHA) and the New York State Department of Health's (NYSDOH's) Environmental Laboratory Approval Program (ELAP). Provide copies of current AIHA and ELAP certificates along with dates of accreditation/reaccreditation. ELAP certificates must show evidence of certification for the specific analytical methods that will be used to analyze each type of sample that will be collected.
- B. Field Reports and Recordkeeping: During all Work performed under this Section, the Contractor shall maintain and provide the following documentation:
- 1. Air Monitoring Documentation: All PCB Air Monitoring results and daily Air Monitoring reports shall be provided to the DEP as soon as possible, but no later than seven (7) calendar days from the date the samples are collected. The results shall be signed by the laboratory employee who analyzed or supervised the analysis of the samples, as well as the Air Monitor that physically performed the Air Monitoring activities at the work site. All laboratory analytical results shall be accompanied by complete COC documentation.
 - a. Each daily Air Monitoring report shall be signed by the Contractor's employee who generated the report. The content of these reports shall include, but is not limited to, the following information: (a) sample "start" and "stop" times; (b) flow rates (initial and final) for each sample; (c) the total volume of air collected for each sample; (d) sample location descriptions/sample location drawings/names of individuals being sampled; (e) types (i.e., makes and models) of sampling equipment used; (f) types of sample media (i.e., filters and cassettes) used; (g) the most recent calibration dates, along with the calibration results, for the sampling equipment used; (h) the name of the Air Monitor that conducted the Air Monitoring; (i) dates that the Air Monitoring

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was conducted; (j) work tasks being performed during the Air Monitoring; (k) unique sample numbers used to identify each sample; and, (l) highlighting of all PEL exceedances.

2. Waste Documentation: Completed and signed waste manifests from TSDFs shall be provided to the DEP as soon as possible but no later than thirty (30) calendar days of disposal. In addition, on-site waste storage areas shall be inspected weekly by the PCB waste manager, who at a minimum shall satisfy the qualification requirements set forth in this Section.
 - a. Each waste storage area inspection shall be coordinated with the Engineer, documented in the form of a written report, and each report shall be signed by the Contractor's employee who generated the report. All reports shall be provided to the DEP within 24-hours of the date the inspection is completed. The content of these reports shall include, but is not limited to, the following information: (a) the name of the individual that conducted the inspection; (b) descriptions of waste streams being stored; (c) types and quantities of waste containers being used; (d) the current disposal status (i.e., when each waste container is scheduled to be removed from the work site) and physical condition of each waste container; (e) the presence/absence of proper labeling for each waste container in accordance with this Section and federal, state, and local regulations; (f) secondary containment systems being used; (g) the methods being used to secure/lock each waste storage area to prevent any unauthorized entry.
 - b. In addition to performing weekly waste storage area inspections, the PCB waste manager shall also maintain an ongoing waste inventory. The waste inventory shall be coordinated with the Engineer, and the content of the inventory record shall include, but is not limited to, the following information: (a) specific dates that each waste container was added/removed from the waste storage area; (b) the full name (printed) and signature of the individual responsible for adding/removing each waste container from the waste storage area.
3. PCB Control Area Inspection Documentation: PCB Control Areas shall be inspected daily by the Competent Person, who at a minimum shall satisfy the qualification requirements set forth in this Section.
 - a. Each daily PCB Control Area inspection shall be documented in the form of a written report, and each report shall be signed by the Contractor's employee who generated the report. All reports shall be provided to the DEP no later than 24-hours after the inspection is completed. The content of these reports shall include, but is not limited to, the following information: (a) the types of work being performed; (b) the names of the PCB workers, Competent Person,

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PCB waste manager, and Monitor on site, as well as the name of the company each individual is representing; (c) the types of Air Monitoring (i.e., Exposure Monitoring or Area Monitoring) being conducted, and the number of samples being collected for each type of Air Monitoring activity; (d) any non-compliance issues observed (i.e., observations that conflict with the requirements of the Contractor's PCB Management Plan, this Section, DEP EHS Policies and Procedures, or federal, state, and local regulations) along with the corrective actions that were taken to achieve compliance.

4. Contractor Project Record: The Contractor's Competent Person shall maintain a project record at the work site. The Contractor Project Record shall be made available to the Engineer or DEP for review at any time during the Work, and shall be submitted to the DEP within 24-hours after the completion of the Work.
 - a. At a minimum, the Contractor Project Record shall contain the following information: (a) copies of training certificates for all individuals involved with the Work; (b) copies of all Air Monitoring results generated during the Work; (c) copies of all available caulking and paint chip/bitumastic coating sample analytical data and survey reports related to the Work; (d) copies of all daily sign-in sheets as required in this Article; (e) a list of emergency phone numbers, including the local fire department, local police department, nearest hospital, as well as phone numbers for the Engineer and DEP personnel responsible for administering the Work; (f) a copy of 40 CFR 761; (g) copies of all SDSs pertaining to all chemicals being used during the Work; (h) a copy of this Section and the related Drawings; (i) a copy of the Contractor's PCB Management Plan; (j) copies of all daily PCB Control Area inspection records; (k) copies of all weekly waste storage area inspection records; (l) a copy of the waste inventory; (m) copies of all DEP EHS Policies and Procedures referenced in this Section (n) a copy of the Contractor's Hazard Communication (HAZCOM) program.
5. Daily Sign-In Sheets: The Contractor shall generate daily sign-in sheets for all individuals entering and exiting each PCB Control Area for the duration of the Work. The daily sign-in sheets shall be maintained by the Competent Person, and shall be made available to the Engineer or DEP for review at any time during the Work. All daily sign-in sheets shall be submitted to the DEP within 24-hours after the completion of the Work.
 - a. At a minimum, each daily sign-in sheet shall include: (a) the individual's full name (printed); (b) the individual's signature; (c) the name of the company the individual is representing; (d) the time of entry and exit from each PCB Control Area; and (e)

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verification by the Competent Person that the individual meets the applicable training requirements, if the individual intends to enter a PCB Control Area.

6. HAZCOM Program: The Contractor's HAZCOM program shall be made available to the Engineer or DEP for review at any time during the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Respirators: The Contractor shall select respirators approved by the NIOSH for use in areas where paints/bitumastic coatings, dusts, materials, or wastes containing contaminants may be disturbed. At a minimum, the Contractor shall provide each individual with a half-face, negative pressure, air purifying respirator equipped with HEPA/P-100 Filter cartridges and Organic Vapor Cartridges, until Exposure Monitoring results indicate that respiratory protection can be modified. The Contractor's CIH shall make all determinations regarding respiratory protection modifications that will be implemented for the Work. All modifications shall be in accordance with OSHA requirements, the Contractor's PCB Management Plan, and any relevant Asbestos Work Plan or Lead Management Plan associated with the Work.
- B. PPE: The Contractor shall provide personnel who have a potential to be exposed to materials or wastes containing contaminants, with appropriate PPE as prescribed by the Contractor's CIH.
- C. HEPA Filters: HEPA/P-100 Filters used in vacuuming equipment, power tools, and local exhaust equipment must meet or exceed any manufacturer's specifications and recommendations, as well as specifications presented in the Standard for Safety High Efficiency, Particulate, Air Filter Units (UL 586).
- D. Waste Containers: Containers for the storage of all PCB Wastes shall be DOT-approved, and shall be provided by the Contractor.
- E. Abrasives: Mechanical paint/bitumastic coating removal equipment shall not use any products containing crystalline silica, and the equipment shall not utilize any

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non-recoverable materials or any cutting materials which introduce toxic or hazardous materials into the environment.

- F. Chemical Strippers: The Contractor shall utilize an environmentally safe chemical paint stripping system, with demonstrated suitability and efficiency in preparing cast-in-place concrete, cement, and plaster surfaces that are free of any visible residues of paints/bitumastic coatings. The system shall include non-alkaline or alkaline strippers that provide the lowest possible level of toxicity consistent with the types of paints/bitumastic coatings to be removed. Neutralization products and procedures shall be provided for all alkaline stripping systems, no stripping system shall contain methylene chloride, and the stripping system shall be low in volatile organic compounds (VOCs).

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Hygiene Facilities: The Contractor shall provide functional Hygiene Facilities as defined in this Section that are appropriate for the types of Work to be performed under this Section. The Contractor shall ensure that employees do not leave a PCB Control Area wearing any potentially contaminated PPE. Using compressed air to dislodge dust from clothing/PPE shall be strictly prohibited. The Contractor shall collect, test, and properly dispose of all wastewater generated from Hygiene Facilities.
1. Handwash Stations: The Contractor shall provide functioning handwash stations on all projects that disturb PCB-Containing Materials with a PCB concentration equal to or greater than 50 ppm, or PCB Wastes. Handwash stations shall have running water at the tap, clean towels, and soap per 29 CFR 1926.51. Substituting “hand wipes” in place of soap and running water will not be acceptable.
 2. Showers: The Contractor shall provide shower facilities for use by employees whose airborne exposure to PCBs is above an OSHA PEL. When shower facilities are necessary, employees are required to shower at the end of the work shift each day prior to leaving the PCB Control Area that they are working in.
- B. Utilities: The temporary use of any on-site utilities shall be subject to the approval of the DEP. The Contractor shall furnish all water and hoses needed for the Work, as well as any temporary hookups. Also, the Contractor shall supply all heating equipment and water filtration devices needed for the Work. In addition, all temporary lighting and temporary electrical service to a PCB Control Area shall

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be provided by the Contractor, and shall be in weather-proof enclosures and be ground fault protected.

- C. Signs: The Contractor shall post conspicuous warning signs at all approaches to work areas and waste storage areas. The signs shall be located at such a distance so that personnel may read the sign and take the necessary precautions before entering a work area or waste storage area. Signs shall comply with federal, state, and local regulations, including the requirements of OSHA. Signs shall not be removed until all Abatement, removal, and construction/demolition activities have been completed. At a minimum, each sign shall bear the following information in English and the predominant language that is spoken by the Contractor's employees if English is not spoken:

WARNING
PCB WORK AREA
POISON
NO SMOKING OR EATING

1. Each sign shall be appropriately modified to include additional warnings for other contaminants that are identified during Exposure Monitoring.

- D. Physical Boundary Delineation: The Contractor shall clearly delineate each work area and waste storage area with a Physical Boundary as defined in this Section.

- E. Work Area Preparation: The Contractor shall utilize HEPA-filtered vacuums, and wet methods during the initial cleaning of each work area. Prior to removal from each work area, all movable objects and mounted objects that can be removed shall be pre-cleaned using HEPA-vacuums and wet methods. Fixed objects that must remain within each work area shall be pre-cleaned using HEPA vacuums and wet methods, and subsequently covered with 6-mil polyethylene sheeting.

3.02 IMPLEMENTATION

- A. Bulk Removal

1. Protection of Existing Work to Remain: All Work involving the disturbance of PCB-Containing Materials and PCB Wastes must be conducted without damage to, or contamination of equipment or surfaces within the work areas or other areas adjacent to the work areas. All such damage or contamination shall be immediately corrected and cleaned up by the Contractor at the Contractor's expense.
2. Prohibited Activities: Contractors shall not conduct activities that are prohibited by OSHA and EPA regulations. The following activities are prohibited, regardless of whether they are conducted subject to an exposure assessment and written compliance program: (a) burning-off paints/bitumastic coatings; (b) using heat guns operating above 1100° F; (c) dry machine sanding, grinding, or blasting paint without a HEPA

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vacuum exhaust tool; (d) uncontained hydroblasting or high-pressure washing; (e) welding painted/coated surfaces unless the paint/coating is removed at least 4-inches from area of heat application (per 29 CFR 1926.345(c)(1)), and local exhaust ventilation is used.

3. Test Patches: Prior to choosing the paint removal method(s) for paints/bitumastic coatings, the Contractor shall perform test patches on surfaces subject to Abatement or spot removal, to determine if the method(s) meet the requirements of this Section
4. Mechanical Removal Equipment: The use of mechanical equipment to remove asbestos-containing caulking or bitumastic coatings will require compliance with DEP (RCNY Title 15, Chapter 1) or NYSDOL (12 NYCRR 56) asbestos regulations, including the use of a full containment enclosure under negative air pressure.
 - a. When removing paints/bitumastic coatings from metal surfaces, the paints/bitumastic coatings must be removed to the extent that only the bare metal remains (i.e., no mill scale remains). In the case of substrates other than metal (e.g., concrete, brick, and block), paints/bitumastic coatings shall be removed from the surface of the substrate to the extent that flaking and peeling will not occur subsequent to the performance of the Work. Acceptance of the Work shall be contingent upon inspection of the substrate surfaces by the Engineer, and must demonstrate the absence of residual paint/coating layers that can be physically measured, pried loose, or peeled away using a scraping device. The Contractor may only use products and tools meeting the performance specifications outlined below:
 - 1) The Contractor shall utilize a vacuum-assisted power tool system with demonstrated suitability and efficiency in preparing metal surfaces to the SSPC SP-11 standard, and with demonstrated effectiveness in maintaining PCB emissions below OSHA exposure limits during the disturbance of paints/bitumastic coatings. Such systems may include dustless needle guns, dustless rotopeens, and dustless right angle grinders, all of which capture dust and debris at the cutting tool edge, and transport the material under vacuum conditions to an air-tight disposal container. Dustless needle guns shall only be utilized on metal surfaces.
 - 2) The vacuum-assisted power tool system shall also be designed to permit the removal and replacement of collection containers under negative pressure in order to prevent the release of dusts. The system shall be equipped with an automatic “shut-off” in the event of vacuum failure.

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- 3) Abrasive/recovery tools shall be monitored at all times by a device capable of determining recovery at the face of each tool, and capable of automatically disabling the tool in the event that recovery levels are insufficient. The monitor, at a minimum, shall have the following features: (a) a remote warning light; (b) an adjustable recovery set point; (c) automatic equipment disabling capabilities; (d) a sensing range of 0.5 pounds per square inch (psi); (e) solid state photohelic instrumentation; (f) remote sensing at the face of the tool.
 - 4) The safe recovery point shall be calibrated each day before start-up, or each time a new tool or vacuum source is used. All manufacturer recommendations shall be followed with respect to the set up and use of the monitor, and the manufacturer's operations manual shall be kept on site at all times. A daily log shall be maintained by the Contractor, identifying all calibrations of recovery levels, as well as any "down time" as a result of insufficient recovery levels.
 - 5) The cutting head of the vacuum-assisted power tool system that is used on flat surfaces shall be capable of cutting to within 1-1/2" of any inside corner, molding, or edge, and may include dustless rotopeens or dustless needle guns. Tools for corners and moldings shall be specifically designed for that purpose, and conform to all inside corners, outside corners, curved, flat, and angled surfaces that are to be abated under this Section. These tools shall also maintain vacuum control at the Work surface/cutting head interface at all times. HEPA vacuum-shrouded needle guns may be used for non-flat surfaces in accordance with manufacturer recommendations. Vacuum-assisted finishing tools, such as right angle grinders, may be used to achieve the SSPC SP 11 standard, but may not be used for primary removal.
 - 6) Vacuum-assisted power tool systems meeting all of the specifications outlined herein, may be used pending the submittal of all required performance documentation, and their acceptance by the Engineer. Any tools which do not meet all of the specifications outlined herein, shall be removed from the project site immediately, and shall not be used for the Work to be performed under this Section.
5. Chemical Strippers: Acceptance of the Work shall be contingent upon inspection of the abated substrate surfaces by the Engineer and must demonstrate the absence of residual paint/bitumastic coating layers that can be physically measured, pried loose, or peeled away using a scraping

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device. The Contractor may only use products and paint stripping systems meeting the performance sections outlined below:

- a. The Contractor shall utilize a chemical paint stripping system with a demonstrated effectiveness in maintaining PCB emissions below OSHA exposure limits during the disturbance of paints/bitumastic coatings. The Contractor shall utilize a mechanical ventilation system during the Work that exhausts away from occupied areas. The application of all paint stripping systems shall be in accordance with manufacturer recommendations.
- b. The Contractor should note that more than one (1) product may be required to strip PCB-containing paints/bitumastic coatings. The use of multiple products shall be in accordance with work practices approved by the individual manufacturer of each chemical paint stripping compound.
- c. All chemical paint stripping products shall be presented to the Engineer for approval prior to the start of any Work to be performed under this Section. When presenting the products to the Engineer, they shall be in the manufacturer's unopened, original containers bearing accurate information regarding the products. Also, the manufacturer's labels on each container shall be intact and legible.
- d. Chemical paint stripping systems meeting all of the requirements outlined herein, may be used pending the submittal of all required performance documentation, and its acceptance by the Engineer. Any products which do not meet all of the specifications outlined herein, shall be removed from the project site immediately, and shall not be used for the Work to be performed under this Section.

3.03 FIELD TESTING / QUALITY CONTROL

A. Air Monitoring

1. **Exposure Monitoring:** For Work involving the disturbance of any detectable concentration of PCBs, the Contractor shall collect personal air samples from employees who are anticipated to have the greatest risk of exposure, as determined by the Contractor's CIH or Competent Person. Personal air samples shall be collected during every work shift from at least one (1) employee that is representative of each type of work task that is being performed. Each personal air sample shall "run" for the employee's entire work shift in order to ensure that enough volume (of air) is collected and an accurate 8-hour TWA can be calculated. Documentation regarding the sample numbers, specific shift when the sampling was conducted, the work tasks that were sampled, the dates of sampling, the employee hours that were worked during the shift, and the total sampling times, shall accompany each laboratory COC form.

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- a. If PCB concentrations being disturbed are less than 50 ppm, Exposure Monitoring may be discontinued following a complete negative exposure assessment and approval from the Engineer and the Contractor's CIH. A negative exposure assessment is defined as current initial exposure monitoring using breathing zone air samples representing the 8-hour TWA exposure for each individual who are representative of each task being conducted. Following discontinuation of exposure monitoring, if there is a change to work practices, exposure monitoring shall again be performed until a second negative exposure assessment is conducted and analyzed.
2. Area Monitoring: If PCB concentrations being disturbed are greater than or equal to 50 ppm, the Contractor shall collect a minimum of two (2) area air samples outside of each PCB Control Area on a daily basis for the duration of the Abatement, removal, or construction/demolition Work, as well as any other Work involving the disturbance of PCB-Containing Materials or PCB Wastes. During sampling activities, all air sample filter cassettes shall be positioned approximately five to six feet above the ground (in order to simulate an individual's breathing zone), and shall not be placed immediately adjacent to obstructions (e.g., walls or columns) which may restrict the flow of air to the filter cassettes. Each air sample shall be analyzed for all contaminants identified during the exposure assessment. If area Air Monitoring indicates an emission level in excess of an OSHA PEL outside of a PCB Control Area, all Work in that area shall be stopped immediately. The Contractor shall then take immediate corrective actions to reduce emission levels to below the OSHA PEL(s), and the Contractor shall clean all adjacent areas that may have become contaminated due to the emissions. Documentation regarding the sample numbers, sample locations, the dates of sampling, the employee hours that were worked during the shift, and the total sampling times, shall accompany each laboratory COC form.
3. Documentation: Complete documentation of all Air Monitoring activities shall be in accordance with this Section.
4. The Contractor shall submit all Air Monitoring results to the DEP as soon as possible, but no later than seven (7) calendar days from when the air samples were collected.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Cleanup and Disposal

1. Cleanup: The Contractor shall maintain all surfaces, including protective coverings (polyethylene sheeting) within each work area, free of accumulations of paint chips/coating debris, dusts, and wastes. The Contractor shall perform housekeeping activities daily throughout each

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work shift and at the end of each work shift, in order to prevent any accumulation of paint chips/coating debris, dusts, and wastes in the work areas. Dry sweeping and using compressed air to cleanup a work area shall be strictly prohibited. HEPA-filtered vacuums and wet methods shall be used to ensure that each work area remains free of visible paint chips/coating debris, dusts, and wastes.

2. **Equipment Decontamination:** All reusable equipment (e.g., hand tools and power tools) that has been in contact with materials that have a PCB concentration greater than or equal to 50 ppm and PCB Wastes, shall be thoroughly decontaminated prior to being removed from the PCB Control Area in accordance with 40 CFR 761.79(c)(2)(i), which permits “swabbing surfaces that have contacted PCBs with a solvent.” The solvent shall be a PODF as defined in 40 CFR 761.79(c)(3)(iv)(C) or (D). Used decontamination materials (e.g., rags used to swab equipment) shall be collected, stored, and disposed of in accordance with this Article.
3. **Sampling and Laboratory Analysis of PCB-Containing Wastes:** For PCB Waste characterization, the PCB waste manager shall sample all potential PCB-containing waste streams in accordance with the TSCA (40 CFR 761). According to the EPA, characterizing PCB-containing waste streams (i.e., determining whether wastes are regulated or non-regulated under TSCA) shall be made based upon the total PCB concentration at the “source” (e.g., the paint/bitumastic coating) prior to any disturbance that may be initiated through Abatement, removal, or construction/demolition activities. Unlike hazardous waste determinations that are made under RCRA (40 CFR 261), sampling to determine whether a waste is TSCA-regulated shall not be made based on the sampling and analysis of mixed bulk waste materials/debris generated as a result of Abatement, removal, or construction/demolition activities. Instead, source materials for PCBs must be collected as grab samples and must not be composited during collection or analysis as that may reduce the concentration of PCBs detected. Rather, individual source samples shall be submitted for analysis to determine the highest concentration of PCBs contained in the source material or wastes.
 - a. PCB concentrations are based on the cumulative total of the nine (9) Aroclor congeners (aka PCB compounds) analyzed by EPA Methods SW 846-8082A (soxhlet extraction method 3540) by Gas Chromatography.
 - b. If PCB concentrations in paints/coatings are present greater than or equal to 50 ppm, all PCB-containing waste generated during paints/coatings disturbance will be classified as TSCA-regulated PCB waste. If PCB concentrations in paints/coatings are less than 50 ppm, all PCB-containing waste generated in the area will be classified as non-TSCA PCB-containing waste.

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- c. If it cannot be confirmed that the source of drummed waste (e.g., paints/coatings) is non-TSCA-regulated, or no source samples are available, or the soxhlet extraction method 3540 was not used for previous analyses, then four (4) biased worse-case grab samples shall be collected from the drum and each sample analyzed for Total PCBs. If any one grab sample result has a PCB concentration of equal to or greater than 50 ppm, the drummed waste shall be characterized as TSCA-regulated waste.
- d. Waste materials/debris generated during Abatement, removal, or construction/demolition activities may be classified as RCRA or NYSDEC hazardous waste (6 NYCRR Part 371.4(e)) in addition to being TSCA-regulated. Therefore, wastes/debris must still be sampled and characterized prior to disposal. All waste samples shall be collected in the presence of the Engineer using the following procedure:
 - 1) Sampling of drummed waste will be biased for the worst-case (highest result) and will be based on inspection of drum contents. For drums with paint chips, with or without stripper waste, collect one grab sample for every quarter of the drum, from any hot spots (i.e., paint chips). As an example, if the drum is full, collect four grab samples, if the drum is half-full, collect two grab samples, and if the drum is one-tenth full, collect one sample. Grab samples shall be composited into one (1) bulk composite sample. For drums with PPE, polyethylene sheeting, rags and towels, collect up to four (4) grab samples with positive bias for paint chips or paint-related staining. As such, samples are likely to be collected from dust or chips at the bottom of the drum. Each grab sample shall be composited into one (1) bulk composite sample, labeled and submitted to a laboratory that satisfies the requirements set for in this Section. Composite samples shall undergo Toxicity Characteristic Leaching Procedure (TCLP) analysis for the eight (8) RCRA metals and Total PCBs to determine if waste is a NYSDEC hazardous waste (i.e., listed waste B007).
 - 2) The Contractor shall also direct the laboratory to analyze each sample for any additional parameters that are required by the specific TSDF being used. Furthermore, if the waste stream is associated with the use of a chemical paint stripping system, the Contractor shall have the laboratory analyze each sample for pH and any other RCRA characteristic that may fail due to the chemical composition of the waste. The Contractor shall ensure that the laboratory

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being used to satisfy the requirements of this Section is also capable of performing these additional analytical tests.

- 3) One (1) representative wastewater sample shall be collected for laboratory analysis from each drum generated. Each sample shall be collected using appropriate field sampling equipment (e.g., a pipette or bailer), and shall be labeled and submitted to a laboratory that satisfies the requirements of this Section.
4. **Sampling and Laboratory Analysis of PCB-Containing Demolition Debris:** The Contractor shall collect representative bulk samples of anticipated demolition wastes to determine proper disposal. In addition to a total PCB analysis of the source materials (e.g., paints/bitumastic coatings), representative bulk samples shall be collected from painted/bitumastic-coated building materials for TCLP analysis for the eight (8) RCRA metals and Total PCBs to determine if waste is a NYSDEC listed hazardous waste (i.e., listed waste B007).
 - a. **Scrap Metal Exemption for Recycling:** Under 6 NYCRR Part 371.1(c)(7), painted scrap metal can be sent to a recycling facility, rather than be discarded as hazardous waste. In order for the DEP to submit a “c7 notification” to the NYSDEC and claim the “scrap metal exemption,” the Contractor must first submit notification to their recycling facility indicating that PCBs are present on the scrap metal in concentrations less than 50 ppm. If concentrations are greater than or equal to 50 ppm, the scrap metal cannot be recycled and instead must be disposed of as a TSCA-regulated waste. If Lead or other heavy metals are detected in the paints/bitumastic coatings on the scrap metal, the Contractor shall also disclose this information to the recycling facility. The Contractor shall receive written permission from the recycling facility indicating that the facility will accept the PCB paint/bitumastic coated scrap metal generated during the Work to be performed under this Section. The Contractor shall submit this documentation to the Engineer for approval prior to disposal.
 - b. Bulk demolition debris (e.g., painted concrete) that is sampled and determined to be non-RCRA-regulated and non-TSCA-regulated waste may be disposed of as construction and demolition (C&D) debris.
5. **Collection, Separation, and Containerization of Wastes:** The Contractor shall collect, separate (by waste stream/waste type), and containerize PCB containing wastes (solid and liquid), debris, PPE, and containment materials on a daily basis in accordance with the PCB Safe Work Practices or PCB Management Plan.

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- a. If any source sample from a specific work area indicates that PCBs in paints/coatings are greater than or equal to 50 ppm, then all waste from that area will be characterized as TSCA-regulated waste. All waste streams must be segregated into separate drums and labeled with PCB waste labels, including out of service date (when PCB waste is first placed in the drum) in addition to RCRA hazardous waste labels (pending analysis). This may include one or more drums for paint chips, chemical stripper waste, and HEPA filters associated with HEPA vacuums. Other waste such as PPE, rags and polyethylene sheeting from a specific work area may be comingled in drums separate from the drums containing paint chips, stripper waste and HEPA filters.
- b. If all source samples from a specific work area indicate that PCBs in paints/coatings are less than 50 ppm, then all PPE, poly and paint/coating waste from that area will be characterized as PCB-containing non-hazardous or hazardous waste pending TCLP analysis of the eight (8) RCRA metals in the waste stream, and should not be managed as C&D debris. Drums should be labeled with RCRA hazardous waste labels (pending analysis). All waste streams shall be segregated into separate drums. Paint chips and HEPA filters shall be drummed as one waste stream from each work area, and polyethylene sheeting, rags, paper towels and PPE from each work area will be drummed as a separate waste stream.
- c. The Contractor shall store all wastes in DOT-approved container systems. No drum/container shall be filled in excess of the capacity marked on the drum/container. All drums/containers shall be sealed and covered immediately after filling, and each drum/container shall have a label affixed to it in accordance with the requirements of this Section. All labels shall remain intact and legible at all times.
- d. No water mixed with or contaminated by hazardous waste may be released onto the ground or into any drain or sewer. It should be noted that a discharge of more than 1 lb. of PCBs onto the ground or into the water within a 24-hour period, shall be considered a violation of the Clean Water Act and shall be treated as a “reportable quantity” in accordance with 40 CFR 117. Such a release shall be grounds for immediate termination of this Contract, and the Contractor shall be liable for any fines, penalties, or remediation costs.
- e. The Contractor shall store non-hazardous wastes separately from hazardous wastes and TSCA-regulated wastes, shall provide all non-hazardous waste containers, and shall make all transportation and disposal arrangements for non-hazardous wastes in accordance with federal, state, and local regulations. TSCA-regulated PCB

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waste must be disposed within 180 days subject to the requirements of 40 CFR 761.65, in addition to any RCRA hazardous waste storage requirements (i.e., 90 days), as applicable.

6. **Storage of Wastes:** The Contractor shall ensure that all drummed wastes are stored in a secondary containment system, and that each waste storage area is demarcated with a Physical Boundary. In addition, the Contractor shall post weekly waste inspections and waste inventories in the regulated waste storage area, as required in this Section, as well as the following emergency information in accordance with DEP EHS Policies and Procedures: (a) the name and telephone number of the facility's Emergency Coordinator; (b) the location of fire extinguishers and fire alarms; (c) the location of spill control materials; (d) the telephone number for the fire department (unless the facility has a direct alarm).
7. **Labeling:** The Contractor shall affix warning labels to all PCB Waste and hazardous waste drums/containers. Labels must be filled out completely at the point of generation when waste is first containerized. Labels shall comply with the requirements of federal, state, and local regulations. PCB labels shall be used to designate PCB waste, including out-of-service date, in addition to RCRA hazardous waste labels. At a minimum, all PCB and hazardous waste labels shall bear the following information in English:

CAUTION
CONTAINS PCBs

A toxic environmental contaminant requiring special handling and disposal in accordance with U.S. Environmental Protection Agency Regulations 40 CFR 761 – For Disposal Information contact the nearest U.S.EPA Office
[Out-of-Service Date – when PCB waste is first placed in drum]

HAZARDOUS WASTE
FEDERAL LAW PROHIBITS IMPROPER DISPOSAL

HANDLE WITH CARE

[Generator Name, Address, and Telephone Number]
[Specific Contents of Container]
[EPA-Issued Generator Identification Number]
[EPA Waste Identification Number]
[Accumulation Start Date]
[Accumulation End Date]

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- a. Since waste classification is pending analysis for RCRA/NYSDEC hazardous waste, the RCRA hazardous waste labels shall indicate “PCB/Hazardous Waste - Pending Analysis.”
8. Disposal of Wastes: All waste profiles for containerized wastes must be reviewed by the Engineer and signed by the DEP as the generator of the waste streams. The Contractor shall notify the DEP at least 14 business days prior to the removal of any waste drums/containers, so that the DEP can inspect the drums/containers and the waste manifests. As per 40 CFR Part 761.207, a Uniform Hazardous Waste Manifest shall be completed for TSCA-regulated and/or NYSDEC hazardous wastes. Wastes shall be disposed of to ensure that drums/containers do not remain on the job site for more than 90 calendar days from the initial “accumulation start date” on the label affixed to the drum/container. Containers that have reached their storage capacity shall not remain on site, and transportation arrangements shall be made for their immediate removal.
- a. Small Capacitors and Fluorescent Light Ballasts: Small Capacitors and Fluorescent Light Ballasts are not classified as hazardous wastes under NYSDEC regulations (6 NYCRR 371.3(e)). However, these items are assumed to contain PCBs, and therefore must be disposed of as PCB Bulk Product Wastes unless marked “No PCBs” by the manufacturer. Small Capacitors and Fluorescent Light Ballasts that are not marked “No PCBs” or are leaking (regardless of PCB concentration), must be managed at one of the following facilities in accordance with 40 CFR 761.62(a): (a) in facilities using a TSCA-approved incinerator; (b) at a TSCA/RCRA-permitted landfill; (c) in facilities using an approved alternate method of destroying PCBs; (d) at a facility using an approved method of removing/decontaminating PCBs; (e) using a TSCA PCB Coordinated Approval issued by the EPA Regional Administrator.
9. Disposal Documentation: The Contractor shall submit written evidence that the TSDF receiving PCB Wastes is approved by federal, state, and local regulatory agencies to receive TSCA-regulated wastes. If asbestos or heavy metals (as defined in Section 02 82 05 - Asbestos Management and Section 02 83 05 - Lead Management) were detected in the wastes, the Contractor shall also ensure that the TSDF is approved by federal, state, and local regulatory agencies to receive these wastes. Once all waste profiles have been completed, the Contractor shall provide the DEP a “Letter of Approval” issued from the TSDF indicating that the wastes will be accepted. The Contractor shall submit one (1) copy of the completed manifest that has been signed and dated by the initial transporter and TSDF in accordance with 6 NYCRR 372 and 40 CFR 262, to the DEP. All waste profiles, manifests, and Land Disposal Restrictions (LDRs) must be signed by a DEP employee per Section 01 35 44 - Hazardous Materials Control.

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END OF SECTION

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**SECTION 02 84 10 – MERCURY MANAGEMENT
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section details the requirements for construction and demolition activities affecting materials containing mercury, as shown on the Drawings, specified herein, or required to complete the Work, including all mercury and mercury-containing equipment identified and impacted by the Work. All Work under this Section shall be performed using methods that have a demonstrated effectiveness in minimizing the quantity of hazardous waste generated; protecting the health and safety of all site personnel and the welfare of the public; and avoiding adverse environmental impacts.
- B. The Contractor shall perform the removal and recycling/disposal of additional materials containing mercury not shown on the Drawings. Unless otherwise specified, the Work of this Section shall also be performed in accordance with the most current DEP Environmental Health and Safety (EHS) Policies and Procedures (including Mercury Management, Hazardous Waste Management, and Spill Prevention, Environmental Release Reporting and Investigation), DEP Bureau of Engineering Design and Construction (BEDC) EHS Standards, and applicable federal, state, and local regulations.
- C. All mercury-containing wastes generated during this Contract Work that qualify as Universal Wastes under federal, state, or local regulations, must be recycled (and not disposed of as hazardous wastes) regardless of the quantity of wastes generated.
- D. The Contractor shall perform all Work under this Section without damaging or contaminating adjacent areas to where the Work is being performed. Where such areas are damaged or contaminated, as determined by DEP, the Contractor shall restore the areas to their original condition at no additional cost to the City.
- E. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.
- B. Except for unforeseen mercury-containing materials and related Work payable under the allowance, as described in Section 01 35 45 – Hazardous Materials Control, no separate payment will be made for performing any Work required under this Section and the Contractor shall include all costs thereof in its lump sum price bid for the Contract.
- C. Payment for disposal of mercury-containing materials and mercury wastes will not be made until a signed copy of the manifest from the recycling facility/Treatment, Storage, and Disposal Facility (TSDF), certifying the amount of mercury-containing materials and mercury wastes delivered is returned with complete chain-of custody (COC) documentation to DEP.

1.03 RELATED SECTIONS

- A. Section 01 35 27 - Environmental Health and Safety Requirements
- B. Section 01 35 45 - Hazardous Materials Control
- C. Section 01 74 20 - Construction Waste Management
- D. Section 02 83 05 - Lead Management
- E. Section 02 84 05 - PCB Management

1.04 REFERENCES

- A. Definitions
 - 1. Certified Industrial Hygienist (CIH): Refers to an individual employed by the Contractor or its Subcontractors who is currently certified by the American Board of Industrial Hygiene (ABIH).
 - 2. Competent Person: Defined by OSHA as one who is capable of identifying existing and predictable hazards in the surroundings or working conditions, and who has authorization to take prompt corrective measures to eliminate them. The Competent Person shall fulfill the requirements of this Section.

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Duties of the Competent Person include the following: (a) determining prior to the performance of the Work, what contaminants are present in the workplace; (b) establishing work areas and assuring that access to and from those areas is limited to authorized personnel; (c) assuring the adequacy of any employee exposure monitoring required by OSHA; (d) assuring that all employees exposed to airborne contaminant levels above Action Levels, Permissible Exposure Limits (PELs), or Recommended Exposure Limits (RELs) wear appropriate Personal Protective Equipment (PPE), respiratory protection, and are trained in the use of appropriate methods of exposure control for all of the contaminants present; (e) assuring that proper hygiene facilities are provided and that workers are trained to use those facilities; (f) assuring that engineering controls specific to the contaminants present are implemented, maintained in proper operating condition, and functioning properly

3. DOT Hazardous Materials Transportation Training: Training that meets the criteria outlined in 49 CFR 172.704. This training shall include discussions from 49 CFR 171 of the following: (a) hazardous materials tables within 49 CFR 172; (b) material packaging and labeling within 49 CFR 178; (c) shipping papers and placards within 49 CFR 173; (d) material loading and segregation within 49 CFR 173.
4. Hazardous Waste Operations (HAZWOPER) Training: Training that meets the criteria outlined in the OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). A minimum of 24-hour HAZWOPER Training will be required for Work being performed under this Section. However, certain types of Work may require 40-hour HAZWOPER Training. All decisions regarding the specific HAZWOPER Training that will be required for each work task shall be made by the Engineer.
5. High-Efficiency Particulate Air (HEPA) Filter: A filter designed to remove 99.97% of all particles greater than 0.3 micrometers (μm) in diameter. For the purpose of this Section, HEPA vacuum equipment used by the Contractor shall meet the Standard for Safety High-Efficiency, Particulate, Air Filter Units (UL 586) developed by Underwriters Laboratories.
6. Mercury-Containing Material: Material or device that contains a detectable amount of elemental mercury, inorganic mercury compounds, or organic mercury compounds. Mercury-Containing Materials may include, but are limited to, the following: batteries, light bulbs, thermometers, thermostats, barometers, manometers, temperature gauges, pressure gauges, and switches.
7. Mercury Awareness Training: Training for individuals that have the potential to be exposed to Mercury-Containing Materials or Mercury Wastes. This training shall include discussions of the following: (a) sources of mercury; (b) current federal, state, and local regulations pertaining to

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mercury; (c) the health effects of mercury exposure; (d) state-of-the-art work practices, engineering controls, and procedures for removal, materials handling, waste management, housekeeping, and spills that involve mercury; (e) the use and maintenance of PPE and the use and maintenance of respirators in accordance with 29 CFR 1910.134; (f) requirements regarding warning signs, labeling, and Safety Data Sheets (SDSs) in accordance with 29 CFR 1910.1200; (g) responsibilities of the Competent Person.

8. Mercury Waste: Non-specific liquid or solid waste generated during the disturbance, removal, construction/demolition, handling, and cleanup of Mercury-Containing Materials.
9. P-100 Filter: (See definition of: “High-Efficiency Particulate Air (HEPA) Filter”).
10. Physical Boundary: A physical barrier designated with ropes, red “do not enter tape,” or a partition that surrounds a work area in order to limit the entry of unauthorized personnel and delineate “clean areas” from areas that may meet or exceed an Action Level, PEL, or REL.
11. REL: An exposure limit recommended by the NIOSH that can be expressed as a Time-Weighted Average (TWA), Ceiling Limit, or Short-Term Exposure Limit (STEL). Once an REL is met or exceeded for a particular contaminant, the Contractor is responsible for ensuring that workers receive appropriate exposure monitoring, PPE, including respiratory protection, hygiene facilities, medical surveillance, and training. The following REL is pertinent to removal, demolition, and disposal activities associated with Mercury-Containing Materials and wastes: (a) mercury – 0.05 mg/m³ as a TWA for up to a ten (10) hour workday and a 40-hour work week, and a ceiling limit of 0.1 mg/m³, as per DEP EHS Policies and Procedures - Vol. III, Mercury Management.
12. Resource Conservation and Recovery Act (RCRA) Training: Training that meets the criteria outlined in 40 CFR 265.16. This training shall include site-specific discussions of the following: (a) hazardous waste identification; (b) waste storage container use and labeling; (c) waste storage area management; (d) personal health and safety, including fire safety; (e) manifesting and the off-site transportation of wastes; (f) procedures for using, inspecting, repairing, and replacing emergency equipment and monitoring equipment; (g) procedures for communicating with other employees and outside emergency response personnel; (h) responses to fires or explosions; (i) responses to leaks, spills, and potential groundwater contamination incidents; (j) the shutdown of operations.
13. TWA: The average time over a given work period (e.g., an eight (8) hour workday) of a person’s exposure to a chemical or agent. The average is determined by sampling for the chemical or agent throughout the time period.

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14. Universal Waste: Any Mercury-Containing Material that meets the criteria outlined in the Standards for Universal Waste Management (40 CFR 273), the Standards for Universal Wastes (6 NYCRR 374-3), or the Mercury-Added Consumer Products Law (Chapter 145, Laws of New York, 2004). Per 40 CFR 273.4(b)(3), if the mercury is removed from a Mercury-Containing Material, the material can no longer be considered a Universal Waste and must be managed as a hazardous waste, or a determination must be made to characterize the material as non-hazardous.

B. Reference Standards

1. The Contractor shall comply with all applicable regulations, standards, and guidelines of federal, state, and local environmental and occupational safety and health agencies regarding Mercury-Containing Materials and Mercury Wastes. These regulations, standards, and guidelines include, but are not limited to the following:
- a. United States (U.S.) Department of Transportation (DOT):
 - 1) 49 CFR 171 - General Information, Regulations, and Definitions;
 - 2) 49 CFR 172 – Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements;
 - 3) 49 CFR 173 – Shippers: General Requirements for Shipments and Packaging’s;
 - 4) 49 CFR 178 – Specifications for Packaging’s.
 - b. U.S. Environmental Protection Agency (EPA):
 - 1) 40 CFR 116 – Designation of Hazardous Substances;
 - 2) 40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances;
 - 3) 40 CFR 260 – Hazardous Waste Management Systems: General;
 - 4) 40 CFR 261 – Identification and Listing of Hazardous Waste;
 - 5) 40 CFR 262 – Standards Applicable to Generators of Hazardous Waste;
 - 6) 40 CFR 263 – Standards Applicable to Transporters of Hazardous Waste;
 - 7) 40 CFR 264 – Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;

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- 8) 40 CFR 265 – Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;
 - 9) 40 CFR 268 – Land Disposal Restrictions;
 - 10) 40 CFR 273 – Standards for Universal Waste Management;
 - 11) 40 CFR 302 – Designation, Reportable Quantities, and Notification.
- c. New York City Department of Environmental Protection (DEP):
- 1) Environmental Health and Safety Policies and Procedures – Vol. II, Spill Prevention, Environmental Release Reporting and Investigation;
 - 2) Environmental Health and Safety Policies and Procedures – Vol. III, Mercury Management;
 - 3) Environmental Health and Safety Policies and Procedures – Vol. IV, Hazardous Waste Management;
 - 4) Environmental Health and Safety Policies and Procedures – Vol. IV, Universal Waste Management;
 - 5) 15 RCNY Chapter 19 – Discharges of Wastewater and Other Materials to Public Sewers.
- d. New York State Department of Buildings (NYCDOB)
- 1) New York State Building Code.
- e. New York State Department of Environmental Conservation (NYSDEC):
- 1) 6 NYCRR 364 – Waste Transporter Permits;
 - 2) 6 NYCRR 370 – Hazardous Waste Management Regulations;
 - 3) 6 NYCRR 371 – Identification and Listing of Hazardous Waste;
 - 4) 6 NYCRR 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities;
 - 5) 6 NYCRR 373 – Hazardous Waste Management Facilities;
 - 6) 6 NYCRR 374 – Management of Specific Hazardous Waste;
 - 7) 6 NYCRR 376 – Land Disposal Restrictions.
- f. Chapter 145, Laws of New York, 2004 – Mercury-Added Consumer Products Law.

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- g. National Institute for Occupational Safety and Health (NIOSH):
 - 1) NIOSH Pocket Guide to Chemical Hazards.
- h. Occupational Safety and Health Administration (OSHA):
 - 1) 29 CFR 1910 – Occupational Safety and Health Standards;
 - 2) 29 CFR 1910.28 – Safety Requirements for Scaffolding;
 - 3) 29 CFR 1910.120 – Hazardous Waste Operations and Emergency Response;
 - 4) 29 CFR 1910.1200 - Hazard Communication Standard
 - 5) 29 CFR 1926 – Safety and Health Regulations for Construction.
- i. Underwriters Laboratories, Inc. (UL):
 - 1) UL 586 – Standard for Safety High Efficiency, Particulate, Air Filter Units.

1.05 DESCRIPTION

- A. Commencement of Work: Five (5) business days prior to the proposed start of Work at each separate location, the Contractor shall notify the Engineer and the onsite safety staff. No Work may proceed at any location until authorized by the Engineer.
- B. The Contractor shall coordinate any required equipment shutdowns with Engineer prior to starting the Work.
- C. Access Restrictions: The Contractor shall inform the Engineer of proposed access restrictions (i.e., areas or items of equipment which will not be accessible during the Work), and give them estimated periods (including specific dates) of such proposed access restrictions. The Contractor shall be aware that Other Contractors may be at the work site. As a result, the Contractor shall not have exclusive rights to the work site, and shall fully cooperate and coordinate this Work with the work of Other Contractors who may be on site. Therefore, the Contractor shall notify Other Contractors in advance of the disturbance, removal, construction/demolition, and disposal Work included herein, to provide them with sufficient time for coordination of interrelated items that are included in their contracts and that must be performed before, after, or in conjunction with the Work included under this Section.
- D. Unexpected Entry into a Work Area: In the event that DEP personnel must enter a work area for reasons unrelated to the supervision or inspection of Work being performed under this Section (e.g., under emergency conditions), the Contractor shall immediately stop work and cleanup any loose debris, so as to permit the safe entry by DEP personnel. Any disturbance of Mercury-Containing Materials or Mercury Wastes shall not proceed until all DEP personnel have exited from the work area.

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- E. Meetings: The Contractor shall visit and investigate the site, review the Drawings, review this Section, review DEP EHS Policies and Procedures, and become familiar with any conditions which may affect the Work, as part of the pre-construction meeting and site walk-through. The Contractor shall hold all meetings with appropriate parties as scheduled and as otherwise necessary to accomplish the Work to be performed under this Section. In addition to the pre-construction meeting and site walk-through, other meetings may be required or may be requested by the Engineer, including briefings to Bureau Operations personnel. Written documentation (i.e., “minutes”) of all meetings shall be generated by the Contractor, and copies shall be provided to the DEP within three (3) business days following each meeting.

1.06 QUALITY ASSURANCE

- A. Scheduling: The Contractor shall coordinate and schedule all phases of the Work to be performed under this Section with the DEP, subcontractors, material suppliers, and other parties as necessary to ensure the proper execution of the Work.
- B. Compliance: In addition to the detailed requirements of this Section and DEP EHS Policies and Procedures, the Contractor shall comply with all applicable regulations of federal, state, and local authorities pertaining to the disturbance, removal, construction/demolition, handling, storage, transportation, and recycling/disposal of Mercury-Containing Materials and Mercury Wastes. All matters regarding the interpretation of any regulations, standards, or policies shall be submitted to the Engineer for resolution before starting the Work. Where the requirements of this Section, DEP EHS Policies and Procedures, or federal, state, or local regulations conflict or vary, the most stringent requirements or regulations shall apply. Work shall be coordinated as needed with 29 CFR 1926 and Sections 01 35 27, 01 35 45, 01 74 20, 02 83 05, and 02 84 05.
- C. Rejection of Non-Complying Items: The DEP reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements. The DEP also reserves the right to reject Contractor submittal items that are deemed inappropriate or unacceptable by the Engineer or DEP. Submittal items that may be deemed inappropriate or unacceptable include proposed vendors or subcontractors (e.g., TSDFs, etc.) with previous regulatory citations/violations. The DEP further reserves the right, and without prejudice to other recourse, to accept non-complying items subject to an adjustment in the Contract amount, as approved by the DEP.
- D. Qualifications:
1. Mercury Removal Company: The Mercury Removal Company shall have successfully completed at least two (2) projects of comparable scope and methodologies to the Work being performed under this Section within the past three (3) years. This experience shall be documented by identifying the following: (a) the name, address, and phone number of each facility where the work was performed; (b) the name of the individual representing the owner who supervised the work at each facility; (c) the types of facilities where the work was performed; (d) the volume and type of each material

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that was removed and recycled/disposed of; (e) the specific methods of removal used at each facility (including the tools, technologies, and engineering controls employed);

2. **Competent Person:** The Contractor and/or Mercury Removal Company shall have on staff and assigned to this Contract a Competent Person who has successfully completed DOT Hazardous Materials Transportation Training, HAZWOPER Training, Mercury Awareness Training, and RCRA Training courses as defined in this Section. Each training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, the Competent Person shall be able to fulfill the duties defined in this Section, shall have a minimum of two (2) years' experience with work involving mercury, and shall have worked on at least three (3) projects of comparable scope and methodologies to the work being performed under this Section. The Competent Person shall be on site during all mercury-related work activities.
3. **Mercury worker:** The Mercury Removal Company shall have on staff and assigned to this Contract a sufficient number of Mercury workers who have successfully completed DOT Hazardous Materials Transportation Training and Mercury Awareness Training courses as defined in this Section. Each training course shall have been completed within the past year in the form of either an initial course or a refresher course. In addition, each Mercury worker shall have a minimum of one (1) year of experience on projects involving mercury, and shall have worked on at least three (3) projects of comparable scope and methodologies to the work being performed under this Section.

1.07 SUBMITTALS

- A. Within 30 business days of the Notice to Proceed or as directed by the Engineer, the Contractor shall submit the following to the Engineer:
 1. **Mercury Management Plan:** The Contractor shall submit a detailed, project-specific Mercury management plan that addresses work procedures and equipment to be used during the disturbance, removal, construction/demolition, handling, collection, and disposal of Mercury-Containing Materials and Mercury Wastes. The Mercury management plan shall be prepared in accordance with this Section and all pertinent federal, state, and local regulations. In addition, the Mercury management plan shall follow all DEP EHS Policies and Procedures, and shall be coordinated with the Engineer. The Mercury management plan shall also be signed and dated by a CIH meeting the qualifications set forth in this Section. The Mercury management plan shall include the following elements:
 - a. **Mercury Control:**
 - 1) Drawings showing the locations and details of each work area and each waste storage;

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- 2) A detailed discussion regarding the interfacing of trades (i.e., how the Contractor will coordinate the Work with other contractors or DEP employees working at the site) and the sequencing of mercury-related Work;
- 3) A detailed discussion on the implementation of proper precaution when Mercury containing equipment (gauges, switches, flow meters, manometers, thermometers, flow regulators, laboratory equipment, lamps, etc.) is removed to prevent release of elemental mercury onto or into connected equipment or appurtenances;
- 4) A detailed discussion on the implementation of proper precaution when Work involves removal, repair or alterations of equipment or appurtenances where known or suspected historical mercury containing equipment (gauges, switches, flow meters, manometers, thermometers, flow regulators, laboratory equipment, lamps, etc.) may have been part of the system;
- 5) A detailed discussion regarding the collection, handling procedures, and recycling/disposal of Mercury-Containing Materials and Mercury Wastes;
- 6) A detailed discussion regarding “real-time” air monitoring for mercury vapor (e.g., using a Jerome® meter) to be implemented during the Work, as applicable. Also, indicate what Action Levels will be used for the Work, how compliance with the Action Levels and the REL (per the DEP EHS Policy and Procedure for Mercury Management) will be determined, and who will be responsible for ensuring that compliance with the Action Levels and REL is maintained. At a minimum, Action Levels shall be established for the following situations: (a) the removal of broken/leaking Mercury-Containing Materials; (b) the implementation of engineering controls and safe work practices; (c) upgrades/downgrades in levels of PPE; (d) work stoppage or the emergency evacuation of on-site personnel;
- 7) A detailed discussion regarding housekeeping procedures to be used for maintaining clean work areas;
- 8) A detailed task analysis for each work activity that has the potential to disturb Mercury-Containing Materials or Mercury Wastes. Each task analysis shall include, but is not limited to, the following information: (a) the type of work activity; (b) the tools/equipment that will be used; (c) operation and maintenance practices and procedures that

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will be used for the tools/equipment; (d) the types of Mercury-Containing Materials that may be disturbed, or Mercury Wastes that may be generated when performing the activity; (e) the engineering controls that will be used to control the spread of contamination during the activity; (f) the proposed crew size for the activity and individual employee responsibilities during the activity; (g) housekeeping procedures that will be used during the activity; (h) PPE that will be used for the removal of both intact and broken (leaking) Mercury-Containing Materials, and the decontamination protocol when handling removal of broken (leaking) mercury-containing equipment;

- 9) Equipment and Supplies: Identify the equipment and supplies that will be used to perform the Work;
- 10) Rental Equipment Notification: If rental equipment is to be used during the Work, the Contractor shall notify the rental agency in writing concerning the intended use of the equipment;
- 11) SDSs: Provide SDSs for all chemical products to be used during the Work.

b. Waste Management:

- 1) The identification of Mercury-Containing Materials and Mercury Wastes (as defined in 40 CFR 116, 40 CFR 260, 40 CFR 261, 6 NYCRR 370 and 6 NYCRR 371) associated with the Work;
- 2) The estimated quantity of each waste stream that will be generated and recycled/disposed of as per 40 CFR 302;
- 3) The name, address, phone number, and qualifications of each vendor and facility that will be transporting, storing, testing, or recycling/disposing of the wastes. The Contractor shall verify the permit status of the facility as well as check for outstanding violations and enforcement actions. Include a 24-hour phone contact for each vendor/facility.
- 4) Current permit documentation for each recycling facility/TSDf indicating that the facility is approved by federal (40 CFR 264 and 40 CFR 265), state (6 NYCRR 373), and local regulatory agencies to receive Mercury-Containing Materials and Mercury Wastes. The documentation shall include an “acceptance letter” from each recycling facility/TSDf indicating its ability to accept the specific waste streams that will be generated during Work performed under this Section;

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- 5) Current 6 NYCRR 364 and 40 CFR 263 permit documentation for the waste transporter that will transport Mercury-Containing Materials and Mercury Wastes from the work site to the recycling facility/TSDF. The documentation shall clearly indicate the transporter's ability to deliver the Mercury-Containing Materials and Mercury Wastes to the chosen recycling facility/TSDF;
 - 6) Spill prevention, containment, and cleanup contingency measures to be implemented during the Work, as well as procedures to be followed during a suspected mercury emissions/bulk material release or emergency situation. All measures and procedures shall be in accordance with this Section, including 15 RCNY Chapter 19;
 - 7) A detailed discussion of the on-site handling, storage, removal, and recycling/disposal of waste materials. This discussion shall include, but is not limited to, the following:
 - (a) specifications for a secondary containment system for each drum storage area;
 - (b) the methods of demarcation that will be used to identify the waste storage areas and each waste container;
 - (c) the methods and procedures that will be used to collect and containerize wastes on a daily basis;
 - (d) the types of containers that will be used to containerize the wastes;
 - (e) the posting of weekly regulated waste inspection and inventory records as required in this Section.
- c. A detailed schedule for the implementation of the Mercury management plan elements. The schedule shall clearly indicate the starting and completion dates for the work, and shall allow adequate time for cleanup activities and inspections;
 - d. The name and qualifications (i.e., experience and training documentation) of the Competent Person who will be responsible for the oversight and execution of the Mercury management plan during activities affecting Mercury-Containing Materials and Mercury Wastes. At a minimum, the Competent Person shall satisfy the qualification requirements of this Section.
 - e. Employee Documentation: For all activities that disturb Mercury-Containing Materials and Mercury Wastes, the Contractor shall provide a sufficient number of properly trained and experienced workers, each of whom shall:
 - (a) have written proof of training (e.g., certificates) in accordance with the qualification requirements of this Section for Mercury workers and Competent Persons that will be used for the Work;
 - (b) copies of resumes for Mercury workers and Competent Persons that will be used for the Work, indicating work experience as required in this Section.

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- f. A current (i.e., within the last month) signed and notarized statement disclosing all of the Mercury Removal Company’s OSHA, EPA, and DOT citations/violations within the past three (3) years.
- B. Field Reports and Recordkeeping: During all Work performed under this Section, the Contractor shall maintain and provide the following documentation:
 - 1. Recycled Materials/Waste Documentation: Completed and signed waste manifests from recycling facilities/TSDFs shall be provided to the DEP within ten (10) business days of disposal. In addition, on-site waste storage areas shall be inspected weekly by the Competent Person, who at a minimum shall satisfy the qualification requirements of this Section.
 - a. Each weekly waste storage area inspection shall be coordinated with the applicable Bureau EHS, documented in the form of a written report, and each report shall be signed by the Contractor’s employee who generated the report. All reports shall be provided to the DEP within 24-hours of the date the inspection is completed. The content of these reports shall include, but is not limited to, the following information: (a) the name of the individual that conducted the inspection; (b) descriptions of waste streams being stored; (c) types and quantities of waste containers being used; (d) the current recycling/disposal status (i.e., when the waste container is scheduled to be removed from the work site) and physical condition of each waste container; (e) the presence/absence of proper labeling for each waste container in accordance with this Section and federal, state, and local regulations; (f) secondary containment systems being used; (g) the methods being used to secure/lock each waste storage area to prevent any unauthorized entry; (i) the presence of any waste containers on site generated during the Work being performed under this Section that violate RCRA generator storage time limitations, as defined in 40 CFR 262.
 - b. In addition to performing weekly waste storage area inspections, the Competent Person shall maintain an ongoing waste inventory. The waste inventory shall be coordinated with the applicable Bureau EHS, and the content of the inventory shall include, but is not limited to, the following information: (a) specific dates that each waste container was added/removed from the waste storage area; (b) the full name (printed) and signature of the individual responsible for adding/removing each waste container from the waste storage area.
 - 2. Mercury Work Area Inspection Documentation: Work areas shall be inspected daily by the Competent Person, who at a minimum shall satisfy the qualification requirements of this Section.
 - a. Each daily work area inspection shall be documented in the form of a written report, and each report shall be signed by the Contractor’s

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employee who generated the report. All reports shall be provided to the DEP within 24-hours of the date the inspection is completed. The content of these reports shall include, but is not limited to, the following information: (a) the types of work being performed; (b) the names of Mercury workers and the Competent Person on site, as well as the name of the company each individual is representing; (c) any non-compliance issues observed (i.e., observations that conflict with the requirements of the Contractor's Mercury management plan, this Section, DEP EHS Policies and Procedures, or federal, state, and local regulations) along with the corrective actions that were taken to achieve compliance.

3. Contractor Project Record: The Contractor's Competent Person shall maintain a project record at the work site. The Contractor Project Record shall be made available to the Engineer or DEP for review at any time during the Work, and shall be submitted to the DEP within 24-hours after the completion of the Work.
 - a. At a minimum, the Contractor Project Record shall contain the following information: (a) copies of training certificates for all individuals involved with the Work; (b) copies of all Mercury-Containing Materials survey reports relating to the Work; (c) copies of all daily sign-in sheets as required in this Section; (d) a list of emergency phone numbers, including the local fire department, local police department, nearest hospital, as well as phone numbers for the Engineer and DEP personnel responsible for administering the Work; (e) a copy of the EPA's Standard for Universal Waste Management (40 CFR 273); (f) a copy of the New York State Department of Environmental Protection's (NYSDEC's) Standards for Universal Wastes (6 NYCRR 374-3) and Mercury-Added Consumer Product's Law (Chapter 145, Laws of New York, 2004); (g) copies of all SDSs pertaining to all chemicals being used during the Work; (h) a copy of this Section and the related Drawings; (i) a copy of the Contractor's Mercury management plan; (j) copies of all daily work area inspection records; (k) copies of all weekly waste storage area inspection records; (l) a copy of the waste inventory; (m) copies of all DEP EHS Policies and Procedures referenced in this Section; (n) a copy of the Contractor's Hazard Communication (HAZCOM) program.
4. Daily Sign-In Sheets: The Contractor shall generate daily sign-in sheets for all individuals entering and exiting each work area for the duration of the Work. The daily sign-in sheets shall be maintained by the Competent Person, and shall be made available to the Engineer or DEP for review at any time during the Work. All daily sign-in sheets shall be submitted to the DEP within 24-hours after the completion of the Work.

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- a. At a minimum, each daily sign-in sheet shall include: (a) the individual's full name (printed); (b) the individual's signature; (c) the name of the company the individual is representing; (d) the time of entry and exit from the area; and (e) verification by the Competent Person that the individual meets the applicable training requirements, if the individual intends to enter a work area.
 - 5. HAZCOM Program: The Contractor's HAZCOM program shall be made available to the Engineer or DEP for review at any time during the Work.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Not Used
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used
- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
- A. Not Used
- 2.02 MATERIALS / EQUIPMENT
- A. PPE: The Contractor shall provide personnel who have a potential to be exposed to Mercury-Containing Materials or Mercury Wastes, with appropriate PPE as prescribed by the Contractor's CIH.
 - B. High-Efficiency Particulate Air (HEPA) Filters: HEPA/P-100 filters used in HEPA vacuuming equipment must meet or exceed any manufacturer's specifications and recommendations, as well as specifications presented in the Standard for Safety High Efficiency, Particulate, Air Filter Units (UL 586).
 - C. Waste Containers: Containers for the storage of all recyclable materials and wastes shall be DOT-approved, and shall be provided by the Contractor.
- 2.03 FABRICATION / ASSEMBLING / FINISHES
- A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Utilities: The temporary use of any on-site utilities shall be subject to the approval of DEP. The Contractor shall furnish all water and hoses needed for the Work, as well as any temporary hookups. Also, the Contractor shall supply all heating equipment and water filtration devices needed for the Work. In addition, all temporary lighting and temporary electrical service to a work area shall be provided by the Contractor, and shall be in weatherproof enclosures and be ground fault protected.
- B. Signs: The Contractor shall post conspicuous warning signs at all approaches to work areas and waste storage areas. The signs shall be located at such a distance so that personnel may read the sign and take the necessary precautions before entering a work area or waste storage area. Signs shall comply with federal, state, and local regulations, including the requirements of OSHA. Signs shall not be removed until all removal and construction/demolition activities have been completed. At a minimum, each sign shall bear the following information in English and the predominant language that is spoken by the Contractor's employees if English is not spoken:

**WARNING
MERCURY WORK AREA
POISON
NO SMOKING OR EATING**

- C. Physical Boundary Delineation: The Contractor shall clearly delineate each work area and waste storage area with a Physical Boundary as defined in this Section.
- D. Work Area Preparation: The Contractor shall utilize HEPA-filtered vacuums, equipped with mercury filters, and wet methods during the initial cleaning of each work area. Prior to removal from each work area, all movable objects and mounted objects that can be removed shall be pre-cleaned using HEPA-vacuums and wet methods. Fixed objects that must remain within each work area shall be pre-cleaned using HEPA vacuums and wet methods, and subsequently covered with 6-mil, polyethylene sheeting. The Competent Person shall visually inspect and verify the adequacy of cleaning prior to removal of objects from the work area and/or covering with polyethylene sheeting.
- E. Removal
 - 1. Protection of Existing Work to Remain: All Work involving the disturbance of Mercury-Containing Materials or Mercury Wastes must be conducted without damage to, or contamination of equipment or surfaces within the work areas or other areas adjacent to the work areas. All such damage or contamination shall be immediately corrected and cleaned up by the Contractor at the Contractor's expense.

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2. Work Area Containment Measures: The Contractor shall utilize impermeable containment materials (i.e., 6-mil polyethylene sheeting) within each work area to prevent potential contamination from Mercury-Containing Materials or Mercury Wastes while performing the Work. At a minimum, the Contractor shall place 6-mil polyethylene sheeting on the floor beneath Mercury-Containing Materials that are being removed. Any containment materials that become contaminated during the Work shall not be reused, and shall be properly containerized and disposed of in accordance with this Section.

3.02 INSTALLATION

- A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Cleanup: The Contractor shall maintain all surfaces, including protective coverings (polyethylene sheeting) within each work area, free of accumulations of debris, dusts, and wastes. The Contractor shall perform housekeeping activities daily throughout each work shift and at the end of each work shift, in order to prevent any accumulation of debris, dusts, and wastes in the work areas. Using compressed air to cleanup a work area shall be strictly prohibited. HEPA-filtered vacuums and wet methods shall be used to ensure that each work area remains free of visible debris, dusts, and wastes.
- B. Collection, Separation, and Containerization of Wastes: The Contractor shall collect, separate (by waste stream/waste type), and containerize Mercury Wastes (solid and liquid), debris, PPE, and containment materials on a daily basis in accordance with the Mercury management plan.
 1. The Contractor shall store all wastes in DOT-approved container systems. No drum/container shall be filled in excess of the capacity marked on the drum/container. All drums/containers shall be sealed and covered immediately after filling, and each drum/container will have a label affixed to it in accordance with this Article. All labels shall remain intact and legible at all times.
 2. No water mixed with or contaminated by mercury may be released onto the ground or into any drain or sewer. It should be noted that a discharge of more than 1 lb. of mercury onto the ground or into the water within a 24-hour period, shall be considered a violation of the Clean Water Act and shall be treated as a “reportable quantity” in accordance with 40 CFR 117. Such

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a release shall be grounds for immediate termination of this Contract and the Contractor shall be liable for any fines, penalties, or remediation costs.

3. Any quantity of elemental mercury that is released or spilled must be immediately reported to DEP. Reporting to NYSDEC Spill Hotline is required for a release of one pound (approximately two tablespoons) or more.
 4. The Contractor shall store non-mercury-containing wastes separately from mercury-containing wastes, shall provide all non-mercury-containing waste containers, and shall make all transportation and disposal arrangements for non-mercury-containing wastes in accordance with federal, state, and local regulations.
- C. **Storage of Wastes:** The Contractor shall ensure that all drummed wastes are stored in a secondary containment system, and that each waste storage area is demarcated with a Physical Boundary in accordance with this Section. In addition, the Contractor shall post weekly waste inspections and waste inventories in the hazardous waste storage area, as defined in this Section, as well as the following emergency information in accordance with DEP’s EHS Policies and Procedures: (a) the name and telephone number of the facility’s Emergency Coordinator; (b) the location of fire extinguishers and fire alarms; (c) the location of spill control materials; (d) the telephone number for the fire department (unless the facility has a direct alarm).
- D. **Labeling:** The Contractor shall affix warning labels to all mercury recycling/waste drums and containers. Labels shall comply with the requirements of federal, state, and local regulations, including EPA and DOT requirements. At a minimum, all labels shall bear the following information in English:

Generator Name, Address, and Telephone Number]
[Specific Contents of Container]
[Accumulation Start Date]
[Accumulation End Date]

1. If necessary (i.e., if waste is to be disposed of as hazardous waste rather than Universal Waste), also include the following information on the label:

HAZARDOUS WASTE
FEDERAL LAW PROHIBITS IMPROPER DISPOSAL
HANDLE WITH CARE
[EPA-Issued Generator Identification Number]
[EPA Waste Identification Number]

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- E. Characterization and Disposal of Wastes: Mercury-Containing Materials to be removed under the Work of this Section shall be recycled in accordance with the EPA’s Standards for Universal Waste Management (40 CFR 273), the NYSDEC’s Standards for Universal Wastes (6 NYCRR 374-3), and the NYSDEC’s Mercury-Added Consumer Products Law (Chapter 145, Laws of New York, 2004). If a material is not regulated as a Universal Waste, the material shall be considered a hazardous waste, and shall be disposed of in accordance with RCRA requirements.
1. All waste profiles for containerized wastes must be reviewed by the Engineer and signed by DEP as the generator of the waste streams. The Contractor shall notify DEP at least 14 days prior to the removal of any waste drums/containers, so that DEP can inspect the drums/containers and review and approve advance copies of all waste manifests. Hazardous wastes shall be disposed of to ensure that drums/containers do not remain on the job site for more than 90 calendar days from the initial “accumulation start date” on the label affixed to the drum/container. Universal Wastes shall be disposed of to ensure that drums/containers do not remain on the job site for more than one (1) year from the initial “accumulation start date” on the label affixed to the drum/container. Containers that have reached their storage capacity shall not remain on site and transportation arrangements shall be made for their immediate removal.
- F. Disposal Documentation: The Contractor shall submit written evidence that the recycling facility/TSDf receiving Mercury-Containing Materials or Mercury Wastes is approved by federal, state, and local regulatory agencies to receive the materials/wastes. Once all waste profiles have been completed, the Contractor shall provide DEP with a “Letter of Acceptance” issued by the TSDf indicating that the wastes will be accepted. On the date of disposal, the Contractor shall submit one (1) copy of the completed manifest, that has been signed and dated by the initial transporter in accordance with 6 NYCRR 372 and 40 CFR 262, to the DEP for signature as Generator. All waste profiles, manifests, and Land Disposal Restrictions (LDRs) per 6 NYCRR 376 and 40 CFR 268 must be signed by a DEP employee per Section 01 35 45 – Hazardous Materials Control.

END OF SECTION

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NO TEXT ON THIS PAGE

SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES
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PART 1 GENERAL

1.01 SUMMARY

- A. The Work specified in this Section consists of designing, furnishing materials for, fabricating, erecting, and removing formwork, falsework and shoring for cast-in-place concrete as indicated on the Contract Drawings, specified herein and needed for a complete installation.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete

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B. Section 03 35 00 - Concrete Finishing

1.04 REFERENCES

A. Abbreviations and Acronyms

1. American Plywood Association (APA)
2. Western Wood Products Association (WWPA)

B. Reference Standards:

1. American Concrete Institute (ACI):
 - a. ACI 117 - Standard Tolerances for Concrete Construction and Materials.
 - b. ACI 303 - Guide to Cast-in-Place Architectural Concrete Practice.
 - c. ACI 347 - Guide to Formwork for Concrete.
 - d. ACI SP-4 - Formwork for Concrete.
2. American Plywood Association (APA):
 - a. APA Grade - Trademark.
3. 2020 Building Code of New York State (NYSBC)
4. Western Wood Products Association (WWPA):
 - a. Western Lumber Product Use Manual.
 - b. Western Lumber Grading Rules

1.05 DESCRIPTION

A. Job Conditions

1. Formwork materials shall be protected before, during and after erection to insure acceptable finished concrete Work. In-place materials and other operations of work in connection with concrete pours shall be protected.
2. In the event of damage to erected forms, necessary repairs or replacements prior to concrete pours shall be performed at no expense to the City.
3. The Contractor shall allow sufficient time, as determined by the Engineer from the approved schedule, between erection of forms and placing of concrete for the various trades to properly install their Work.
4. External or superimposed loads, lateral or vertical, shall not be applied on casting concrete until concrete has developed specified 28-day compressive strength and reached the minimum curing age required by Section 03 30 00- Cast-in-Place Concrete.

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5. Stay-in-place forms are not permitted unless otherwise shown on the Contract Drawings or as approved by the Engineer.

B. Design of Formwork:

1. Formwork shall be designed and constructed in compliance with ACI SP-4 and, if applicable, ACI 303.
2. The Contractor shall assume responsibility for the design, engineering and construction of formwork. Forms shall be designed to produce concrete members identical in shape, lines and dimensions to members shown on the Contract Drawings.
3. The formwork shall be designed for the loads and lateral pressures in accordance with ACI 347 and wind loads as specified by the NYSBC.
4. Construction and control joints, openings, offsets, keyways, recesses, moldings, chamfers, blocking, screeds, bulkheads, waterstops, anchorages, inserts, and other features shall be provided as required.
5. Formwork shall be designed to be readily removable without impact, shock, or damage to 'green' concrete surfaces and adjacent materials.
6. The maximum deflection of facing materials reflected in concrete surfaces exposed to view shall be 1/240 of the span between structural members. The formwork shall be cambered to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads.
7. Formwork surface materials shall meet the requirements of Section 03 35 00 - Concrete Finishing.

1.06 QUALITY ASSURANCE

- A. Unless otherwise noted on the Contract Drawings, formwork shall be constructed so that the concrete surfaces will conform to the tolerance limits as given in ACI 117.
- B. A full size mock-up of a cast-in-place wall shall be erected on the Site where directed. Mock-up shall conform to requirements of Section 03 35 00 - Concrete Finishing.
- C. Shop Drawings approvals shall be obtained before custom fabrication is started and before delivery of materials to the Site.
- D. Work of this Section shall be coordinated with the work of other trades so that construction is not delayed.
- E. Formwork erection procedures and health and safety of the work force shall be the responsibility of the Contractor. The requirements of authorities having jurisdiction shall be complied with.

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- F. Errors of detailing and fabrication and the correct fit of the formwork shall be the responsibility of the Contractor.
- G. Materials, fabrications and workmanship found defective shall be promptly removed and replaced and new acceptable work shall be provided in accordance with Contract requirements at no additional expense to the City.
- H. Design of formwork layout, spans, fastenings, joints, and framed openings shall be under the direct supervision of a Professional Engineer, who is licensed and registered in the State of New York with minimum of 10 years of experience in structural design of formwork.

1.07 SUBMITTALS

- A. Shop Drawings submitted for approval of the Engineer shall include, but not be limited to, the following data:
 - 1. Design calculations of all field-constructed and prefabricated formwork. The Contractor shall submit drawings and calculations signed and sealed by a professional engineer licensed in the State of New York for form designs and re-shoring.
 - 2. For each type of form required, material type, material thickness, finish, and a dimensional cross-sectional profile.
 - 3. Details of erection, including various connections, layouts of form units placement directions, anchoring and support details, attachment of accessories, each condition requiring enclosures, cut opening, special jointing, and other accessories as required to complete the work.
- B. Manufacturer's specifications and installation instructions for each type of required formwork and accessory shall be submitted. These include each type of sheeting, chamfer strips, form facing materials, form ties, form liners, rustication strips, form release agent, dovetail anchor slots, form coating material, form caulking, and similar items.
- C. Plan for Reshoring: When reshoring is permitted or required, the operations shall be planned in advance and in accordance with acceptable procedures and the requirements of this Section.
 - 1. The Contractor shall submit as a part of the shop drawings a Plan for Reshoring prepared and sealed by a New York State registered professional engineer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered to the site in an undamaged condition and at such intervals as will avoid delay in the work.
- B. Material shall be stored and protected in a clean, properly drained location. Material shall be kept off the ground under a weather-tight covering permitting good air circulation. Formwork materials shall be stored on dry wood sleepers,

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pallets, platforms or other appropriate supports which have slope for positive drainage. Materials shall be protected from distortion, excessive stresses, corrosion and other damage. Materials shall not be stored on the structure in a manner that might cause distortion or damage to the supporting structure. The maximum uniform distributed storage load shall not exceed 20 pounds per square foot.

- C. Material shall be handled safely in a manner that will prevent distortion or other damage. Care shall be exercised at all times to avoid damage through careless handling during unloading, storing and erecting. Panels shall be supported by using strong backs while lifting panels in a horizontal position.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. A-2 Cone Snap-in Form Tie shall be as manufactured by:

1. Dayton Superior Corporation, Miamisburg, OH. www.daytonsuperior.com
2. Williams Form Engineering Corp. , Belmont, MI. www.williamsform.com
3. Or approved equal.

- B. Form caulking shall be as manufactured by:

1. Series 1200 Construction Caulking; GE Silicones/Momentive Performance Materials, Inc., Wilton, CT. www.siliconeforbuilding.com
2. Dow Corning 999-A; Dow Corning Co., Auburn, MI. www.dow.com/en-us/
3. Or approved equal.

- C. Form release agent (Non NSF 61 approved) shall be as manufactured by:

1. Specco F-100; Specco Industries, Inc., Lemont, IL. www.specco.com
2. Debond Form Coating; L&M Construction Chemicals, Inc., Bethany, CT. www.lmcc.com
3. Magic Kote; Dayton Superior Corporation, Miamisburg, OH. www.daytonsuperior.com
4. Or approved equal.

- D. Form film (Non NSF 61 approved) shall be as manufactured by:

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1. Dayton Superior Corporation, Miamisburg, OH. www.daytonsuperior.com
2. Arclin, Roswell, GA www.arclin.com
3. Or approved equal.

E. Form liners shall be as manufactured by:

1. Dura-Tex; Dayton Superior Corporation, Miamisburg, OH.
www.daytonsuperior.com
2. The Euclid Chemical Company, Cleveland, OH www.euclidchemical.com
3. Or approved equal.

F. Rustications shall be as manufactured by:

1. Dayton Superior Corporation, Miamisburg, OH. www.daytonsuperior.com
2. Nox-Crete Products Group, Street, Omaha, NE. www.nox-crete.com
3. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Lumber

1. Only stress-grade lumber shall be provided. Form framing, sheathing and shoring shall conform to WWPA Western Lumber Product Use Manual.
2. For lumber in contact with concrete, the lumber shall be provided with dressed or tongue-and groove edges on at least the side contacting the concrete, unless otherwise indicated on the Contract Drawings.

B. Plywood

1. Only grade-marked plywood conforming to APA shall be provided.
2. B-B Plyform, Exterior Class 1 or 2, or High Density Overlay (HDO) form plywood, Class 1 or 2 conforming to U.S. Product Standard PS-1 shall be provided.
3. Thickness shall be as required to maintain alignment and surface smoothness, but not less than 5/8 inch thick.

C. Steel Forms

1. Commercial grade sheets not less than 16 gage shall be provided.
2. Steel forms in rust-free condition shall be maintained by use of steel wool and light grinding, followed by coats of the specified release agent.
3. Stock material that is free from warps, bends, kinks, cracks, and rust or other matter that could stain the concrete shall be provided.
4. Panels shall be fabricated in conformance with the approved submittals.

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5. Outward facing surfaces shall be reinforced as required to prevent warpage and deformation during concrete placement.

D. Form Ties

1. Commercially manufactured type form ties, hangers, and clamps of such type that, after removal of the forms, metal will not be closer than concrete cover as indicated on the Contract Drawings from concrete surface shall be provided. Non-fabricated wire ties will not be permitted.
2. A cone-shaped, snap-in type form tie suitable for the intended use with a working load as required and an integral hot forged head shall be provided.
3. Ties with swaged washers or other suitable devices to prevent seepage of fluid along the ties shall be provided. Ties shall be left in place. She-bolt with water seals shall be provided.
4. Form ties for all liquid-retaining structures shall have waterstop at mid-thickness of wall.
5. Lugs, cones, washers, or other devices which do not leave holes or depressions greater than 1-inch in diameter shall be provided.

E. Chamfer Strips

1. 3/4 inch by 3/4 inch triangular fillets shall be provided, all of which shall be milled from clear, straight-grain pine, surfaced each side, or all of which shall be extruded vinyl type with or without nailing flange unless otherwise indicated on the Contract Drawings.

F. Inserts

1. Galvanized cast steel or galvanized welded steel inserts, complete with anchors to concrete and fittings such as bolts, wedges and straps shall be provided.

G. Dovetail Anchor Slots

1. Dovetail anchor slots manufactured from 22 gage, electro-galvanized steel with removable felt or polyurethane filler shall be provided, where indicated on the Contract Drawings.

H. Shop Fabricated Form

1. Forms shall be fabricated in accordance with the approved submittals.
2. Forms shall be maintained clean, smooth, and free from imperfections and warpage.
3. Locate joints as indicated on the approved Shop Drawings.

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- a. Form panels shall be arranged in symmetrical patterns conforming to the general lines of the structure.
- b. Except when otherwise indicated on the Contract Drawings, panels on vertical surface shall be oriented with the long dimension horizontal joints level and continuous.
- c. Form panels on each side of the panel joint shall be precisely aligned by means of fasteners common to both panels, to result in a continuous, unbroken concrete surface.
- d. Largest stock size practicable shall be provided.
- e. Between form joints, areas less than the stock size of the form liner material shall be lined with a single piece of liner material.

I. Form Caulking

1. Form caulking shall be a one-component, gun-grade silicone sealant that is capable of producing flush, watertight and non-absorbent surfaces and joints. Sealant shall be compatible with the type of forming material and concrete ingredients used.

J. Form Release Agent

1. Form release agent shall be nonreactive and a VOC compliant commercial formulation form-coating compound that will not bind with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede wetting of surfaces to be cured with water or curing compounds.
2. For concrete that can contact potable water, use only form release agents that comply with the ANSI/NSF Standard 61 confirming to the above requirements. Concrete for all Outlet Structures included in this Contract are considered to be in contact with potable water. Accordingly, for all concrete work of outlet structures, the Contractor must furnish NSF approved form release agent at no cost to city.

K. Form Film

1. Form film shall conform to the requirements of the form release agent above.
 - a. Thinner shall be provided as recommended by manufacturer of the form film.

L. Form Liners

1. Form liners shall be provided as required to create the finishing, texture, and configuration shown on the Contract Drawings.

M. Rustications

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1. Rustications shall be provided as required to create the finishing, texture, and configuration shown on the Contract Drawings.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Field Measurements

1. Prior to commencement of the Work, existing dimensions, elevations, locations and conditions applicable to the Work shall be field verified. Variances and discrepancies from the Contract Drawings and potential interferences shall be reported promptly to the Engineer.
2. Sufficient field measurements shall be taken prior to preparation of Shop Drawings and fabrication of construction materials, where possible, to ensure proper fitting of the work. However, job progress shall not be delayed. The Contractor shall allow for adjustments and fittings wherever the taking of field measurements before fabrication may not be possible or might delay the work.
3. Actual field-verified conditions may require modifications to the fabrication and/or erection details as indicated on the Contract Drawings. The Work shall be performed to meet actual field conditions encountered.

- B. Preparation

1. The Contractor shall examine the areas and conditions under which the Work of this Section is to be performed. Conditions detrimental to the proper and timely completion of the Work shall be corrected. Work shall not proceed until unsatisfactory conditions have been corrected. Prior to placement of concrete, forms shall be inspected for cleanliness and accuracy of alignment.
2. Earth cuts shall not be used as forms for vertical surfaces, unless noted on the Contract Drawings.
3. Where different levels are indicated for wall footings, the footings shall be stepped. Unless otherwise indicated on the Contract Drawings, steps in wall footings shall not be of greater height than the thickness of the footings and steps shall not lap less than 6 inches. No form shall be set at

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the back of such steps and where earth has slumped off in such locations it shall be cut back to a vertical plane just before the concrete is placed.

3.02 IMPLEMENTATION

A. Erection and Installation

1. Forms shall be constructed in accordance with ACI 347 to required dimensions, plumb, straight and mortar tight, and all joints and seams shall be made mortar-tight. Forms shall be substantial, properly braced, and tied together to maintain position and shape and to resist all pressures to which they may be subject. Unless otherwise noted on the Contract Drawings, formwork shall be constructed so that the concrete surfaces will conform to the tolerance limits in ACI 117.
2. The size and spacing of studs and wales shall be determined by the nature of the work and the height to which concrete is placed. Forms shall be made adequate to produce true, smooth surfaces.
3. Forms shall be supplied for repeated use in sufficient number to ensure the required rate of progress. Forms shall be cleaned and inspected immediately prior to depositing concrete. Deformed, broken or defective forms shall be removed from the work.
4. Joints shall be snug and tight and shall occur only at the designated locations. Construction and control joints other than those shown on the Contract Drawings shall be approved by the Engineer. Horizontal joints shall be level, and vertical joints shall be plumb. Joints shall be made perpendicular to the main reinforcement except where otherwise indicated on the Contract Drawings.
5. Temporary openings shall be provided where interior area of formwork is inaccessible for cleanout or inspection before concrete placement, and for placement of concrete. Temporary openings shall be securely braced and set tightly to forms to prevent the loss of concrete mortar. Temporary openings shall be located on forms in locations as inconspicuous as possible consistent with the requirements of the work.
6. Openings shall be provided in concrete formwork of the correct size and in the proper location to accommodate other operations of construction work in the project. Expansion joint material, waterstops, and other embedded items to be built into forms shall be accurately placed and securely supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.
7. Edge forms or bulkheads and intermediate screed strips for slabs shall be set to obtain required elevations and contours in the finished slab surface.

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8. Forms shall be set sufficiently to prevent joints in wood forms from opening prior to concrete pour.
9. Cutting form ties back from the face of the concrete shall not be permitted.
10. Formwork shall be observed continuously while concrete is being placed to see there are no deviations from desired elevation, alignment, plumbness and camber. If, during casting, weakness develops and the formwork shows settlement, deflection or distortion, the Work shall be stopped, improperly cast concrete shall be removed and the formwork shall be reconstructed to perform properly.
 - a. Forms for columns, beams, girders, walls and window openings shall be erected in accordance with ACI 117, with a maximum camber of 3/4-inch in 20 feet. Column sides shall be clamped with metal column clamps, or equal, spaced according to manufacturer's recommendation. Exposed external angles of columns, beams, girders and walls, except where specially shown on the Contract Drawings shall be provided with 3/4-inch bevel strips securely nailed on all concrete formwork including concrete encasement of structural steel shapes.
11. Form release agents shall be applied in accordance with manufacturer's instructions and as specified herein:
 - a. Form contact surfaces shall be coated with form release agent compound before reinforcement is placed. Excess form release agent material shall not be allowed to accumulate in the forms or to come into contact with surfaces which are required to be bonded to fresh concrete such as concrete reinforcement and embedded items.
 - b. Steel forms shall be coated with non-staining, rust-preventive form oil or otherwise shall be protected against rusting. Rust-stained steel surfaces in contact with concrete shall not be used.
12. Excess form coating material shall not be allowed to accumulate in the forms.
13. Form coatings shall not be allowed to come in contact with construction joints or reinforcing steel.
14. Runways for moving equipment shall be provided with struts or legs and supported directly on the formwork or structural member without resting on the reinforcing steel.
15. Wood forms shall be constructed for wall openings to facilitate loosening and to counteract swelling of the forms.

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16. All sleeves, inserts, anchors, and embedded items required for adjoining work or for support of joining work shall be placed prior to concreting.
17. Architectural Formwork:
 - a. Form liners and rustication strips shall be installed in strict accordance with the manufacturer's written instructions and recommendations. The ends of the form liner pattern shall be clogged and all form joints and edges shall be taped using 1/8-inch thick by 3/4-inch wide foam tape centered on the joints, then caulked in accordance with the manufacturer's recommendations each time forms are set. A representative of the manufacturer shall be present at the site to supervise the installation of the form liner for the entire project.
 - b. Forms for smooth concrete shall be installed in such a manner that there will be no horizontal form joints, and the forms shall be aligned so that vertical joints occur only at "V-Groove" rustications. Form ties shall be spaced in a uniform pattern vertically and horizontally. Form ties shall be positioned in smooth concrete bands and in panels between "reveal" rustications, if any.
 - c. Beam and girder soffits shall be erected in accordance with ACI 117 and sufficiently braced, shored, and wedged to prevent deflection. Column sides shall be clamped in accordance with this specification with metal column clamps, spaced according to the manufacturer's directions.

B. Reshoring

1. During reshoring the concrete in beams, slabs, columns, or any other structural members shall not be loaded with combined dead and construction loads in excess of the loads permitted by the Engineer for the developed concrete compressive strength at the time of reshoring.
2. Reshores shall be placed after stripping operations are complete but in no case later than the end of the working day on which stripping occurs.
3. Reshoring for the purpose of early form removal shall be performed so that at no time will large areas of new construction be required to support their own weight. While reshoring is under way, no live loads shall be permitted on the new construction. Reshores shall be tightened to carry their required loads but they shall not be overtightened so that the new construction is overstressed. Reshores shall remain in place until the concrete has reached its specified 28-day strength, unless otherwise noted on the Contract Drawings.

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4. For floors supporting shores under newly placed concrete, the original supporting shores or reshores shall be left in place. The shoring or reshoring system shall have a capacity sufficient to resist the anticipated loads and in all cases shall have a capacity equal to at least one-half of the capacity of the shoring system above. Reshores shall be located directly under the floors supporting shores unless other locations are permitted or shown on the Contract Drawings.
 5. In multi-story buildings reshoring shall be extended over a sufficient number of stories to distribute the weight of newly placed concrete, forms, and construction live loads so the design superimposed loads of the floors supporting shores are not exceeded.
- C. Removal of Forms and Ties
1. Forms shall be removed in accordance with ACI 347 recommendations without damage to concrete and in a manner to ensure complete safety to the structure. Forms, form ties and bracing shall not be removed without specific permission of the Contractor's Registered Professional Engineer.
 2. Top forms on sloping surfaces of concrete shall be removed as soon as removal operations will not allow the concrete to sag. Any needed repairs or treatment required on sloping surfaces shall be performed at once and shall be followed immediately with the specified curing.
 3. Upon removal of forms, the Engineer shall be notified in order that a review of the newly stripped surfaces may be made before patching.
 4. Wood forms for wall openings shall be loosened without causing damage to the concrete. The face of concrete shall not be pried against. Only wooden wedges shall be used.
 5. Whenever the formwork is removed during the curing period, the exposed concrete shall be cured in accordance with one of the methods specified in Section 03 30 00 - Cast-in-Place Concrete.
 6. In general, forms shall not be removed until the concrete has hardened sufficiently to safely support its own load, plus any superimposed load that might be placed thereon. At a minimum, the forms shall be left in place until the length of time and the minimum concrete strength stated below is met, unless otherwise required by Section 03 30 00 – Cast in Place Concrete. These times represent cumulative days, not necessarily consecutive, during which the air surrounding the concrete is above 50 degrees F.

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	Min Time (days)	Min Strength (psi)
1. Curbs and Walks	2	1500
2. Columns	2 days if under 10 ft. tall; 1 day ea. additional 5 ft.	2000
3. Side forms for girders and beams	3	2000
4. Walls	2 days if under 10 ft. tall; 1 day ea. Additional 5 ft., 5 days max.	2000
5. Bottom forms of slabs:		
a. Under 20 feet clear span	8	3000
b. Over 20 feet clear span	10	3500
6. Bottom forms of beams and girders:		
a. Under 10 feet clear span	8	3000
b. 10 to 20 feet clear span	14	3500
c. Over 20 feet clear span	21	4000

a. These times shall be increased if the concrete temperature following placement is permitted to drop below 50 degrees F.

7. Care shall be taken in removing forms, wales, shorings, supports and form ties to avoid spalling or marring the concrete. Rubbed finish, if required, and such patching as may be necessary shall be started immediately after removal.

D. Re-Use of Forms

1. Forms for re-use shall meet requirements for new forms with respect to effect on cast-in-place concrete appearance and structural stability.
2. Re-use of forms shall in no way delay or change the concrete placement schedule as compared to the schedule obtainable if all forms were new (in the case of wood forms) or if the total required forms were available (in the case of metal forms).

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3. Formwork shall be cleaned and re-oiled prior to re-use. Plywood forms shall not be re-used if unused holes from form ties exist from a previous use. High density overlay plywood panels shall be thoroughly cleaned and lightly recoated before each additional use. Wood forms shall not be used more than three times.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Protection

1. During installation, the forms shall not be used as a storage platform nor as a working platform until the forms have been permanently fastened in position.
2. The surface of installed forms shall not be overloaded.

End of Section

SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES
CONTRACT KENS-EAST-2

NO TEXT ON THIS PAGE

SECTION 03 15 14 – CAULKING, WATERPROOFING, AND PARGETING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. The Work specified in this Section includes all caulking and sealing Work, waterproofing, and pargeting as shown on the Contract Drawings and as ordered or approved by the Engineer. Caulking includes, but is not limited to, joints in concrete surfaces, expansion joints, joints between metal frames and masonry, spaces between pipes and pipe sleeves, and other joints as shown on the Contract Drawings or as required.
- B. The Contractor shall, as specified and as shown on the Contract Drawings, and as ordered or approved, furnish all labor, equipment, and materials for caulking, applying waterproofing and pargeting; and installing joint filler material. Waterproofing and pargeting shall be applied immediately prior to final demobilization from the site.
- C. Satisfactorily wash down and clean and dry surfaces to be waterproofed. Provide acceptable protection for concrete surfaces to be waterproofed and for the temporarily exposed waterproofing.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 07 13 00 – Sheet Waterproofing

1.04 REFERENCES

- A. Reference Standards:

1. ASTM A1064 – Standard Specification for Carbon Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
2. ASTM C33/C33M – Standard Specification for Concrete Aggregate
3. ASTM C150/C150M – Standard Specification for Portland Cement
4. ASTM D41 – Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
5. ASTM D226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
6. ASTM D312 – Standard Specification for Asphalt Used in Roofing
7. ASTM D6506 – Standard Specification for Asphalt Based Protection for Below-Grade Waterproofing
8. ASTM C1330 – Standard Specification for Cylindrical Sealant Backing for use with Cold-Applied Sealants

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Persons installing caulking, waterproofing, or pargeting shall have a minimum of five (5) years' experience installing similar products on comparable projects.
- B. The Contractor shall arrange to have a manufacturer's representative on-site during the initial application of waterproofing products.

1.07 SUBMITTALS

- A. Submit manufacturer's data indicating product name, type, physical and chemical characteristics, instructions for handling and placement, and any other pertinent information.
- B. Working drawings showing locations where the submitted products are to be installed with sufficient views, as required, to adequately depict the installation of the caulking, waterproofing, and pargeting.

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- C. Submit names and resumes of any employees that will perform caulking, waterproofing, or pargeting Work.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Delivery and Acceptance Requirements:
 - 1. Deliver materials in manufacturer's original unopened and undamaged containers, with label information accurately representing container contents.
 - 2. Include the following information on the label:
 - a. Name of material and supplier; and
 - b. Installation, handling and protection requirements.
 - 3. Deliver materials in sufficient quantities to allow uninterrupted continuity of the Work.
 - B. Storage and Handling Requirements:
 - 1. Store only approved materials on project site;
 - 2. Store materials in original, undamaged containers with manufacturer's labels and seals intact;
 - 3. Store all materials in strict accordance with the manufacturer's instructions; and
 - 4. Prevent damage to materials during storage on-site.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sealants:
 - 1. Sealants
 - a. Synthacalk GC2+, as manufactured by the Pecora Corporation, Harleyville, PA; www.pecora.com
 - b. Sika Duoflex NS, as manufactured by Sika Corporation; www.usa.sika.com
 - c. Or approved equal.
 - 2. Sealant primers

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- a. P-53-VOC, as manufactured by the Pecora Corporation, Harleyville, PA; www.pecora.com
- b. Sika Duoflex Primer-5050, as manufactured by Sika Corporation; www.usa.sika.com
- c. Or approved equal.

B. Backer Material:

1. Bond breaker tape
 - a. Pecora 531, as manufactured by the Pecora Corporation, Harleyville, PA; www.pecora.com
 - b. Bond Breaker Tape 8891, as manufactured by 3M Corporation; www.3m.com/industrial
 - c. Or approved equal.

C. Wall Waterproofing:

1. Sonoshield HLM 5000, as manufactured by BASF Corporation, Florham Park, NJ; www.buildingsystems.basf.com
2. Hydralastic 836 SL, as manufactured by W.R. Meadows, Inc.; www.wrmeadows.com
3. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Materials

1. Sealants:
 - a. Sealants shall be two (2) part, polysulfide, non-sagging sealant.
 - b. Sealant Primers shall be two (2) component, epoxy primer.
2. Backer Material:
 - a. Backer Rod shall conform to the requirements of ASTM C1330 as recommended by the sealant manufacturer.
3. Roof Waterproofing:
 - a. Roofing Felt: Comply with the requirements of ASTM D226.
 - b. Asphalt: Comply with the requirements of ASTM D312. Asphalt shall not be heated above 400 degrees Fahrenheit.
4. Priming Coat for Roof Waterproofing: Priming oil shall comply with the requirements of ASTM D41.
5. Pargeting:
 - a. Wire Mesh 4x4-10/10 ASTM A1064.
 - b. Portland Cement ASTM C150, Type II.

SECTION 03 15 14 – CAULKING, WATERPROOFING, AND PARGETING
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- c. Aggregates ASTM C33.
- 6. Wall Waterproofing:
 - a. Waterproofing for walls shall be liquid, cold-applied elastomeric waterproofing membrane.
 - b. Protection Board: Protection board shall meet the requirements of ASTM D6506 – Standard Specification for Asphalt Based Protection for Below-Grade Waterproofing.
- 7. The Waterproofing Membrane shown on the Contract Drawings shall be as specified in Section 07 13 00 – Sheet Waterproofing.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Preparation

- 1. All surfaces to be waterproofed or caulked shall be cleaned as required by the manufacturer. Caulking, waterproofing, and pargeting materials shall not be applied to surfaces that are contaminated by dirt, oil, grease, loose mortar, frost, ice, standing water, or other deleterious substances. If the ambient temperature is below 40 degrees Fahrenheit, the substrate shall be heated immediately before application of the waterproofing.
- 2. When required by the manufacturer, substrates shall be primed prior to application of final coating.

3.02 APPLICATION

- A. Backer Rod Installation:

- 1. Thoroughly clean joint spaces before they are caulked so they are free of dirt, loose mortar, and other material.
- 2. Compress the backer rod in the joint to approximately 75 percent of its original diameter, using a blank rounded tool or a plain faced roller.
- 3. Take care not to puncture the surface skin of the backer rod and to avoid excessive longitudinal stretching of the rod during installation.
- 4. Install backer rod to the proper depth so that the sealant may be applied in the thicknesses as specified herein.

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5. Install bond-breaker tape at the bottom of all joints too shallow for backer rod.
 6. Pipe Sleeves: Pack plumber's oakum tightly into the space behind the sealant backer to a depth of at least 1-inch before installing the sealant and sealant backer in all pipe sleeves in exterior concrete walls below grade.
- B. Sealants:
1. Ensure complete mixing of base and activator. When using mixing equipment, ingredients should be mixed for a minimum of five (5) minutes. Stir mixture slowly to prevent incorporation of air bubbles. Tint sealant to match the color selected.
 2. The application of the sealant shall be done by thoroughly skilled and experienced workers in strict accordance with the manufacturer's instructions.
 3. The joint surfaces shall be sound, clean, and dry.
 4. Mask surfaces adjacent to the joints if necessary to obtain a neat sealer line. Then apply primer and sealant in the manner and with the equipment recommended by the manufacturer.
 5. In joints up to 1/2-inch wide, the depth of the sealant shall be the same as the width. In wider joints, the depth of the sealant shall be half the width of the joint.
 6. Joints shall be tooled within ten (10) minutes of application and the masking tape shall be removed immediately.
 7. Remove excess sealant from nonporous surfaces while in the uncured state with a commercial solvent recommended by the manufacturer of the sealant. On porous surfaces, allow excess sealant to cure, and then remove by abrasion or other approved mechanical means, in a manner that will leave the surfaces clean and uninjured.
- C. Roof Waterproofing:
1. Waterproofing for the roofs of the chambers, including the removable precast roof slabs, shall consist of four (4) plies of roofing felt laid in hot asphalt. Roofing felt shall comply with the requirements of ASTM D226. Asphalt shall comply with the requirements of ASTM D312. Asphalt shall not be heated above 400 degrees Fahrenheit.
 2. Application of Four-Ply Waterproofing:
 - a. The surfaces to be waterproofed shall be primed. All surfaces shall then be covered with four (4) full thicknesses of 15-lb type roofing felt, each set in a uniform coat of hot asphalt.
 - b. Lap each layer of felt 27-1/2 inches.

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- c. Mop asphalt solidly between each 27-1/2 inch lap so that in no place shall felt touch felt. All of the surfaces shall finally be coated with hot asphalt.
 - d. Each coat of asphalt shall be applied at a rate of 30 pounds per 100 square feet.
 - 3. Priming Coat for Waterproofing: Concrete surfaces receiving the waterproofing and dampproofing shall be primed with a uniform brush coat of concrete priming oil conforming to the requirements of ASTM D41, applying one (1) gallon for each 100 square feet.
 - D. Joints:
 - 1. The joints around and between the precast concrete units shall be made watertight by filling them as shown on the Drawings.
 - 2. Finished joints shall be tested as required, and those joints showing leakage shall be refilled at the Contractor's expense.
 - E. Pargeting:
 - 1. Place a 2-inch pargeting coat of mortar, reinforced with 4x4-W10xW10 wire mesh over all horizontal surface waterproofing, as shown on the Drawings.
 - 2. Take all necessary measures to prevent damage to the installed waterproofing. Any damaged part shall be repaired or replaced to the satisfaction of the Engineer.
 - 3. Insofar as practicable, place the pargeting on waterproofing immediately after the waterproofing has been installed.
 - 4. The proportions of pargeting by volume shall be, unless otherwise approved, as follows: 1-part Portland cement, 1 ½ -half parts fine aggregate, 3- parts coarse aggregate not exceeding 3/8-inch in size, and sufficient water to provide for a workable mix.
 - F. Wall Waterproofing
 - 1. Prepare surfaces to be waterproofed per the waterproofing manufacturer's recommendations.
 - 2. Apply liquid waterproofing in strict accordance with the manufacturer's instructions.
 - 3. Prior to backfilling, install protection board to prevent the membrane from being punctured by backfill operations.
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Not Used
- 3.04 STARTUP / DEMONSTRATION
- A. Not Used

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3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 03 21 00 - REINFORCING STEEL
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish and install all reinforcing steel as indicated on the Contract Drawings including all labor, materials, hardware, equipment, transportation, and services required for fabricating, cutting, bending, fastening, placing, and any special work and supplies necessary to hold the reinforcing steel in place and protect it from injury and corrosion in accordance with the requirements of this Section and needed for a complete installation as approved by the Engineer.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 03 30 00 - Cast-In-Place Concrete.

SECTION 03 21 00 - REINFORCING STEEL
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- B. Section 03 41 00 - Precast Structural Concrete
- C. Section 03 45 00 - Precast Architectural Concrete

1.04 REFERENCES

A. American Concrete Institute (ACI):

- 1. ACI 301 - Specifications for Structural Concrete for Buildings.
- 2. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
- 3. ACI 315 - Guide to Presenting Reinforcing Steel Design Details
- 4. ACI 318 - Building Code Requirements for Reinforced Concrete.
- 5. ACI SP66 - Detailing Manual.

B. American Welding Society (AWS):

- 1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

C. American Society for Testing and Materials (ASTM):

- 1. ASTM A82 - Steel Wire, Plain, for Concrete Reinforcement.
- 2. ASTM A184 - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
- 3. ASTM A 1064 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
- 4. ASTM A496 - Steel Wire, Deformed, for Concrete Reinforcement.
- 5. ASTM A497 - Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
- 6. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- 7. ASTM A616 - Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
- 8. ASTM A617 - Axle-Steel Deformed and Plain Bars for Concrete Reinforcement
- 9. ASTM A706 - Low-Alloy Steel Deformed Bars for Concrete Reinforcement
- 10. ASTM A767 - Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
- 11. ASTM A775 - Epoxy-Coated Reinforcing Steel Bars.

D. Concrete Reinforcing Steel Institute (CRSI):

- 1. DA4 - Manual of Standard Practice.

SECTION 03 21 00 - REINFORCING STEEL
CONTRACT KENS-EAST-2

1.05 DESCRIPTION

- A. Placing drawings showing all dimensions necessary for fabrication and placing of the reinforcing steel and accessories without reference to the project drawings shall be submitted for approval. Approval shall be obtained from the Engineer before fabrication.
- B. Details of concrete reinforcement not covered in the Contract shall be in accordance with ACI 315, ACI 318, ACI SP-66, and CRSI DA4.
- C. When it is found necessary to move reinforcement beyond the specified placing tolerances to avoid interference with other reinforcement, conduits, or embedded items, a submittal showing the resulting arrangement of reinforcement shall be submitted to the Engineer for approval.
- D. All reinforcement, at the time concrete is placed, shall be free of mud, oil or other materials that may adversely affect or reduce the bond. Reinforcement with rust, mill scale or a combination of both shall be considered satisfactory provided the minimum dimensions, weight and height of deformation of a hand-wire-brushed test specimen are not less than the applicable ASTM specification requirement.
- E. Provide accurate templates for column dowels to secure their position and to ensure their proper placement in concrete unless otherwise approved by the Engineer. To obtain an approval to place column dowels without using template, the Contractor must submit such request with details how column dowels will be secured in their position while submitting placing drawings specified in this Article.
- F. All splices shall be as indicated on the Contract Documents unless otherwise permitted by the Engineer. Mechanical connections that provide a minimum of 125 percent of the yield strength of the reinforcing bars may be used when permitted by the Engineer.
 - 1. Reinforcement coating shall be removed in the area of the mechanical connection, if so required by the connection manufacturer.
 - 2. After installation of mechanical connections on zinc-coated (galvanized) or epoxy-coated reinforcing bars, coating damage shall be repaired in accordance with the requirements of this Section. All external parts of mechanical connections used on coated bars, including steel splice sleeves, bolts and nuts shall be coated with the same material used for repair of coating damage.
- G. Temperature Reinforcing
 - 1. Unless otherwise shown on the Contract Drawings or in the absence of the concrete temperature reinforcing being shown:
 - a. The minimum cross sectional area of horizontal and vertical concrete temperature reinforcing in walls shall be 0.0033 times the gross concrete area.

SECTION 03 21 00 - REINFORCING STEEL
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- b. The minimum cross sectional area of temperature reinforcing perpendicular to the principal reinforcing in slabs shall be 0.0020 times the gross concrete area.
2. Temperature reinforcing shall not be spaced further apart than five times the slab or wall thickness, nor more than 18 inches.

1.06 QUALITY ASSURANCE

All reinforcement shall be supported and fastened before concrete is placed and shall be secured against displacement within the tolerances permitted in this Section.

1.07 SUBMITTALS

- A. The Contractor shall submit placing drawings, Shop Drawings, and material specifications for the approval of the Engineer. Submittals shall include, but not limited to:
 1. Detailed placement and shop fabrication drawings, prepared in accordance with ACI 315 and ACI SP66 shall be furnished for all concrete reinforcing. These drawings shall be made to such a scale as to clearly show joint locations, openings, and the arrangement, layout, bending, assembly diagrams, bar schedules, spacing, lapping, and splicing of the bars.
 2. Certified copies of mill reports shall accompany all deliveries of reinforcing steel.
 3. Description of the reinforcing steel manufacturer's marking pattern.
 4. Description of proposed supports for each type of reinforcing.
 5. Description of reinforcing weld locations and weld procedures.
- B. The Contractor shall also include the following:
 1. Requests to relocate any bars that cause interferences or that cause placing tolerances to be violated.
 2. Request to use splices not shown on the Contract Drawings.
 3. Request to use mechanical couplers along with manufacturer's literature on mechanical couplers with instructions for installation, and certified test reports on the couplers' capacity.
 4. Request for placement of column dowels without the use of templates.
 5. Request and procedure to field bend or straighten partially embedded reinforcing.
 6. Request to use hooked anchorage systems, dowel bar substitute systems, and dowel bar sleeves, along with manufacturer's literature and instructions for installation, and certified test reports.

SECTION 03 21 00 - REINFORCING STEEL
CONTRACT KENS-EAST-2

1.08 DELIVERY, STORAGE, AND HANDLING

- A. All reinforcing shall be neatly bundled and tagged for placement when delivered to the job site. Bundles shall be properly identified for coordination with mill test reports.
- B. Coating damage zinc-coated (galvanized) reinforcing bars due to handling, shipping and placing shall be repaired in accordance with the requirements of this Section.
- C. Equipment for handling epoxy-coated reinforcing bars shall have protected contact areas. Bundles of coated bars shall be lifted at multiple pickup points to prevent bar-to-bar abrasion from sags in the bundles. Coated bars or bundles of coated bars shall not be dropped or dragged. Coated bars shall be stored on protective cribbing. Coating damage due to handling, shipping and placing shall be repaired in accordance with the requirements of this Section.
- D. Reinforcing steel shall be stored above ground on platforms or other supports and shall be protected from the weather at all times by suitable covering. It shall be stored in an orderly manner and plainly marked to facilitate identification.
- E. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.
- F. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcing shall be re-inspected and if necessary re-cleaned.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Reinforcing Steel:
 - 1. Nucor Corporation, Charlotte, NC 28211; www.nucor.com
 - 2. ArcelorMittal, Chicago, IL; www.usa.arcelormittal.com
 - 3. Gerdau, Tampa, FL; www.gerdau.com
 - 4. Or Approved Equal.
- B. Dowel Adhesive System:
 - 1. The adhesive system shall be:

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- a. HIT HY-150 Injection Adhesive Anchor System as manufactured by Hilti, Inc., Plano, TX; www.hilti.com
- b. Epcon System as manufactured by ITW Ramset/Redhead, Glendale Heights, IL; www.itwredhead.com
- c. Sikadur Injection Gel as manufactured by Sika Corp., Lyndhurst, NY; www.usa.sika.com
- d. Dewalt, Towson, MD; www.dewalt.com
- e. Or Approved Equal.

C. Mechanical Couplers:

1. Nvent Lenton, Solon, OH; www.erico.com.
2. Dayton Superior, Miamisburg, OH; www.daytonsuperior.com.
3. BarSplice Products, Dayton, OH; www.barsplice.com.
4. Or Approved Equal.

2.02 MATERIALS / EQUIPMENT

A. Reinforcement

1. Reinforcing Steel:

- a. All reinforcing steel shall be deformed except spirals and welded wire fabric, which may be plain bars. Reinforcement shall be the grades required by the Contract Documents and shall conform to one of the following specifications:
 - 1) ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 2) ASTM A616 - Rail-Steel Deformed and Plain Bars for Concrete Reinforcement (including supplementary requirements S1).
 - 3) ASTM A617 - Axle-Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 4) ASTM A706 - Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
 - 5) Wire or wire fabric with a specified yield strength f_y exceeding 60,000 psi shall have the stress f_y corresponding to a strain of 0.35 percent.
 - 6) Reinforcing steel shall conform to the applicable requirements of Sections 03 30 00 – Cast-in-Place Concrete, 03 41 00 - Precast Structural Concrete, 03 45 00 -

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Precast Architectural Concrete and the New York City Building Code.

2. Coated Reinforcing Bars:
 - a. Furnish and install coated reinforcing bars for structural concrete Work wherever shown and/or noted on the Contract Drawings.
 - b. Reinforcing bars shall be zinc-coated (galvanized) or epoxy-coated. The reinforcing bars to be coated shall conform to the requirements of this Section.
 - 1) Zinc-Coated (Galvanized) Reinforcing Bars: Zinc-coated (galvanized) reinforcing bars shall conform to ASTM A767. Supplementary requirements S1 and S2 shall apply when fabrication after galvanization includes cutting and bending. Supplementary requirement S2 shall apply when fabrication after galvanization includes only bending. Repair of damaged zinc coating when required shall be made with a zinc-rich formulation conforming to ASTM A767. Repair shall be done in accordance with the material manufacturer's recommendations.
 - 2) Epoxy-Coated Reinforcing Bars: Epoxy-coated reinforcing bars shall conform to ASTM A775. Coating damaged due to shipping, handling and placing need not be repaired in cases where the damaged area is 0.1 square inches or smaller. Repair damaged areas larger than 0.1 square inches with patching material conforming to ASTM A775 and in accordance with the material manufacturer's recommendations. The maximum amount of damage including repaired and unrepaired areas shall not exceed 2 percent of the surface area of each bar. Fading of the coating color will not be cause for rejection of epoxy-coated reinforcement.
3. Bar Mats:
 - a. Furnish and install bar mats for structural concrete Work wherever shown and/or noted on the Contract Drawings.
 - b. Bar mats shall be of the clipped type conforming to ASTM A184 and shall be fabricated from reinforcing bars that conform to the requirements of this Section.
 - 1) Bar mats shall be fabricated from zinc-coated (galvanized) reinforcing bars. Metal clips shall be zinc-coated (galvanized). Non-metallic clips may be used. Coating damage at the clipped intersections shall be repaired in accordance with the requirements of this Section.

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- 2) Bar mats shall be fabricated from epoxy-coated reinforcing bars. Metal clips shall be epoxy-coated. Non-metallic clips may be used. Coating damage at the clipped intersections shall be repaired in accordance with the requirements of this Section.
4. Wire:
 - a. Wire shall be smooth or deformed wire as indicated in the Contract Documents.
 - 1) Smooth wire shall conform to ASTM A82.
 - 2) Deformed wire shall conform to ASTM A496, size D4 and larger.
 5. Welded Wire Fabric:
 - a. Welded wire fabric shall be fabricated from smooth or deformed wire and shall conform to the wire size and wire spacing required or indicated on the Contract Documents. Welded wire fabric shall conform to one of the following specifications:
 - 1) Plain wire fabric ASTM 1064, except welded intersections shall be spaced not farther apart than 12 inches in the direction of the principal reinforcement.
 - 2) Deformed wire fabric ASTM A497, except welded intersections shall be spaced not farther apart than 16 inches in the direction of the principal reinforcement.
 6. Spirals:
 - a. As indicated in the Contract Documents, spirals shall be fabricated from reinforcing bars or wire.
- B. Wire Bar Supports
1. Unless noted otherwise on the Contract Drawings, wire bar supports shall be in accordance with Class 1, maximum protection or Class 2, moderate protection in Chapter 3 of CRSI DA4.
- C. Coated Wire Reinforcement Supports
1. Epoxy-Coated Reinforcement:
 - a. Use wire reinforcement supports coated with dielectric material including epoxy or other polymer for a minimum distance of 2 inches from the point of contact with epoxy-coated reinforcement.
 2. Zinc-Coated Reinforcement:
 - a. Use galvanized wire reinforcements supports or wire reinforcement supports coated with dielectric material with zinc-coated reinforcement.
- D. Precast Concrete Reinforcement Supports

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1. Concrete supports used for supporting reinforcement shall be not less than 4 inches square having a compressive strength equal to or greater than the specified compressive strength of the concrete being placed.

E. Dowel Adhesive System

1. Where shown on the Contract Drawings, reinforcing bars anchored into hardened concrete with a dowel adhesive system shall use a two-component adhesive mix which shall be injected with a static mixing nozzle following manufacturer's instructions.
2. The embedment depth of the bar shall be per manufacturer's recommendations, so as to provide a minimum allowable bond strength that is equal to 125 percent of the yield strength of the bar, unless noted otherwise on the Contract Drawings.
3. The adhesive system shall be as specified in this Section:
4. The Engineer's approval is required for use of this system in locations other than those shown on the Contract Drawings.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Welding

1. When required or permitted, all welding of reinforcing bars shall conform to ANSI/AWS D1.4. Unless otherwise permitted by the Engineer, welding of crossing bars (tack welding) for assembly of reinforcement is prohibited.
2. Welding of wire to wire, and of wire or welded wire fabric to reinforcing bars or structural steels, shall conform to applicable provisions of ANSI/AWS D1.4 and any supplementary requirements specified by the Supervising Engineer for Concrete Construction for the particular application.
3. After completion of welding on zinc-coated (galvanized) or epoxy-coated reinforcing bars, coating damage shall be repaired in accordance with the requirements of this Section. All welds and all steel splice members when used to splice bars shall be coated with the same material used for repair of coating damage.

B. Fabrication

1. All reinforcement shall be bent cold unless otherwise permitted by the Engineer.
2. Fabricating and Placing Tolerances:
3. Reinforcing bars shall be fabricated in accordance with the standard fabricating tolerances in Figures 4 and 5 of ACI 315. Tolerances shall not permit a reduction in cover.
4. Placing Tolerances for Reinforcement:

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Item	Tolerances, Inches
1. Clear distance: a. To formed soffit b. To other formed surfaces	-1/4 ±1/4
2. Minimum spacing between bars:	-1/4
3. Clear distance from unformed surface to top reinforcement: a. Members 8 inches deep or less b. Members more than 8 inches deep but less than 24 inches deep c. Members 24 inches deep or greater	±1/4 -1/4, +1/2 1/4, +1
4. Uniform spacing of bars, but the required number of bars shall not be reduced:	±2
5. Uniform spacing of stirrups and ties, but the number of stirrups and ties shall not be reduced:	±1
6. Longitudinal locations of bends ^o and ends of reinforcement: a. General b. Discontinuous ends of members	±2 ±1/2
7. Length of bar laps:	1-1/2
8. Embedded length: a. For bar sizes No. 3 through 11 b. For bar sizes No. 14 and 18	-1 -2

5. When it is necessary to move bars to avoid interference with other reinforcement, conduits or embedded items exceeding the specified placing tolerances, the resulting arrangement of bars shall be subject to approval of the Engineer.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Testing

1. The Contractor shall provide samples from each load of reinforcing steel delivered in a quantity as directed by the Engineer for testing.
2. In addition, , the Contractor shall also provide samples of each type of welded splice used in the work in a quantity and of dimensions as directed by the Engineer for testing. At the discretion of the Engineer, radiographic testing of direct butt welded splices will be performed. The Contractor shall provide assistance necessary to facilitate testing. The Contractor shall repair any weld which fails to meet the requirements of AWS D1.4.

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3. The testing will be performed by QA/QC consultant employed and paid by the City to ensure that reinforcing steel and welded splice comply with the technical requirements of the Contract.
4. The Contractor shall be charged by the City for the cost of any additional tests and investigation on work performed which does not meet the specifications.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 IMPLEMENTATION

- A. Placing

1. Minimum concrete cover for reinforcement, except for extremely corrosive atmosphere, other severe exposures or fire protection shall be as follows unless indicated otherwise on the Contract Documents.
2. Minimum Concrete Cover for Reinforcement:

Item	Minimum Cover, Inches
1. Slabs and Joists: <ol style="list-style-type: none"> a. Top and bottom bars for dry conditions: <ol style="list-style-type: none"> 1) No. 11 bars and smaller 2) No. 14 and No. 18 bars b. Bars in formed concrete surfaces exposed to water or weather, and over or in contact with sewage and for bottoms bearing on work mat, or slabs supporting earth cover: <ol style="list-style-type: none"> 1) No. 5 bars and smaller 2) No. 6 through No. 18 bars 	 3/4 1-1/2 1-1/2 2
2. Beams and Columns: <ol style="list-style-type: none"> a. For dry conditions: <ol style="list-style-type: none"> 1) Stirrups, spirals and ties 2) Principal reinforcement b. Exposed to earth, water, sewage or weather: <ol style="list-style-type: none"> 1) Stirrups and ties 2) Principal reinforcement 	 1-1/2 2 2 2-1/2
3. Walls: <ol style="list-style-type: none"> a. For dry conditions: <ol style="list-style-type: none"> 1) No. 11 bars and smaller 2) No. 14 and No. 18 bars 	 3/4 1-1/2

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Item	Minimum Cover, Inches
b. Formed concrete surfaces exposed to earth, water, sewage, weather or in contact with ground	2
4. Footings and Base Slabs:	
a. At formed sides and ends and bottoms bearing on concrete work mat	2
b. At unformed surfaces and bottoms in contact with earth	3
c. Top of footings	Same as slabs
d. Over top of piles	2

3. For bundled bars, minimum concrete cover shall be equal to the equivalent diameter of the bundles but need not be greater than 2 inches; except for concrete deposited against and permanently in contact with ground, minimum cover shall be 3 inches. The equivalent diameter of the bundle shall be based on a single bar of a diameter derived from the equivalent total area.
4. Unless otherwise indicated on the Contract Documents, reinforcement supported from the ground or mud mat shall rest on precast concrete blocks not less than 4 inches square and having a compressive strength equal to or greater than the specific compressive strength of the concrete being placed. Other means of support may be used if accepted by the Engineer.
5. Reinforcement supported from formwork shall rest on bar supports made of concrete, metal, plastic or other acceptable materials. Where the concrete surface will be exposed to the weather in the finished structure, the portions of all bar supports within 1/2 inch of the concrete surface shall be non-corrosive or protected against corrosion.
6. Zinc-coated (galvanized) reinforcing bars supported from formwork shall rest on galvanized wire bar supports coated with dielectric material or on bar supports made of dielectric material or other acceptable materials. All other reinforcement and embedded steel items in contact with galvanized reinforcing bars or within a minimum clear distance of 2 inches from galvanized reinforcing bars unless otherwise required or permitted shall be galvanized.
7. Epoxy-coated reinforcing bars supported from formwork shall rest on coated wire bar supports or on bar supports made of dielectric material or other acceptable materials. Wire bar supports shall be coated with dielectric material for a minimum distance of 2 inches from the point of contact with the epoxy-coated reinforcing bars. Reinforcing bars used as support bars shall be epoxy coated. In walls having epoxy-coated reinforcing bars, spreader bars, where specified, shall be epoxy coated.

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Proprietary combination bar clips and spreaders used in wall with epoxy-coated reinforcing bars shall be made of corrosion-resistant material or coated with dielectric material.

8. Zinc-coated (galvanized) reinforcing bars shall be fastened with zinc-coated tie wire or non-metallic-coated tie wire or other acceptable materials.
9. Epoxy-coated reinforcing bars shall be fastened with nylon-epoxy or plastic-coated tie wire; or other acceptable materials.
10. Welded wire fabric for slabs on grade shall extend to within 2 inches of the concrete edge. Welded wire fabric may extend through the contraction joints. Welded wire fabric shall be adequately supported during placing of concrete to assure proper positioning in the slab.
11. Bending or straightening of bars partially embedded in concrete shall not be permitted except when specifically approved by the Engineer. Bending and preheating shall be in accordance with the requirements of this Section.

B. Bending of Bars

1. Minimum Inside Bend Diameters:

- a. The minimum inside bend diameters shall conform to the following requirements unless otherwise permitted by the Engineer.

Bar Size	Minimum Diameter
No. 3 through 8	6 bar diameters
No. 9, 10, 11	8 bar diameters
No. 14 and 18	10 bar diameters

2. The beginning of the bend shall not be closer to the concrete surface than the minimum diameter of bend. Preheating, if required, shall be in accordance with the requirements of the Section. The following requirements shall be adhered to for individual bar sizes:

Bar Size	BEND REQUIREMENTS
No. 3 through No. 5	Bars may be cold bent the first time. Cold bend bars only when temperature is above 32 degrees Fahrenheit. Preheating is required for subsequent straightening or bending.
No. 6 and larger	Preheating is required.

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3. When zinc-coated (galvanized) or epoxy-coated reinforcing bars are field bent, coating damage shall be repaired in accordance with the applicable requirements of the Section.

C. Preheating of Bars

1. Preheating prior to bending or straightening, when required, shall be in accordance with the following requirements:
 - a. The preheat shall be applied to a length of bar equal to at least 5 bar diameters each way from the center of the bend except that preheat shall not extend below the surface of the concrete. The temperature of the bar at the concrete interface shall not exceed 500 degrees Fahrenheit.
 - b. The preheat temperature shall be 1100 to 1200 degrees Fahrenheit.
 - c. The preheat temperature shall be maintained until bending or straightening is complete.
 - d. The preheat temperature shall be measured by temperature measurement crayons, contact pyrometer or other acceptable method.
 - e. Heated bars shall not be artificially cooled until the material temperature is less than 600 degrees Fahrenheit.
2. Preheating may be applied by any method which does not harm the bar material or cause damage to the concrete.

D. Splicing

1. Reinforcing bar splices shall only be used at locations shown on the Contract Drawings. When it is necessary to splice reinforcing at points other than where shown, the character of the splice shall be approved by the Engineer.
2. The length of lap for reinforcing bars, unless otherwise shown on the Contract Drawings shall be in accordance with ACI 318 for a class B splice.
3. Laps of welded wire fabric shall be in accordance with ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each 2 running feet. Wires shall be staggered and tied in such a manner that they cannot slip.
4. Mechanical and welded splices shall be used only where shown on the Contract Drawings or when approved by the Engineer.
5. Couplers which are located at a joint face shall be a type which can be set either flush or recessed from the face as shown on the Contract Drawings. The couplers shall be sealed during concrete placement to completely eliminate concrete or cement paste from entering. After the concrete is

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placed, couplers intended for future connections shall be plugged and sealed to prevent any contact with water or other corrosive materials. Threaded couplers shall be plugged with plastic plugs which have an O-ring seal.

E. Dowel Adhesive System Installation

1. The installation of the dowels shall be done in strict conformance with the manufacturer's recommendations. The dowels shall be supported in the correct position until the adhesive sets and gains enough strength to prevent any dislocation.
2. At least 25 percent of the dowels to be installed shall be proof tested to 1.33 times the allowable load specified by the manufacturer of the adhesive-injection system.
3. If the dowels are required to have a hook at the end to be embedded in the new work, an approved mechanical coupler shall be provided at a convenient distance from the face of existing concrete to facilitate the testing.

F. Miscellaneous Installation Requirements

1. Exposed Reinforcement:
 - a. Reinforcement left exposed for the bonding of future construction shall be effectively protected from corrosion by encasement in cement mortar or by other temporary covering as approved by the Engineer.
2. Field Cutting of Reinforcement:
 - a. Reinforcement shall not be cut in the field except when specifically permitted by the Engineer in writing.
3. Reinforcement Through Expansion Joint:
 - a. Reinforcement or other embedded metal items bonded to the concrete shall not be continuous through any joint intended as an expansion joint. Dowels bonded on only one side of a joint and waterstops may extend through the joint.

3.03 FIELD TESTING / QUALITY CONTROL

A. Inspection

1. No concrete shall be deposited until the Supervising Engineer for Concrete Construction or his approved representative has inspected the placing of the reinforcing steel and has given permission to place the concrete. Concrete placed in violation of this provision may be rejected with subsequent removal by the Contractor.
2. The Contractor shall advise the Engineer of his intentions to place concrete and shall allow him adequate time to inspect all reinforcing steel before concrete is placed.

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3. The Contractor shall advise the Engineer of his intentions to place grout in masonry walls and shall allow him adequate time to inspect all reinforcing steel before grout is placed.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

- A. The Work specified in this Section consists of providing all labor, materials, equipment, supervising, testing and incidentals necessary to furnish and install cast-in-place concrete as indicated on the Contract Drawings and as specified herein.
- B. Work includes producing concrete consisting of Portland cement, fine and coarse aggregate, water and approved admixtures; proportioned, mixed, transported, placed, finished and cured as specified. Work shall also include:
 - 1. Providing openings in concrete as required to accommodate Work under this and other Sections.
 - 2. Building into the concrete all items such as sleeves, frames, anchor bolts and inserts required to accommodate Work.
- C. This Section covers cast-in-place structural concrete for use in buildings, foundations, structures, and miscellaneous cast-in-place concrete.
- D. This Section includes concrete mix designs for precast concrete structures furnished and installed in accordance with Section 03 41 00 – Precast Structural Concrete.
- E. The following index of this Section is presented for convenience:

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1.02	PAYMENT	
A.	No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.	
1.03	RELATED SECTIONS	
A.	Section 03 10 00 -	Concrete Forming and Accessories
B.	Section 03 21 00 -	Reinforcing Steel
C.	Section 03 32 00 -	Joints in Concrete
D.	Section 03 35 00 -	Concrete Finishing
E.	Section 03 41 00 -	Precast Structural Concrete
F.	Section 03 60 00 -	Grouting
1.04	REFERENCES	
A.	American Association of State Highway and Transportation Officials (AASHTO):	
1.	AASHTO M 182	Specification for Burlap Cloth Made From Jute or Kenaf and Cotton Mats
2.	AASHTO T 318	Proposed Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying
B.	American Concrete Institute (ACI):	
1.	ACI CT-18	ACI Concrete Terminology
2.	ACI 117	Specification for Tolerances for Concrete Construction and Materials and Commentary
3.	ACI 207.1R	Guide to Mass Concrete
4.	ACI 211.1	Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete

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5. ACI 213R Guide for Structural Lightweight-Aggregate Concrete
 6. ACI 214R Guide to Evaluation of Strength Test Results of Concrete
 7. ACI 301 Specification for Structural Concrete
 8. ACI 302.1R Guide to Concrete Floor and Slab Construction
 9. ACI 304R Guide for Measuring, Mixing, Transporting and Placing Concrete
 10. ACI 305R Guide to Hot Weather Concreting
 11. ACI 306R Guide to Cold Weather Concreting
 12. ACI 308.1 Specification for Curing Concrete
 13. ACI 309R Guide for Consolidation of Concrete
 14. ACI 311.4R Guide for Concrete Inspection
 15. ACI 318 Building Code Requirements for Structural Concrete and Commentary
 16. ACI 347R Guide to Formwork for Concrete
 17. ACI 506R Guide to Shotcrete
 18. ACI 506.2 Specification for Shotcrete
 19. ACI MNL-2 ACI Manual of Concrete Inspection
 20. ACI MNL-15 Field Reference Manual: Standard Specifications for Structural Concrete ACI 301 with selected ACI references.
- C. American National Standards Institute/National Science Foundation (ANSI/NSF) Standard 61 - “Drinking Water System Components - Health Effect”
- D. American Society for Testing and Materials (ASTM)
1. ASTM C 31 Standard Practice for Making and Curing Concrete Test Specimens in the Field
 2. ASTM C 33 Standard Specification for Concrete Aggregates
 3. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 4. ASTM C40 Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
 5. ASTM C 42 Standard Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

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6. ASTM C 88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
7. ASTM C 94 Standard Specification for Ready-Mixed Concrete
8. ASTM C 109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
9. ASTM C 138 Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
10. ASTM C 143 Standard Test Method for Slump of Hydraulic Cement Concrete
11. ASTM C 150 Standard Specification for Portland Cement
12. ASTM C 157 Standard Test Method for Length Change of Hardened Hydraulic-Cement, Mortar, and Concrete
13. ASTM C 171 Standard Specification for Sheet Materials for Curing Concrete
14. ASTM C 172 Standard Practice for Sampling Freshly Mixed Concrete
15. ASTM C 173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
16. ASTM C 227 Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations
17. ASTM C 231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
18. ASTM C 260 Standard Specification for Air-Entraining Admixtures for Concrete
19. ASTM C 295 Standard Guide for Petrographic Examination of Aggregates for Concrete
20. ASTM C 309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
21. ASTM C 311 Test Method for Sampling & Testing Fly Ash or Natural Pozzolans for Use in Concrete
22. ASTM C 330 Standard Specification for Lightweight Aggregates for Structural Concrete
23. ASTM C 387 Standard Specification for Packaged, Dry Combined Materials for Mortar and Concrete
24. ASTM C 470 Standard Specification for Molds for Forming Concrete Test Cylinders Vertically

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25. ASTM C 494 Standard Specification for Chemical Admixtures for Concrete
26. ASTM C 567 Standard Test Method for Density Structural Lightweight Concrete
27. ASTM C 595 Standard Specification for Blended Hydraulic Cements
28. ASTM C 618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
29. ASTM C845 Standard Specification for Expansive Hydraulic Cement
30. ASTM C 881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
31. ASTM C 882 Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear
32. ASTM C 979 Standard Specification for Pigments for Integrally Colored Concrete
33. ASTM C 989 Standard Specification for Slag Cement for Use in Concrete and Mortars
34. ASTM C 1064 Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete
35. ASTM C 1077 Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
36. ASTM C 1141 Specification for Admixtures for Shotcrete
37. ASTM C 1157 Standard Performance Specification for Hydraulic Cement
38. ASTM C 1240 Standard Specification for Silica Fume for Use as a Mineral Admixture in Hydraulic-Cement Concrete, Mortar, and Grout
39. ASTM C 1260 Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
40. ASTM C1293 Standard Test Method for Determination of Length Change of Concrete due to Alkali-Silica Reaction
41. ASTM C 1398 Test Method for Laboratory Determination of time of Setting of Hydraulic-Cement Mortars Containing Additives for Shotcrete by the Use of Gillmore Needles

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42. ASTM C 1480 Packaged, Pre-Blended, Dry, Combined Materials for Use in Wet or Dry Shotcrete Application
 43. ASTM C 1567 Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
 44. ASTM C1602 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
 45. ASTM E 329 Standard Specification for Agencies Engaged in the Construction Inspection Testing of Special Inspection
- E. 2020 Building Code of New York State (NYSBC)
- F. Concrete Plant Manufacturer’s Bureau (CPMB) - “Concrete Plant Standards.”
- G. Concrete Reinforcing Steel Institute (CRSI):
1. CRSI – “Manual of Standard Practice”
 2. CRSI – “Placing Reinforcing Bars”
- H. National Ready Mixed Concrete Association (NRMCA)
- I. New York State Department of Transportation (NYS DOT) - Standard Specifications
- J. Portland Cement Association (PCA) – “The Design and Control of Concrete Mixtures”
- K. Definitions
1. CQAS - DEP’s Concrete Quality Assurance Service program managed by the Bureau of Engineering Design and Construction’s Engineering Services group within the In-House Design directorate.
 2. Inspection Requirements – Special Inspections and testing requirements of the Building Code of New York State as defined in NYSBC 1705.3 and 1903 shall apply to all applicable materials and construction.
 3. Lightweight Concrete - Concrete intentionally made to have low density by use of lightweight aggregate and usually required to have an air-dry unit weight less than 115 lbs. per cubic foot.
 4. Normal Weight Concrete - Concrete for which density is not a controlling attribute, made with aggregates of types covered by ASTM C 33, and usually having unit weights in the range of 135 to 160 lbs. per cubic foot.
 5. Supervising Engineer for Concrete Construction - Professional Engineer designated by the Commissioner and acceptable to the Engineer who will be responsible for the Special Inspections and for

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coordination and compliance with the DEP's CQAS Program. The Supervising Engineer for Concrete Construction may or may not be the Resident Engineer. The Supervising Engineer for Concrete Construction shall undertake all responsibilities outlined in Article 28 and NYSBC 1705.3 Special Inspections. Unless otherwise approved by the Engineer, the Supervising Engineer for Concrete Construction shall maintain his/her office and all records at the job site.

6. Other technical words and terms used in this Section are defined in ACI CT-18.

1.05 DESCRIPTION

A. Classes of Concrete:

1. Class 25 - use for lean concrete.
2. NYSDOT Class D concrete for sidewalks, headers and curbs.
3. Class 40 - See Contract Drawings for usage.
4. Class 45 -use for utility and civil structures, see Contract Drawings for usage
5. Class 50LW - use for structural Lightweight Concrete, see Contract Drawings for usage.
6. Class 50LWPG - use for structural Lightweight Concrete with pea gravel aggregates, see Contract Drawings for usage
7. Class 50 - see Contract Drawings for usage
8. Class 50F - use as an alternate to Class 50 for:
 - a. Foundations
 - b. Walls greater than or equal to 18inches in thickness
9. Class 50M - use for mass concrete.
10. Class 50HES - use for High Early Strength concrete, minimum 4,500 psi at 7 days.

B. Work in Connection with other disciplines:

1. All sleeves, inserts, anchors and embedded items required for adjoining work or for its support shall be placed prior to concreting. No concrete shall be deposited until the Resident Engineer or their authorized representative has inspected the placement of the embedded items and the reinforcing bars and has given his permission to place the concrete.
2. All Work related to the concrete or must be supported by it, shall be coordinated with the work of this Section, including but not limited to

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the introduction or furnishing of embedded items prior to concrete placement.

3. Electrical conduits, junction boxes or pipes shall be placed prior to concreting. The Contractor shall coordinate the placement of such items of work in order that they are installed in accordance with Contract requirements as approved. The Contractor shall protect such installations to the extent that they are not displaced or damaged during concrete placement.
4. Openings in slabs shall be provided for pipes, conduits and the like required for the work of others where indicated on the Contract Drawings or for which directions are given prior to placing concrete. When work of others is completed, the excess part of the respective openings shall be completely closed up to the pipe sleeve and/or inserts to match the adjoining work.
5. Sleeves for miscellaneous metalwork, castings, pipes and anchors furnished shall be set true and to proper alignment in the concrete as indicated on the Contract Drawings or required by the manufacturer's templates.
6. Voids in embedment shall be filled temporarily with readily removable material to prevent entry of concrete into the void.

1.06 QUALITY ASSURANCE

A. General:

1. Work performed under this Section shall comply with the applicable provisions and recommendations in Article 1.04 - References of this Section.
2. The Contractor shall be solely responsible for the quality of concrete produced under this Contract throughout all phases of construction to include the design of mixes and the preparation and testing of trial batches prior to the commencement of concrete operations and throughout the progress of the Work. The actions of any testing laboratory, whether employed by the Contractor or by the City or its representatives, shall not relieve the Contractor of this responsibility.
3. Concrete materials and operations will be tested and inspected by the Supervising Engineer for Concrete Construction or their authorized representative as the work progresses. Failure to detect defective work or material shall not in any way prevent later rejection when a defect is discovered, nor shall it obligate the Engineer for final acceptance.
4. The Contractor shall coordinate with the representatives of the DEP CQAS program to provide access for sampling of fresh concrete, hardened concrete, and concrete materials as requested.

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5. Materials and installed work may require testing and retesting, as directed by the Engineer, at any time during the progress of the Work. The Contractor shall allow free access to material stockpiles and facilities at all times. Tests not specifically indicated to be done at the City's expense, including the retesting or rejected materials and installed Work, shall be done at the Contractor's expense. Testing designated as being performed by the City will not prevent the Contractor from performing independent or additional testing at his expense.
- B. Qualifications
1. Testing Laboratory:
 - a. The Contractor shall employ, at its own expense, a testing laboratory experienced in the concrete mix design and testing of concrete materials and mixes. This laboratory shall be responsible for all concrete mix design and trial batch and shrinkage testing.
 - b. Testing agencies that perform testing services on concrete shall meet the requirements of ASTM E 329.
 - c. Testing laboratory shall have been inspected within the last 2 years by the Cement and Concrete Reference Laboratory (CCRL) of the National Institute of Standards and Technology for testing concrete aggregates and for the preparation and testing of concrete trial batches with or without admixtures. The laboratory shall provide documentation indicating how any deficiencies in the latest CCRL inspection report have been corrected.
 - d. Testing and inspection shall be conducted in accordance with the requirements of ASTM C 1077 and other applicable standards.
 - e. Tests of concrete required by this Section shall be made by an ACI Concrete Field Testing Technician Grade 1 or equivalent. Equivalent certification programs shall include requirements for written and performance examinations as stipulated in ACI publication CP1.
 2. Batch Plant:
 - a. The concrete batch plant whether an on-site plant operated by the Contractor or an off-site Ready-Mixed Concrete Supplier, shall meet all qualifications required by the "Concrete Plant Standards" of the Concrete Plant Manufacturers Bureau published by the CPMB of Silver Spring, Maryland.

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- b. Approval of concrete batch plants as outlined above is subject to the continuous checking and acceptance by the Commissioner or their duly authorized representative.
 - 3. Mass Concrete – Thermal Control Plan
 - a. Thermal Control Plan shall be developed by a Professional Engineer, licensed and registered in the state of New York and competent in the modeling, design, and temperature control of mass concrete (T.C. Engineer). T.C. Engineer shall have a minimum of 10 years of experience in mass concrete design and installation/placement and have completed at least five mass concrete projects of similar dimension and thermal control requirements that are comparable to the mass concrete work of this Contract.
- C. Preconstruction Testing:
 - 1. Testing of proposed concrete materials and mix designs including trial batch and shrinkage testing shall be at the Contractor’s expense.
 - 2. Laboratory Trial Batch:
 - a. Each concrete mix specified shall be verified by a laboratory trial batch, unless indicated otherwise. Each trial batch shall also be witnessed by a DEP representative, unless otherwise approved.
 - b. Each trial batch shall be reported on DEP’s Mix Design Submittal (MDS) forms and shall include the following testing:
 - 1) Aggregate gradation for fine and coarse aggregates.
 - 2) Combined aggregate gradation including total percentage of each aggregate size retained on each sieve.
 - 3) Fly ash testing to verify meeting specified properties, unless certification by an independent testing laboratory is provided by the fly ash supplier.
 - 4) Slump.
 - 5) Air content.
 - 6) Compressive strength based on 3 cylinders tested at 7 days and 3 cylinders tested at 28 days (6 cylinders minimum.)
 - 7) Shrinkage test, as specified herein.
 - c. Each trial batch shall provide the following information:
 - 1) Project identification name and number.

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- a) Specified strength $f'c$.
 - b) Name of the concrete producer supplying materials.
 - c) Name of the Design Trial Lab.
- 2) Date of trial.
 - 3) Complete identification of aggregate source of supply.
 - 4) Tests of aggregates for compliance with specified requirements.
 - 5) Scale weight of each aggregate.
 - 6) Absorbed water in each aggregate.
 - 7) Brand, type and composition of cement.
 - 8) Brand, type and amount of each admixture.
 - 9) Amounts of water used in trial mixes.
 - 10) Proportions of each material per cubic yard.
 - 11) Gross weight and yield per cubic yard of trial mixtures.
 - 12) Measured slump.
 - 13) Measured air content.
 - 14) Shrinkage test results where required and as specified herein.
 - 15) A minimum of three (3) trial runs with different water/cement ratios shall be performed for each mix design proposed.
 - 16) Compressive strength developed at 7 days and 28 days, and if required, 56 days or longer. A minimum of three (3) test cylinders shall be cast for each 7-day, 28-day and if required, 56-day test for each trial run.
- d. The requirement for a trial batch may be waived if the required test information has been provided in a previous laboratory trial batch run on the identical mix design within the previous twelve (12) months and the history of the concrete mix field results are acceptable to the Supervising Engineer for Construction. The same brand, type, source and supplier of all materials must have been used.
 - e. On the day of the trial test, the laboratory shall provide to the DEP witness a 1-2 lb. neat cement sample for delivery to the

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DEP Laboratory for chemical composition analysis, for fly ash and slag and cement.

3. Shrinkage Test:
 - a. Drying shrinkage tests, as specified herein, shall be performed with every trial batch test.
 - b. Drying shrinkage specimens shall be 4-inch by 4-inch by 11-inch prisms with an effective gage length of 10 inches, fabricated, cured, dried and measured in accordance with ASTM C 157 modified as follows: Specimens shall be removed from molds at an age of 23 \pm 1 hours after trial batching, shall be placed immediately in water at 70 degrees F \pm 3 degrees F for at least 30 minutes, and shall be measured within 30 minutes thereafter to determine original length and then submerged in saturated lime water at 73 degrees F \pm 3 degrees F. Measurement to determine expansion expressed as a percentage of original length shall be made at age 7 days. This length at age 7 days shall be the base length for drying shrinkage calculations (“0” days drying age). Specimens then shall be stored immediately in a humidity control room maintained at 73 degrees F \pm 3 degrees F and 50 percent \pm 4 percent relative humidity for the remainder of the test. Measurements to determine shrinkage expressed as percentage of base length shall be made and reported separately for 7, 14, 21, and 28 days of drying after initial 7 days of moist curing.
 - c. The drying shrinkage deformation of each specimen shall be computed as the difference between the base length (at “0” days drying age) and the length after drying at each test age. The average drying shrinkage deformation of the specimens shall be computed to the nearest 0.0001 inch at each test age. If the drying shrinkage of any specimen departs from the average of that test age by more than 0.0004-inch, the results obtained from that specimen shall be disregarded. Results of the shrinkage test shall be reported to the nearest 0.001 percent of shrinkage.
 - d. The maximum concrete shrinkage for specimens cast in the laboratory from the trial batch, as measured at 21-day drying age or at 28-day drying age shall be 0.039 percent or 0.045 percent, respectively. The Contractor shall only use a mix design for construction that has first met the trial batch shrinkage requirement.

1.07 SUBMITTALS

- A. Product Data:

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1. Mix Designs:
 - a. Mix designs shall be submitted to the Engineer for approval before their first use. Proposed mix proportions and all related data, in a format acceptable to the Engineer, shall be submitted to the Engineer for review six (6) weeks before the start of any concreting operations.
 - b. Mix design submittals shall be complete and shall include all methods and test data used to establish proportions to include a four-point curve (of four different w/c ratios and corresponding compressive strengths), compressive strength test results, shrinkage test results, and information on all concrete materials as specified herein.
 - c. Prior to changing the brand, type, size or source of cementitious materials, aggregates, water, ice or admixtures, including changing of mix proportions new historical field strength test data, data from new trial mixtures or evidence which indicates that the change will not adversely affect the relevant properties of the concrete shall be submitted. Adjustments to admixture dosage do not require new trial batch testin.
2. Materials:
 - a. Submit the proposed source of all cementitious material and the proposed sources for coarse and fine aggregate.
 - b. For fine & coarse aggregates, submit petrographic analysis report (in accordance with ASTM C 295) and expansion results by mortar bar tests (in accordance with ASTM C 1260) confirming that aggregate meet specification requirement and are not susceptible to alkali-aggregate reaction.
 - c. Submit cement mill test reports or certified laboratory test results demonstrating that all cementitious materials meet the requirements of this Section.,
 - d. Submit certified laboratory test results demonstrating that all aggregates conform to the requirements of this Section.
 - 1) Aggregates or materials approved by the Materials Bureau of the New York State Department of Transportation (NYSDOT), in the most recent NYSDOT approved lists may be acceptable for use without a detailed submission at the discretion of the Engineer. The submittal must state the particular material or aggregate source to be used with approval identification number, and/or page number.

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- 2) If aggregate will be produced on site, submit the layout of the aggregate processing plant and a description of its equipment and functioning.
 - e. Submit manufacturer’s data sheets for all admixtures proposed for use. The manufacturer shall certify that all admixtures to be combined in each batch of concrete are compatible.
 - f. For concrete that can be in contact with potable water, submit documentation that all materials are NSF-61 compliant.
 - g. Submit manufacturer’s product data for materials incidental to concrete construction to include:
 - 1) Epoxy bonding agents
 - 2) Finishing aids
 - 3) Curing and protection materials
 - 4) Crack injection materials
 - 5) Concrete repair materials
 - 6) Prepackaged mortar.
 3. Equipment:
 - a. Submit a complete description of all equipment that is proposed for batching, mixing, transporting, conveying, placing, consolidating, and curing concrete.
 - b. If concrete is proposed to be batched on-site, submit all pertinent information as required by the “Concrete Plan Standards of the Concrete Plant Manufacturers Bureau” published by the CPMB.
 - c. If Ready-Mixed concrete is proposed for use, submit the identification of the Ready-Mixed Concrete Supplier, the physical capacity of the plant, trucking facilities available, distance of plant from the site, and the estimated amount of concrete which can be produced and delivered to site in a normal eight (8) hour day, considering output to other customers.
- B. Certifications:
1. All materials used in the manufacture of concrete shall be accompanied by a certificate from the manufacturer or fabricator or supplier indicating test results of current production stockpiles or shipments.
 2. Submit notarized certification of conformance to referenced standards when requested by Engineer.

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3. Submit certifications that proposed testing laboratories meet the requirements of this Section.
 4. Submit certification that the proposed batch plant conforms to the requirements of the Concrete Plant Standards.
- C. Shop Drawings:
1. Working lift drawings showing the proposed sequence for placing concrete, to include the location of all construction joints. Lift drawings shall be coordinated with reinforcement drawings, formwork drawings, and drawings produced by other disciplines to show items embedded in concrete as described elsewhere in these Specifications. Lift drawings shall also be coordinated with submittals for placement and conveyance equipment as specified in this Section.
 2. Calculations, signed and sealed by a Professional Engineer licensed in the State of New York, demonstrating the minimum compressive strength required for the removal of forms and the loading of structures.
- D. Qualification
1. Submit qualifications of testing company with a list containing at least five mass concrete projects on which the testing company had participated. In the list of projects include names and phone numbers of owner's representatives who can verify the testing company participation on those projects.
- E. Workplan, Methodology, and Special Procedure Submittals
1. Submit details for transporting, placing, and curing concrete for final lining, ring beams and refill concrete for shaft and tunnel connection as shown on the Drawings. This shall include, but not be limited to:
 - a. Details for equipment, schedules, labor, supplies, and other information as necessary, of the proposed method for placing and curing the concrete for the shaft.
 - b. Layout of surface facilities and details for transporting concrete to placement areas. Details of pumping pressures and rates, placement sequences and volumes, lift thicknesses, and the theoretical quantity for each concrete placement including curing.
 - c. Lift drawings showing details of delivery pipes, slicklines, injection ports, and other materials.
 - d. Methods for diverting groundwater and construction water away from concreting operations.

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- e. Details for proposed sequence and schedule for supporting, installing and aligning procedures for , 30 inch diameter stainless steel casing pipes in uptake shaft during installation of concrete lining.
 - 2. Submit proposed procedures for bonding new concrete work to existing concrete.
 - 3. Submit proposed procedures for protection and curing of concrete.
 - 4. Submit procedures for removing stains, rust, efflorescence, surface deposits.
 - 5. Submit procedures for plugging tie holes or for other minor surface defects.
 - 6. Submit procedures for repair of defective concrete.
 - 7. Submit proposed methods for measuring concrete compressive strength for termination of curing such as maturity, penetration resistance, pulse velocity, rebound hammer, or pullout strength.
 - 8. Submit special procedures for protection of concrete under wet weather placement conditions.
 - 9. Submit special procedures for placement of concrete under water.
 - 10. Submit special procedures for placement and curing of concrete under hot and cold weather conditions.
 - 11. Mass Concrete
 - a. Thermal Control Plan: Submit the Thermal Control Plan (TCP) sign and sealed by T.C. Engineer; at a minimum furnishing submittals listed in ACI-301 and elaborating Heat Dissipation Study (Reference ACI 207 or thermal modeling software) prepared by the T.C. Engineer for each mass concrete element of the Contract (i.e. for Shaft lining 3 ft or more thickness, Shaft bottom slab, and any other mass concrete Work that has section three feet or more in the least dimension). TCP shall also describe the measures and procedures the Contractor intends to use to satisfy Temperature Control Requirements for mass concrete specified in this Section.
 - b. Submit placement plans for each mass concrete element showing all temperature sensors and manufacturer’s installation instructions and operating manuals for all related equipment to the Engineer for approval prior to its placement.
- F. Field Quality Control

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1. Submit placement card and request to place concrete to the Engineer at least 48 hours in advance of the planned placement.
 2. Submit copies of all delivery tickets for each load of Ready-Mixed concrete received to site. Delivery tickets shall contain all information specified in ASTM C94.
 3. Submit batch tickets for each batch of job-site mixed concrete.
 4. Submit all temperature data related to the mass concrete placement and curing demonstrating that the placement conformed to the submitted thermal control plan.
 5. Submit compressive strength test results as may be required to demonstrate sufficient curing of concrete as specified in this Section along with request for early termination of curing.
- G. Submit samples of materials as specified and as otherwise may be requested by the Engineer, including names, sources, and descriptions.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Delivery and Acceptance Requirements.
1. The Contractor shall make all arrangements to ensure the steady and uninterrupted delivery of concrete to prevent the formation of cold joints.
 2. The batch plant shall have sufficient capacity to ensure the completion of all work within the time stipulated by the Contract Documents.
 3. The Contractor shall take action to reduce noise created by concrete batching, delivery, and surface placement operations, particularly those performed at night, and shall ensure compliance with all specified noise requirements.
 4. Ready-mixed concrete delivered from an off-site batch plant shall not be allowed on site without a valid delivery ticket. Concrete batched onsite shall not be placed until a valid batch ticket is produced and delivered to the Engineer.
- B. Storage and Handling Requirements.
1. Cement shall be stored in weather tight buildings, bins or silos which will provide protection from dampness and contamination and will minimize warehouse set.
 2. Cements of different types shall be stored separately. Contractor shall ensure that appropriate measures are in place to prevent cross-contamination at any point in the batching process.

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3. Transport and stockpile aggregates separately according to sources and gradations. Handle aggregate to prevent segregation, intermingling loss of fines, and contamination by earth or foreign materials. Tests for determining conformance to requirements for cleanliness and grading shall be performed on samples secured from the aggregates at the point of batching. Frozen or partially frozen particles shall not be used.
4. Each size of coarse and fine aggregate shall be kept in a separate hopper or bin.
5. Stockpiles of natural sand shall be allowed to drain freely to minimize variations in moisture content throughout the stockpile.
6. All aggregates shall be delivered to the batching plant bins by a belt conveyor or other approved means; and the operation thereof shall be controlled so as to prevent the mixing of the sizes and kinds of aggregates with each other. Any mixture of fine and coarse aggregates or of the two sizes of coarse aggregate in the batching plant bins or prior thereto shall be cause for rejection of such materials, and the affected bin or bins shall be emptied and inspected prior to refilling with the correctly graded aggregate.
7. Admixtures shall be stored in such a manner as to avoid contamination, evaporation or damage. For those used in the form of suspensions or non-stable solutions, suitable agitating equipment shall be provided to assure uniform distribution of the ingredients.
8. Liquid admixtures shall be protected from freezing and other temperature changes which would adversely affect their characteristics. All admixture containers shall be clearly marked with paint as to their content and dosage.
9. All admixture containers shall be clearly marked as to their content and dosage.
10. Lightweight Aggregates:
 - a. Cover or presoak coarse and fine lightweight aggregates when transporting them.
 - b. Presoak dry lightweight aggregates unless presoaking is not recommended by the aggregate supplier or is not acceptable to the Engineer. Leave presoaked aggregates in the stockpile after soaking for at least 12 hours before using.
 - c. Do not allow machinery to run over lightweight aggregates.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

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1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The concrete materials and their manufactures listed in this paragraph below are furnished for the information of the Contractor.
- B. The Contractor shall note that all materials used in concrete and for the curing and repair of concrete which can contact potable water, as determined by Engineer, shall be certified as meeting the requirements of ANSI/NSF 61 for contact with potable water. Accordingly, Contractor must select and furnish all materials used in concrete and for the curing and repair of concrete (i.e., either NSF approved materials or regular non-NSF approved materials) that is appropriate for the Work and which satisfy requirements of this specification and has Engineer's approval.
- C. Cementitious Materials
1. Silica fume (Non NSF 61 approved) shall be one of the following:
 - a. MasterLife SF100, as manufactured by BASF Construction Chemicals, LLC, Florham Park, NJ; www.buildingsystems.basf.com
 - b. Force 10,000 D, as manufactured by GCP Applied Technologies, Cambridge, MA.; www.gcpat.com
 - c. Sikacrete 950 DP, as manufactured by Sika Corp., Lyndhurst, NJ; www.usa.sika.com
 - d. Eucon MSA, as manufactured by the Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - e. Or approved equal.
- D. Concrete Admixtures:
1. See Contract Drawings for additional admixture requirements.
 2. Shrinkage reducing admixtures shall be one of the following:
 - a. Eclipse, as manufactured by GCP Applied Technologies, Cambridge, MA.; www.gcpat.com
 - b. MasterLife SRA series and MasterLife CRA 007 as manufactured by BASF Construction Chemicals, LLC, Florham Park, NJ; www.buildingsystems.basf.com

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- c. Sika Control NS, as manufactured by Sika Corp., Bayville, NJ (NSF/ANSI Standard 61 Approved)
 - d. Or approved equal.
3. Corrosion inhibiting admixture shall be one of the following:
- a. DCI or DCI-S, as manufactured by GCP Applied Technologies, Cambridge, MA; www.gcpat.com
 - b. MasterLife CI30, as manufactured by BASF Construction Chemicals, LLC, Florham Park, NJ; www.buildingsystems.basf.com
 - c. Eucon CIA, as manufactured by Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - d. Hycrete X1002, as manufactured by Hycrete, Inc., Carlstadt, NJ. www.hycrete.com (NSF/ANSI Standard 61 Approved)
 - e. Sika Ferro Gard 903, as manufactured by Sika Corp., Bayville, NJ. www.usa.sika.com (NSF/ANSI Standard 61 Approved)
 - f. Cortec MCI-2005 NS, as manufactured by Cortec Corporation, St. Paul, MN. www.cortecvci.com (NSF/ANSI Standard 61 Approved)
 - g. Or approved equal.
4. Crystalline waterproofing shall be one of the following:
- a. ADMIX as manufactured by Penetron International, East Setauket, NY; www.penetron.com
 - b. Sika WT-215P as manufactured by Sika Corp., Lyndhurst, NJ (NSF/ANSI Standard 61 Approved); www.usa.sika.com
 - c. Krystol Internal Membrane (KIM) as manufactured by Kryton, Vancouver, British Columbia, Canada; www.kryton.com
 - d. MasterLife 300D as manufactured by BASF, Florham Park, NJ; www.buildingsystems.basf.com.
 - e. Or approved equal.
5. Viscosity Modifying (Non NSF 61 approved) shall be one of the following:
- a. Sika Stabilizer-4R as manufactured by Sika Corp., Lyndhurst, NJ; www.usa.sika.com

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- b. MasterMatrix VMA 358, 362, or 450 as manufactured by BASF Construction Chemicals, LLC, Florham Park, NJ; www.buildingsystems.basf.com
 - c. Or approved equal.
- E. Concrete bonding agent:
 - 1. Two component epoxy-resin bonding agent shall be one of the following:
 - a. Sikadur 32, Hi Mod LPL, as manufactured Sika Corp., Lyndhurst, NJ; www.usa.sika.com
 - b. Duralkote 61 LPL MV, as manufactured by the Euclid Chemical Company, Cleveland, OH; (NSF/ANSI Standard 61 Approved); www.euclidchemical.com
 - c. Pro-Poxy 200 as manufactured by Dayton-Superior, Miamisburg, OH; (NSF/ANSI Standard 61 Approved); www.daytonsuperior.com
 - d. FX-752 as manufactured by Simpson Strong-Tie, Pleasanton, CA; www.strongtie.com
 - e. Or approved equal.
 - 2. Three component epoxy modified cementitious bonding agent shall be one of the following:
 - a. Sika Armatec 110 EpoCem, as manufactured by Sika Corp., Lyndhurst, NJ; www.usa.sika.com
 - b. Or approved equal.
- F. Finishing Aids:
 - 1. Evaporation retardant shall be one of the following:
 - a. MasterKure ER 50, as manufactured by BASF Construction Chemicals, LLC, Florham Park, NJ; www.buildingsystems.basf.com
 - b. Eucobar, as manufactured by Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - c. SikaFilm, as manufactured by Sika Corp., Lyndhurst, NJ; www.usa.sika.com
 - d. SikaTard -440 as manufactured by Sika Corp., Fairless Hills, PA. (Approved NSF/ANSI Standard 61)
 - e. Or approved equal.
- G. Curing and Protection Materials:

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1. Curing compounds shall be one of the following:
 - a. Super Aqua Cure VOX, as manufactured by Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - b. Sealtight 1100, as manufactured by W.R. Meadows, Inc., Hampshire, IL; www.wrmeadows.com
 - c. MasterKure, as manufactured by BASF Construction Chemicals, LLC, Florham Park, NJ; www.buildingsystems.basf.com
 - d. Atlas Quantum-Cure NSF, as manufactured by Atlas Tech Products. Sandiego, CA.; (Approved NSF/ANSI Standard 61)
 - e. Or approved equal.
 2. Temperature Monitoring Equipment:
 - a. IQT-Meter or IQM-Meter as manufactured by James Instruments Inc., Chicago, IL; www.ndtjames.com
 - b. HCS T1 or HCS T2, as manufactured by Hilti Corporation; www.hilti.com.
 - c. Or approved equal.
- H. Crack Injection Materials:
1. Epoxy (Non NSF 61 approved):
 - a. Epoxies for injection shall be one of the following:
 - 1) Sikadur 35, Hi Mod L.V. and Sikadur 31, Hi-Mod Gel, as manufactured by Sika Corp., Lyndhurst, NJ; www.usa.sika.com
 - 2) Dural Injection Gel, as manufactured by Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - 3) Or approved equal.
 2. Hydrophilic Resin (Non NSF 61 approved):
 - a. Hydrophilic resins shall be one of the following:
 - 1) Sika Inject 215, as manufactured by Sika Corp., Lyndhurst, NJ; www.usa.sika.com
 - 2) Or approved equal.
- I. Concrete Repair Materials:
1. Concrete repair mortar shall be one of the following:

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- a. Five Star Structural Concrete, as manufactured by Five Star Products, Inc., Shelton, CT; www.fivestarproducts.com
 - b. SikaTop 122 Plus, SikaTop 123 Plus, SikaTop 111 Plus, or Sikacem 133, as manufactured by Sika Corp., Lyndhurst, NJ; www.usa.sika.com
 - c. MasterEmaco S 488CI or S 466-CI, as manufactured by BASF Construction Chemicals, LLC, Florham Park, NJ; www.buildingsystems.basf.com
 - d. Verticoat or Verticoat Supreme, as manufactured by the Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - e. EucoRepair V100, as manufactured by Euclid Chemical Company, Cleveland, OH; (NSF/ANSI Standard 61 Approved).
 - f. Or approved equal.
- J. Concrete Bond Breakers shall be a non-staining type which will provide a positive bond prevention, such as the following:
- 1. Silcoseal Advantage by Nox-Crete Inc., Omaha, NE, www.nox-crete.com
 - 2. Easy-Lift E by Atlas Construction Supply, Inc., San Diego, CA, www.atlasform.com
 - 3. Or approved equal.
- 2.02 MATERIALS / EQUIPMENT
- A. All materials used in concrete or the curing and repair of concrete, which can contact potable water, shall be certified as meeting the requirements of ANSI/NSF 61 for contact with potable water when in the finished concrete.
 - B. The Contractor shall note that concrete for all Outlet Structures included in this Contract shall be considered to be in contact with potable water. Accordingly, for all concrete work of outlet structures, the Contractor must furnish & use NSF approved concrete materials at no additional cost to city.
 - C. Materials listed in this Section apply to all concrete unless specified otherwise in the Contract.
 - D. Cementitious Materials
 - 1. Cement:
 - a. Cement shall be produced by an acceptable, recognized manufacturer. The cement shall be produced by one plant only per mix design. Alternate cement sources may be used provided

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- that a mix design has been accepted and a trial batch verifying performance has been made.
- b. Cement which has deteriorated because of improper storage or handling shall be rejected.
 - c. Cement for concrete which can contact potable water (see requirements stated in Para 2.02 A & B above)
 - 1) Portland cement shall comply with the requirements of, ASTM C 150, Type II with an alkali content below 0.70%.
 - 2) Cement shall also comply with the National Sanitation Foundation (NSF)/ANSI Standard 61 for potable water.
 - d. Cement for concrete which cannot contact potable water
 - 1) Regular Portland cement complying with the requirements of, ASTM C 150, Type II with an alkali content below 0.70%.
 - 2) Alternatively, at contractor option & expense, the Contractor can also use NSF approved cement used for Concrete that can contact potable water
2. Fly Ash and Natural Pozzolans:
- a. Fly ash mineral admixture, when used, shall meet the requirements of ASTM C 618 Class F, except as follows:
 - 1) The loss on ignition shall be a maximum of 4%.
 - 2) The maximum percent of sulfur trioxide (SO₃) shall be 4.0.
 - b. Natural pozzolan mineral admixture, when used, shall meet the requirements of ASTM C 618 Class N.
 - c. Fly ash shall not be used in concrete that is in contact with potable water.
 - d. The percentage of cementitious material, by weight, replaced by fly ash shall not exceed 20%, where authorized by the Engineer.
3. Ground Granulated Blast Furnace Slag:
- a. Ground granulated blast furnace slag (GGBF) mineral admixture, when used, shall meet the requirements of ASTM C 989, Grade 100 or better.
 - b. GGBF slag will be permitted as a substitute for fly ash or natural pozzolans, at no additional cost to the City, in the event that

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Class F Fly Ash or Class N natural pozzolans are not available. A higher percentage of GGBF slag of the total cementitious material in concrete shall be permitted as approved by the Engineer to suit the project needs.

- c. Laboratory trial batches will be tested to determine compliance with strength requirements, times of setting, slump, slump loss, and shrinkage characteristics.
 - d. GGBF slag used in concrete that contacts potable water shall be certified as meeting the requirements of ANSI/NSF 61.
4. Silica Fume:
- a. Silica fume mineral admixture shall be the dry compacted or slurry form and shall meet the requirements of ASTM C 1240. Silica Fume shall be considered to be a cementitious material. Application rate shall be 7 percent by weight of cement, unless indicated otherwise.
- E. Aggregate
- 1. Aggregate susceptible to alkali-aggregate reaction shall not be used for concrete production. Confirm suitability of aggregates with a petrographic analysis in accordance with ASTM C295 and by mortar bar tests in accordance with ASTM C1260 ensuring that the expansion result of each aggregate source tested does not exceed 0.10 percent at an age of 16 days.
 - 2. Coarse and fine aggregates shall meet the requirements of ASTM C 33
 - 3. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, ochre, or other materials that can cause stains on exposed concrete surfaces. Marine dredged aggregates shall not be used.
 - 4. Aggregates shall not be delivered to the concrete batching plant until the sources have been approved. Use aggregates from the same sources throughout the Work, except as approved. Aggregates from different, approved sources shall not be intermingled.
 - 5. Fine Aggregates:
 - a. Fine aggregate shall be composed of clean, sharp, hard, strong, durable, insoluble, uncoated, natural sand free from loam, clay lumps or other deleterious substances.
 - b. Dune sand, bank run sand and manufactured sand are not acceptable.

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- c. Sand having a Fineness modulus (FM) less than 2.40 or greater than 3.00 shall not be allowed.
 - d. Fine aggregate shall meet the requirements of ASTM C 33 except that loss when tested for soundness using magnesium sulfate shall not exceed 12 percent.
 - e. Fine aggregates will be rejected if the variation in fineness modulus is greater than 0.20 from the fineness modulus of the accepted representative sample upon which the mix design was based.
 - f. Fine aggregate shall not contain more than 2% by weight of organic materials when tested in accordance with ASTM C40, or shall it contain more than 2% by weight of clay or silt passing the No. 200 sieve. It shall be free from such quantities of other deleterious material as will render it unsuitable.
 - g. The loss of fine aggregate when tested for soundness using magnesium sulfate in accordance with ASTM C88 shall not exceed 12 percent.
6. Fine aggregates shall contain a water-soluble chloride ion content that does not exceed 0.15 percent by weight of cement.
7. Coarse Aggregates:
- a. Coarse aggregate shall be crushed stone processed from natural rock or stone and shall consist of clean, hard, strong, durable, insoluble, unweathered, and uncoated pieces of uniform quality throughout; and shall be free from such alkali, decomposed minerals, organic material, clay, mica, schist, or other foreign matter that will render it unsuitable.
 - b. Use of slag and pit or bank run gravel is not permitted.
 - c. Coarse aggregate gradations shall be as specified in Table 1 - Concrete Mix Requirements and shall meet the requirements of ASTM C 33. All aggregate gradations listed for each concrete class shall be used.
 - d. Coarse aggregate shall meet the requirements of ASTM C 33, , with the following additional requirements.
 - 1) Clay lumps shall not exceed 1.0 percent by weight of coarse aggregate.
 - 2) Shale and other soft particles shall not exceed 3.0 percent by weight of coarse aggregate.

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- 3) Thin, elongated, or laminated particles shall not exceed 3.0 percent by weight of coarse aggregate.
 - e. Loss when subjected to five (5) cycles of the magnesium sulfate soundness test in accordance with the requirements of ASTM C88 shall not exceed 12% by weight.
 - f. Coarse aggregate shall have a specific gravity of 2.8 or greater.
 - g. The loss in weight of coarse aggregate of each of the sizes specified shall not exceed 35% when tested in accordance with ASTM C131 for abrasion resistance.
 - h. Pieces of coarse aggregate, approximately one-inch in diameter, shall, when immersed on 600 cc of a 1-to-1 solution of hydrochloric acid, show a loss from their original dry weight of no more than 10% in 45 minutes.
 - i. Coarse aggregate for Lightweight Concrete shall conform to ASTM C 330 and shall meet the gradation requirements for ¾” to No. 4.
 - j. Nominal maximum size of coarse aggregate shall be not larger than:
 - 1) 1/5 the narrowest dimension between sides of forms, nor
 - 2) 1/3 the depth of slabs, nor
 - 3) 3/4 the maximum clear spacing between individual reinforcing bars or wires, bundles of bars, individual tendons, bundled tendons or ducts.
8. Combined Aggregate:
- a. Aggregate gradations shall be determined during trial batch testing and shall be based upon the combined gradation and particle distribution in the mixture of coarse and fine aggregates.
 - b. Fine aggregate and coarse aggregate sizes specified shall be combined to produce a workable and cohesive concrete mix that is appropriate for its specific application. Coarse aggregate contents shall be based on Table 6.3.3 of ACI 211.1. Adjust the content required for pumping applications as specified in ACI 211.1.
 - c. Gradations of combined aggregate shall be plotted and submitted on:
 - 1) A combined grading chart (percent passing versus sieve size).

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- 2) An aggregate Particle Distribution Chart (percent retained versus sieve size).
 - 3) A Shilstone Workability Chart. Combined gradations shall plot within the workability box.
 - 4) A 0.45 Power Chart.
9. Fine and coarse lightweight aggregates for Lightweight Concrete shall conform to ASTM C 330. From 20 to 35 percent shall pass the No. 50 sieve and 10 to 20 percent shall pass the No. 100 sieve in the sand fraction gradation. Normal weight aggregate for Lightweight Concrete shall conform to ASTM C 33.
- F. Concrete Admixtures
1. Provide admixtures produced by established reputable manufacturers, and use in compliance with the manufacturer's printed instructions. All admixtures shall be compatible and by a single manufacturer capable of providing qualified field service representation. Do not use admixtures which have not been incorporated and tested in the accepted mixes, unless otherwise authorized in writing by Engineer.
 2. Use only admixtures approved by the Engineer. Only admixtures that comply with the NSF/ANSI Standard 61 shall be used for concrete that can contact with potable water.
 3. Air entraining admixtures shall conform to the NYS DOT Materials Bureau approved list and ASTM C 260.
 4. Normal range or midrange water reducing admixture shall be in conformance with ASTM C 494 Type A, and comply with the NYS DOT Materials Bureau approved list.
 5. High-Range Water Reducing Admixture:
 - a. High range water reducer shall conform to ASTM C 494, Type F or G and comply with the NYS DOT Materials Bureau approved list.
 6. Set Controlling Admixture:
 - a. Set controlling admixture shall be either with or without water-reducing properties.
 - b. Where the air temperature at the time of placement is expected to be consistently over 90 degrees Fahrenheit, a water-reducing set controlled admixture conforming to ASTM C 494, Type D and the NYS DOT Materials Bureau approved list.
 - c. Where the air temperature at the time of placement is expected to be consistently under 40 degrees Fahrenheit, except for mass

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concrete placement, a non-corrosive, non-chloride accelerator conforming to ASTM C 494, Type C and the NYS DOT Materials Bureau approved list shall be used.

7. Shrinkage Reducing Admixture:
 - a. A shrinkage-reducing admixture is permitted to be used in the mix design where necessary to meet specified shrinkage limitations provided that specified strength requirements are met and there is no reduction in sulfate resistance and no increase in permeability.
 8. Corrosion Inhibiting Admixture:
 - a. Corrosion inhibiting admixture shall be a calcium nitrite solution containing a minimum of 30 percent calcium nitrite.
 - b. The quantity of mix water shall be adjusted to account for the water portion of the calcium nitrite solution.
 - c. As the calcium nitrite solution accelerates setting time, retarding admixtures shall be provided as needed, unless the admixture has been formulated to not accelerate setting.
 9. Calcium chloride, admixtures containing thiocyanate, or admixtures containing more than 0.05 percent chloride ions shall not be used.
 10. Crystalline Waterproofing:
 - a. Crystalline waterproofing admixtures where approved shall be PRAH type and appropriate for use in below grade structures.
- G. Water
1. Use only potable water for production of concrete, mortar, and grout.
- H. Bonding Agent
1. Provide a two component epoxy-resin bonding agent conforming to ASTM C 881.
 2. Provide three component epoxy modified cementitious bonding agent where two component bonding agent does not provide sufficient open time.
- I. Finishing Aids
1. Evaporation Retardant:
 - a. Evaporation retardant shall be a material which seals the surface of plastic concrete to prevent moisture loss. The material shall be able to be worked into the concrete surface by subsequent

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finishing operations with no adverse effect on finishing effort and no discoloration of the finished concrete.

J. Curing and Protection Materials

1. Absorptive covers shall consist of burlap cloth made from jute or kenaf, weighing approximately 10 ounces per square yard and complying with AASHTO M 182, Class 3.
2. Curing mats shall be heavy carpets or cotton mats, quilted at 4 inches on center. Curing mats shall weigh a minimum of 12 ounces per square yard when dry.
3. Moisture retaining covers shall conform to ASTM C 171 and consist of one of the following materials.
 - a. Waterproof paper.
 - b. Polyethylene film.
 - c. White burlap-polyethylene sheet.
4. Curing compounds shall conform to the requirements of ASTM C 309 Type 1-D (water retention requirements):
 - a. Provide fugitive dye when requested by Engineer.
5. Insulation Blankets:
 - a. Closed cell flexible foam sheet material such as polystyrene or urethane. Foam sheet material which is capable of being bent 90 degrees without breaking or tearing shall be provided at corners. The foam insulation blankets shall be 1/2-inch thick.
 - b. Quilted, flexible insulation blankets that retain their insulating value when wet and which retard the evaporation of water.
6. Temperature Monitoring Equipment:
 - a. Thermocouples or thermistors shall be as manufactured by James Instruments Inc. or equal. They shall be suitable for embedment in concrete and capable of registering temperatures within the accuracy of 0.5 degrees Fahrenheit over a minimum temperature range of 20 to 200 degrees Fahrenheit.
 - b. Temperature monitoring and recording equipment shall consist of rechargeable battery-powered recording thermometers with microprocessors. The equipment shall be capable of taking and recording temperature readings at each temperature sensor at preset time intervals. The thermometer units shall be compatible with the temperature sensors used, shall have a non-volatile memory capacity of at least 120 readings per sensor, and shall

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be designed to be connected to a battery-powered compatible printer unit. Time periods shall be able to be set over a minimum range of 10 to 60 minutes.

K. Crack Injection Materials

1. Epoxy:

a. Epoxy for injection shall be a low viscosity, high modulus moisture insensitive type.

2. Hydrophilic Resin:

a. Hydrophilic resin shall be an acrylic-ester based resin with a maximum viscosity of 50 cps. It shall cure into a flexible rubber-like material which has the potential for unrestrained increase in volume in excess of 100 percent in the presence of water.

L. Concrete Repair Materials

1. Concrete repair mortar shall be a prepackaged polymer-modified cementitious repair mortar with the following minimum properties:

a. Compressive strength at one day: 2000 psi (ASTM C 109).

b. Compressive strength at 28 days: 6000 psi (ASTM C 109).

c. Bond strength at 28 days: 1800 psi (ASTM C 882 modified).

2. Concrete repair mortar formulation recommended by the manufacturer for the specific application conditions shall be used.

3. Cement mortar shall consist of a mix of 1 part cement to 1 1/2 parts sand with sufficient water to form a trowelable consistency. Minimum compressive strength at 28 days shall be 5000 psi. Where required to match the color of adjacent concrete surfaces, white portland cement shall be blended with standard portland cement so that, when dry, the patching mortar shall match the color of the surrounding concrete.

M. Equipment.

1. Batching Plant.

a. Except for placements less than 2 cubic yards which may be mixed by hand, all concrete shall be batched at an approved automatic batching facility.

b. The concrete batch plant, scales, hoppers, conveyors, bins, admixtures dispensers, mixers, and controls shall conform to all requirements of the Concrete Plant Standards of the Concrete Plant Manufacturers Bureau.

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- c. The concrete batch plant shall have the ability to add chilled water, heated water, or ice as placement conditions warrant.
- d. The quantity of cement and of each separate size of aggregate entering each batch of concrete shall be determined by direct weighing equipment, the quantity of water for each batch shall be determined by weighing or measuring equipment and the quantity of ice, if necessary, shall be determined by weighing equipment, all provided by the Contractor as approved by the Engineer.
- e. The batching plant shall be so arranged that the operator may conveniently observe and inspect the operation of the bin gates, the materials in each weighing hopper, the weighing equipment, and the batching recorders.
- f. The batching controls shall be so interlocked that a new batching cycle cannot be started until all weighing hoppers are empty.
- g. Provide suitable facilities and assistance for obtaining representative samples of the aggregates and cement.
- h. Maintain the batching recorders so that they are continuously in good operating condition.
- i. Weighing Aggregates and Cement:
 - 1) In addition to the requirements of the Concrete Plant Standards, provide separate weighing equipment for the aggregates and for the cement. Weighing equipment shall comply with the following requirements:
 - a) Batching controls of a semi-automatic plant shall be so interlocked that the charging mechanisms cannot be opened until the scales have returned to zero.
 - b) Provide suitable means of adjustment for readily compensating for the varying moisture contents of the aggregates and for changing the batch weights. Install and maintain in operating condition an electrically actuated and properly calibrated moisture meter of approved design. This meter shall determine and indicate on the readily visible scale or chart the percentage of moisture present in the fine aggregate as it is batched.
 - c) Make provisions to permit the convenient removal of overweight material in excess of the

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prescribed tolerances. Comply with ASTM C94 tolerance requirements for air content, mineral admixtures, admixtures, aggregates, water and cement.

- j. Measuring and Dispensing Admixtures:
 - 1) The accuracy of measurement of any admixture shall be within ± 3 percent.
 - 2) Unless otherwise approved, the admixture dispenser shall be interlocked with the sand entering each batch of concrete so that the introduction of the admixture, if approved, will be automatic.
 - 3) The dispenser shall be capable of ready adjustments to permit varying the quantity of admixture to be batched. The quantity of admixture in each batch shall be indicated on the recorder tape.
 - 4) High range water reducing admixtures shall be introduced into the concrete either entirely at the batch plant, or minimum 50% at the batch plant and the remainder at the job site. The method of adding the admixture at the jobsite shall be as approved by the Engineer.
 - 5) For cold weather concreting, the admixture dispenser may be interlocked with the water dispenser and the water temperature on heating shall not exceed 100 degrees F.
- k. Ready-Mix Concrete Plants shall have current NYSDOT certification. Scales shall be certified every 90 days and the plant shall be inspected annually.

2. Conveying and Transporting Equipment

- a. Conveying equipment shall contain no aluminum components.
- b. Transit trucks shall be in a high state of maintenance and equipped with an approved revolution counter. Trucks that have worn fins, non-operative counters, or are leaking fluids shall be removed from site.
- c. Transit trucks shall have a water tank having a capacity of at least 100 gallons. Water tanks shall be equipped with a gauge clearly showing the amount of water in the tank and metering and dispensing equipment in accordance with ASTM C94 and NRMCA requirements.

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- d. Belt conveyors shall be horizontal or at a slope which will not cause segregation or loss. Protect concrete to minimize drying and effects of temperature rise. Use an acceptable discharge hopper at the discharge end to prevent segregation. Do not allow mortar to adhere to the return length of the belt.
- e. Chutes shall be metal or metal-lined having rounded bottoms and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.
- f. Pump equipment shall be of suitable kind and adequate pumping capacity and shall be subject to approval by the Supervising Engineer for Concrete Construction.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Proportioning and Mixing

- 1. Prepare concrete design mixes subject to the limitations listed in Table 1 and specified herein so as to create a homogeneous mix and a concrete which meets the specified strength requirements and, of equal importance, provides a concrete which is water tight and durable against deterioration and abrasion. The mix design shall produce a concrete of a consistency which can be placed so as to meet the required finished appearance. The minimum cement necessary to produce the required strength shall be used. The mix design shall be submitted using the Mix Design Submittal Form at the end of this Section.
- 2. Air Content:
 - a. All concrete shall be air entrained with the exception of concrete placed in underground shaft and tunnel structures or unless indicated otherwise.
 - b. Air content for concrete shall be as indicated on the Contract Drawings. If none is provided, air content for normal weight concrete shall be in accordance with ACI 211.1 for the selected aggregate size. Unless indicated otherwise, the concrete service condition shall be considered moderate exposure.

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- c. Air content as measured at the point of placement shall be within +2%/-1% of the value in the approved mix design as follows:

NOMINAL MAXIMUM AGGREGATE SIZE (IN.)	Total Air Content, percent by Volume (+/- 1.5%)
1/2	7
3/4	6
1	6

3. Lightweight Concrete shall contain 6 percent \pm 2 percent total air when the nominal maximum size of coarse aggregate is greater than 3/8 in., or 7 percent \pm 2 percent when the nominal maximum size is 3/8 in. or less as determined in accordance with ASTM C173.
4. Slump:
- a. Slump for all concrete shall be 3 +/- 1 inches, unless indicated otherwise.
 - b. Where high range water reducing admixture is used, the specified water-cementitious material ratio shall be reduced by 0.02 and concrete shall be proportioned for no higher than 3-inch slump. The slump after addition of the high range water reducing admixture shall not exceed 8 inches when measured at the point of placement.
 - c. A tolerance of up to 2 inch above the maximum indicated slump shall be allowed for one batch in any five consecutive batches tested provided that it can be demonstrated that the specified water-cementitious material ratio is not exceeded.
 - d. The slump of Lightweight Concrete for floors shall not exceed 4 in. at the point of placement.
 - e. For troweled floors, the slump of structural Lightweight Concrete with 100 percent normal weight sand discharged by pump shall not exceed 4 in. at the point of placement.
5. Shrinkage Limitation:
- a. The maximum concrete shrinkage for specimens cast in the laboratory from the trial batch, as measured at 21-day drying age or at 28-day drying age shall be 0.039 percent or 0.045 percent, respectively. The Contractor shall only use a mix design for construction that has first met the trial batch shrinkage requirements. Shrinkage limitations shall not apply to Class 25 concrete, unless indicated otherwise.

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- b. If the trial batch results fail to meet the shrinkage limitation, the mix shall be redesigned to reduce shrinkage. Alternately, the Contractor may use a higher shrinkage mix when acceptable to the Engineer, provided that the amount of shrinkage reinforcement in the structures is increased as determined by the Engineer to resist the higher levels of shrinkage stresses. The additional reinforcing shall be provided at the Contractor's expense.
- 6. The percentage of mortar in the concrete mix shall not exceed 60 percent without approval by the Engineer.
- 7. The unit weight limitations for Lightweight Concrete shall be as shown on the Contract Drawings.
- 8. Proportioning: Concrete proportions shall be determined in accordance with the provisions of Sections 1905.2.1 through 1905.2.3 of the NYSBC.
 - a. Proportions of materials for concrete shall be established to provide
 - 1) The proportioning of ingredients shall produce a mixture that will provide workability and consistency to permit concrete to be worked readily into the corners and angles of the forms and around reinforcement by the methods of placing and consolidation employed on the work, but without permitting the materials to segregate or excessive bleeding. Yield of all mixes as designed shall not exceed 27.2 cu.ft./cu.yd.
 - 2) Resistance to special exposures are required by NYSBC Section 1904.
 - 3) Conformance with the strength test requirements of Sections 1905.6
 - b. Concrete is to meet the durability requirements of Section 1904 of NYSBC.
 - c. Where different materials are to be used for different portions of proposed work, each combination shall be evaluated.
 - d. Concrete proportions shall be established in accordance with NYSBC Section 1905.3 or Section 1905.4, and shall comply with the applicable requirements of Section 1904.
 - 1) NYSBC Section 1905.3 - Proportioning on the basis of field experience/or trial mixtures. Concrete proportioning determined on the basis of field

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- experience or trial mixtures shall be done in accordance with ACI 318, Section 5.3. If the required f'_c is obtained for trial batch mixed prior to the date specified, the trial mix design may be approved. All mixes shall be approved by the Engineer prior to construction.
- 2) NYSBC Section 1905.4 - Proportioning without field experience. Concrete proportioning determined without field experience or trial mixtures shall be done in accordance with ACI 318, Section 5.4. This method of proportioning shall not be permitted for load-carrying structural concrete or concrete mix proportions that are required to conform to NYSBC Section 1904.
- e. Proportioning on the basis of field experience and/or trial mixtures using a mix design employing the same ingredients proposed for use, and used successfully on a previous project, or projects, may be used provided the following are submitted by a licensed concrete testing laboratory and approved by the Design Engineer of record in conformance with NYSBC 1905.3 and ACI 318 Section 5.3.
- 1) The name and location of the plant from which the concrete will be batched.
 - 2) The concrete mix design including detailed data and analysis of the ingredients proposed for use as specified herein.
 - 3) Reports for at least 30 (thirty) consecutive tests of 7 day and 28 day concrete strength tests of the proposed mix made during the previous twelve months of concrete batched and delivered from the same plant that is to furnish this job. These data shall include an evaluation in accordance with ACI 214R to determine the average strengths, moving averages and the coefficients of variation. In addition, the results of a minimum of 3 shrinkage tests for this mix made during the previous twelve months and using the same materials to be used on this project.
 - 4) Reports of compliance tests of fine and coarse aggregates made during the above tests.
- f. Average strength reduction. As data becomes available during construction, it is permissible to reduce the amount by which the average compressive strength (f'_c) is required to exceed the specified value of f'_c in accordance with ACI 318, Section 5.5

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- g. Evaluation and acceptance of concrete. The criteria for evaluation and acceptance of concrete shall be as specified in NYSBC Sections 1905.6.3.3 through 1905.6.5.5.
- h. Qualified technicians. Concrete frequency and testing shall be tested in accordance with the requirements of NYSBC Section 1905.6.2 thru 1905.6.5.5. An agency shall performs tests on fresh concrete at the job site, prepare specimens required for curing under field conditions, prepare specimens required for testing in the laboratory and record the temperature of the fresh concrete when preparing specimens for strength tests. All field sampling and testing, including the testing of aggregates, concrete mixes, and strength testing of specimens, shall be subject to special inspection by an approved agency. All testing laboratories shall be approved testing agencies and shall employ qualified special inspectors to perform all required laboratory tests. Test results from the testing laboratory shall be promptly distributed by the Contractor to the concrete producer and the Engineer.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Inspection
 - 1. The Contractor shall give the Engineer sufficient written notification in advance of concrete placements so as to allow examination of the Work by the Engineer. In no case shall advance notification be less than 48-hours prior to placement.
 - a. If the Contractor submits a placement card and subsequently postpones or cancels a placement after third-party inspection staff have been dispatched to the site or to the batch plant, the Contractor shall be liable for the cost of the inspection staff.
 - 2. The placement of concrete may be prohibited at any time when, in the judgement of the Engineer, the conditions are unsuitable or the proper precautions are not being taken, or the work is being conducted in any way unsatisfactory to the Engineer.
 - 3. The Contractor shall examine the substrate and the conditions under which Work is to be performed and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the Work until

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unsatisfactory conditions have been corrected in a manner acceptable to the Engineer.

4. No concrete shall be placed until the Engineer or their authorized representative has inspected the placement of the embedded items and the reinforcing bars and has given permission to place concrete.

B. Preparation for Concrete

1. The Contractor shall be responsible for coordinating amongst the trades and shall ensure that all necessary work is completed prior to the placement of concrete.
2. All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting.
3. All contractors whose work is related to the concrete or must be embedded in it or supported by it, shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.
4. Sleeves for miscellaneous metal work, castings, pipes and anchors furnished under the Contract shall be set true and to proper alignment in the concrete as indicated on the Drawings or required by the manufacturer's templates.
5. The Contractor shall protect all embedded items so they are not displaced or damaged during the concrete placement.
6. Openings in slabs shall be provided for pipes, conduits and the like required for the Work of others where indicated on the Drawings or for which directions are given prior to placing concrete. After subsequent work is installed, the Contractor shall completely fill any openings in concrete by filling with concrete, packing with grout, or other approved methods so as to form a watertight seal around the pipe.
7. Required voids shall be filled temporarily with readily removable material to prevent entry of concrete into the void.
8. Hardened concrete and foreign materials shall be removed from the inner surfaces of the conveying equipment.
9. Formwork shall have been completed in conformance with Section 03 10 00 - Concrete Forming and Accessories; ice and standing water shall have been removed; reinforcement shall have been secured in place in conformance with Section 03 21 00 - Reinforcing Steel; expansion joint material, anchors and other embedded items shall have been positioned.
10. Formwork or other surfaces to receive concrete shall be tight, sound, free of debris, protected against excessive air currents, and shall be sprinkled with water..

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11. Subgrade shall be watered sufficiently to achieve surface saturated density of subgrade materials.
12. Soft spots in subgrade shall be removed and replaced with approved backfill materials.
13. Earth surfaces against which concrete is to be placed shall be clean, damp, and free of oil, frost, ice, standing or running water, mud, coatings, debris, and any loose, semi-detached, or unsound material, and shall be compacted to the satisfaction of the Engineer.
14. Rock surfaces against which concrete is to be placed shall be clean, free of oil, ice, standing or running water, mud, coatings, debris, and any loose, semi-detached, or unsound material.
 - a. Faults of seams in rock shall be cleaned to a satisfactory depth and to firm rock on both sides.
 - b. Any loose rock that may be behind wire mesh support or other materials used for supporting rock shall be satisfactorily removed.
 - c. Immediately before concrete is placed, clean all accessible rock surfaces thoroughly using high velocity air-water jets or by approved methods.
 - d. Keep all rock surfaces continuously moist for at least 24 hours immediately prior to placing concrete.
15. All panning, vent and grout pipes, plus the internal drainage system systems, shall be secured in place before placing concrete.
16. Surfaces of structural steel, liner plates, sheet piles, or any other steel members, to be embedded in the concrete under this Contract shall be cleaned and loose rust shall be removed to the extent practicable, to the discretion of the Engineer.
17. Install and secure in place all bulkheads or devices necessary to keep the surfaces against which concrete is to be placed free of running or standing water. Secure such devices to prevent their being jarred loose during concreting operations. No concrete shall be placed until all water entering the space to be filled with concrete has been cut off by grouting or has been diverted and cared for by methods approved by the Engineer. Water shall not be allowed to rise on any concrete until after it has been in place for at least 24 hours, except as specifically approved by the Engineer.
18. When high ambient temperatures necessitate protection of concrete immediately after placing or finishing, make provisions in advance of

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concrete placement for windbreaks, shading, fogging, sprinkling, ponding, or wet covering with a light colored material.

19. During cold weather, make provisions in advance of concrete placement to maintain the temperature of the concrete above 55°F. Use heating, covering or other means adequate to maintain the required temperature without injury to concrete due to concentration of heat. Do not use combustion heaters during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases containing carbon dioxide.
20. Conveyance, mixing, batching, pumping, and consolidating equipment, as required, shall be on-site, shall be tested, and shall be in good working order. Adequate spare equipment shall be available to ensure the steady placement of concrete.

C. Bonding

1. When specified, the surface of joints shall be prepared in accordance with Section 03 32 00 – Joints in Concrete.
2. When fresh concrete is to be placed against masonry or hardened concrete, the existing surface shall be thoroughly cleaned and made free of laitance and debris. Keys shall be provided where shown on the Drawings and exposed surfaces shall be high-pressure water blasted prior to the placement of new concrete. The substrate shall be saturated surface dry with no standing water prior to the new concrete placement.
3. Unless the joint is to be an expansion or contraction joint, the existing surface shall be roughened to an amplitude of approximately ¼-inch. The masonry or hardened concrete shall be prepared by placing a thick layer of rich mortar, or by applying an epoxy bonding agent, on the surface to receive fresh concrete.
4. All exposed concrete shall be provided with ¾-inch chamfer unless otherwise specified.

3.02 IMPLEMENTATION

A. Mixing and Transporting Concrete

1. Ready-Mixed Concrete:
 - a. Ready-Mixed concrete shall be batched, mixed and transported in accordance with the appropriate sections of ASTM C 94 and ACI 304R, where applicable..
 - b. Ready-mixed concrete shall only be batched in plants which are certified by the NRMCA and on the NYSDOT approved list..

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- c. Ready-mixed concrete shall only be batched in plants which meet the following:
 - 1) Concrete plants shall be certified by the National Ready Mixed Concrete Association (NRMCA) and shall comply with the rules of the department.
 - 2) Upon written application by the producer, accompanied by a detailed report on how the facilities compare with the standards of the NRMCA, the above requirements may be waived, in writing by the Engineer.
 - 3) If the detailed report mentioned above is issued by the testing agency which will perform the inspection of the batching and mixing of the concrete and indicates that satisfactory quality concrete can be produced by the plant in question, based on prior job performance records, then the above requirement will be waived, in writing, by the Supervising Engineer for Concrete Construction.
- d. Approval of plants as outlined above is subject to the continuous checking and acceptance by the Commissioner or his duly authorized representative.
- e. Only plants meeting the requirements for certification of the NRMCA for automatic batching and automatic recording will be permitted.
 - 1) If at any time automatic proportioning or recording instruments become inoperative, the plant may be allowed to batch concrete manually or operate with manual recording for a period of not more than 48 working hours from the time of breakdown. This shall not be allowed for class 50, 50LW, 50LWPG, 50F, 50M, or 50HES concrete.
 - 2) If at the end of 48 working hours, the plant is still not in operating order, the following shall be complied with:
 - a) DEP shall be contacted and an independent inspector, other than the regular plant inspector shall be assigned to each batching operation at the plant, at no additional cost to the City.
 - b) Additional inspectors shall observe and record the weight of each component of the batch.

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- c) The manually recorded batch weights shall appear on a ticket presented to inspection personnel at the project site.
- 2. Batch Mixing at Site:
 - a. All components of the plant must bear the proper rating plates issued by the Concrete Plant Manufacturers Bureau and the limitations thereon shall be strictly adhered to.
 - b. The batch shall be so charged into mixer that some water will enter in advance of the cement and aggregates. Water shall continue to flow for a period which may extend to the end of the first 25 percent of the specified mixing time. Controls shall be provided to insure that the batch cannot be discharged until the required mixing time has elapsed. When concrete of normal weight is specified, controls shall be provided to insure that no additional water may be added during mixing. The entire batch shall be discharged before the mixer is recharged.
 - c. Each batch of 2 cu.yd. or less shall be mixed for not less than 1 1/2 minutes. The mixing time shall be increased 15 seconds for each additional cubic yard or fraction thereof. Shorter mixing time may be permitted provided performance tests made in accordance with ASTM C 94 indicate that the time is sufficient to produce uniform concrete. At least three quarters of the required mixing time shall take place after the last of the mixing water has been added. The interior of the mixer shall be free of accumulations that will interfere with mixing action. Replace mixer blades when they have lost 10 percent of their original weight.
- 3. Control of Admixtures:
 - a. Air entraining and chemical admixtures shall be charged into the mixture as a solution and shall be dispensed by an automatic dispenser or similar measuring device. The accuracy of measurement of any admixture shall be within ± 3 percent. Admixtures shall be charged into the mixer in such manner as not to come into direct contact with the cement.
 - b. Two or more admixtures may be used in the same concrete provided such admixtures are added separately during the batching sequence and provided further that evidence is submitted to show that the admixtures used in that combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

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- c. All admixtures shall be added prior to mixing.
 - d. Admixtures shall be added at the batch plant and not on site unless otherwise approved by the Engineer.
4. Structural Lightweight Concrete:
- a. This section covers the requirements for production of structural Lightweight Concrete and appurtenances in structures. Portions of the structure to be treated as Lightweight Concrete under the provisions of this Section are so designated on the Contract Drawings. Lightweight Concrete shall comply with all requirements of this Section unless otherwise specified in the Contract.
 - b. Performance and Design Requirements:
 - 1) Entrain air in Lightweight Concrete that will be exposed to freezing and thawing conditions. Use 6 ± 2 percent total air content when the nominal maximum size of aggregate is greater than $3/8$ in. Use 7 ± 2 percent total air content when the nominal maximum size is $3/8$ or less. Determine the air content by the volumetric methods of ASTM C 173. Select concrete mixture proportions for concrete to provide a compressive strength as required by the Contract Drawings.
 - 2) Use ASTM C 150 Type II cement for Lightweight Concrete required to be chemical-resistant. Select concrete mixture proportions to provide a specified minimum compressive strength 4000 psi, unless otherwise specified on the Contract Drawings.
 - c. Mixtures:
 - 1) Proportion Lightweight Concrete mixtures to meet the specified limit on maximum air-dry unit weight as determined by the method of ASTM C 567. Correlate the air-dry unit weight with the fresh unit weight of the same concrete to permit use of the latter as the basis for acceptance during construction.
 - 2) Determine the cement factor needed to attain the required strength for Lightweight Concrete in accordance with the N.Y. City Administrative Building Code and relate strength to cement content of the concrete.
 - d. Batching and Mixing:

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- 1) Batch and mix lightweight aggregate concrete as recommended by the aggregate producer and the concrete producer, and in accordance with this Section. If the procedure recommended by the aggregate producer and the concrete producer is at variance with this Section, submit the producers' recommendations to the Engineer for acceptance.
 - 2) For low absorption aggregate, batch and mix aggregate that has been shown to absorb less than 2 percent water by weight during the first hour after inundation. Test aggregate for water absorption with the minimum moisture content likely to occur on the job. Pre-dampening may be used to achieve this condition.
 - 3) For high absorption aggregate, batch and mix concrete made with lightweight aggregates absorbing 2 percent water by weight or more by:
 - a) First, add the aggregate to approximate 80 percent of the mixing water and mix for a minimum of 1 1/2 minutes in a stationary mixer or 15 revolutions at mixing speed in a truck mixer.
 - b) Then add any admixtures, the cement, and the withheld portion of mixing water and complete the mixing.
 - 4) Additional water may be added to the mixture, if needed, to bring the mixture to the specified slump after truck transport. Increase the slump of concrete entering the pump as required to maintain the specified slump at the point of placement.
 - 5) The lightweight aggregate shall be presoaked by vacuuming, ponding, or sprinkling continuously with water until the aggregate moisture content is sufficient to minimize slump loss through the pump line. Slump loss through the pump line shall not exceed 4 inches. The presoaking period shall be up to 30 days or as required by the Engineer after determination at the batch plant.
5. Tempering and Control of Mixing Water:
- a. Concrete shall be mixed only at the mix plants or at the job site. Concrete shall be mixed in quantities not to exceed immediate job placement requirements.

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- b. A minimum of 90% of the water shall be added at the batch plant.
- c. The addition of any water to the mix while the truck is in route from plant to job site is strictly prohibited. Mixing in transit is strictly prohibited. Agitating in transit is permitted, but shall be kept to a minimum.
- d. When concrete arrives at the point of delivery with a slump below that which will result in the specified slump at the point of placement and is unsuitable for placing at that slump, the slump may be adjusted to the specified value by adding water if all the water required in the accepted mixture proportions has not been added at the start of mixing and if permitted by the Engineer. Addition of water shall be in accordance with ASTM C 94. Neither the specified water-cement ratio nor slump shall be exceeded. Do not make slump adjustments after 15 percent of the batch has been unloaded. Do not add water to concrete containing a plasticizing or a high range water reducing admixture. Do not add water to concrete in delivery equipment not acceptable for mixing. Measure air content of air-entrained concrete, after slump adjustment, to verify compliance to specified requirements.
- e. Each increment of water added at the job site must be incorporated by additional mixing by turning the drum not less than 30 revolutions. The addition of the increments of water and the start of the mixing procedures shall not be commenced earlier than one-half hour prior to the beginning of discharge. From the time the batch or load has been mixed to the specified slump, no further water shall be added to the concrete.
- f. Discharge of the concrete shall be completed within the limits set out in the following table. Time and drum revolution limits shall be measured from the introduction of any mixing water to the cement and aggregates or the introduction of the cement to the aggregates (ribbon loading).

CONCRETE DISCHARGE REQUIREMENTS	
CONCRETE TEMPERATURE	Limit
Over 90 degrees F	Concrete shall be removed from site and discarded
85° to 90 degrees F	1 hour or 300 revolutions, whichever comes first
80° to 85 degrees F	1 hour 15 minutes or 300 revolutions, whichever comes first

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CONCRETE DISCHARGE REQUIREMENTS	
CONCRETE TEMPERATURE	Limit
70° to 80 degrees F	1 hour 30 minutes or 300 revolutions, whichever comes first
Below 70 degrees F	2 hours or 300 revolutions, whichever comes first

6. Weather Conditions: Additional provisions as specified herein shall be taken when the ambient temperature during placement is above 80 degrees F or below 40 degrees F and for mass concrete
 7. Mixing Small Quantities of Concrete:
 - a. Only when permitted by the Supervising Engineer for Concrete Construction, small quantities of concrete may be mixed either by a small manually controlled portable mixer or by hand. In such cases, volumetric measurement of aggregates will be permitted.
 - b. Concrete shall be hand mixed on a watertight platform. Cement and aggregates shall first be mixed dry until a uniform color is obtained. Water shall then be added and the entire mass turned over at least six times, or until the mixture is uniform and of the required consistency. Not more than one-half cubic yard of concrete shall be hand mixed in any batch.
- B. Concrete Placement
1. General:
 - a. Remove all debris, muck, loose materials and loose rock from excavated surfaces and shotcreted surfaces, prior to concreting operations to provide clean concrete contact with the excavated surfaces and shotcrete.
 - b. Place concrete as required to completely fill excavations and outside the limits of finished surfaces as shown on the Drawings.
 - c. Furnish and install all materials to be embedded in cast-in-place concrete and other items of miscellaneous metal, as ordered or approved by the Engineer.
 - d. The Contractor shall provide concrete placement including preparation before placing, conveying, depositing, consolidation, weather protection, bonding, underwater concreting, and placing of grout and mortar according to the following requirements.
 2. Conveying:

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- a. Concrete shall be handled in accordance with ACI 304R from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent separation or loss of ingredients and in a manner which will assure that the required quality of the concrete is obtained.
 - b. Conveying equipment shall be of size and design to insure a continuous flow of concrete at the delivery end and shall be approved.
 - c. Placement shall be controlled so that segregation does not occur in the discharged concrete.
 - d. Adequate skilled personnel and equipment shall be available to handle and place the concrete immediately upon delivery.
 - e. Concrete shall be conveyed at a rate so as to prevent the formation of cold joints or the loss of slump.
3. Depositing:
- a. Concrete shall be deposited continuously, or in lifts as approved such that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located at points as provided for in the drawings or as approved. Placing shall be carried on at such a rate that the concrete which is being integrated with fresh concrete is still plastic. Concrete which has partially hardened or has been contaminated by foreign materials shall not be deposited. Temporary spreaders in forms shall be removed when the concrete placing has reached an elevation rendering their service unnecessary. They may remain embedded in the concrete only if made of metal or concrete and if prior approval has been obtained. .
 - b. Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Concrete shall not be subjected to any procedure which will cause segregation.
 - c. Place concrete for beams, girders, brackets, column capitals, haunches, and drop panels at the same time as concrete for slabs.
 - d. The maximum difference in the elevation between the discharge end of the pipe or device for placing concrete behind the forms and the surface of the concrete at that location shall not exceed 6 feet.
4. Consolidation and Finishing:

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- a. Where a surface mortar is to be the basis of the finish, the coarse aggregate shall be worked back from the forms with a suitable tool so as to bring a full surface of mortar against the form, without the formation of excessive surface voids.
- b. All concrete shall be consolidated by internal vibration, spading, rodding, or forking so that the concrete is thoroughly worked around the reinforcement, around embedded items and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting or planes of weakness. Use internal vibrators of the largest size and power that can properly be used in the Work. Over-vibrating and use of vibrators to transport concrete within forms shall not be allowed.
- c. Vibrators shall be inserted and withdrawn at many points, approximately 18 in. apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not sufficient to cause segregation, generally from 5 to 15 sec. duration.
- d. Sufficient spare vibrator shall be kept on the job site during all concrete placing operations. Follow the detailed recommendations given in of ACI 309R, where applicable. Workers shall be experienced in use of the vibrators.
- e. External vibration shall only be used when explicitly permitted by the Supervising Engineer for Concrete Construction. Vibrating operations shall be continuous throughout the entire section where concrete is being deposited. Vibrators shall be clamped to the studs or wales or in pairs so that while one is vibrating the other can be shifted to insure constant vibration. External vibration shall conform to the requirements of ACI 309R.
- f. Concrete finishes shall conform to the requirements of Section 03 35 00 - Concrete Finishing.
- g. Execution:
 - 1) Do not vibrate Lightweight Concrete to the point that large particles of aggregate float to the surface.
 - 2) Do not work Lightweight Concrete to the point that mortar is driven down and an excess of the lightweight aggregate appears at the surface.
- h. Self-Supporting Floors and Roofs:
 - 1) Reinforced Concrete Beams and Girders shall be cast monolithically with adjoining arches.

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- 2) Canopies, Cornices and Marquees shall be monolithically cast with floor arches, with profiles true to indicated contours. Top surfaces of canopies and marquees shall be pitched to drain. Exposed soffits and edges shall be rubbed with carborundum stone and left clean and true.
5. Protection, Weather, Placing and Preparation of Forms:
- a. Concrete placed during rain, sleet or snow, or when the mean daily temperature falls below 40 degrees F or is expected to be below 40 degrees F during placing or within 24 hours thereafter or rises above 90 degrees F shall be adequately protected as provided in Article 3.02, Paragraph C. and approval for placement shall be obtained from the Supervising Engineer for Concrete Construction.
 - b. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish.
 - c. Placing temperature:
 - 1) When the mean daily temperature falls below 40 degrees F, the minimum temperature of concrete as placed shall be 50 degrees F. Follow the detailed recommendations given in “Cold Weather Concreting” (ACI 306R), and in accordance with NYCBC Section 1905.12, where applicable.
 - 2) Concrete deposited in hot weather shall have a placing temperature which will not cause difficulty from loss of slump, flash set, or cold joints. The temperature of the concrete preferably should be less than 80 degrees F and shall not exceed 90 degrees F unless permitted by the Supervising Engineer for Concrete Construction. Loss of slump, flash set, or cold joints due to the temperature of the concrete as placed will not be acceptable. When the temperature of the steel is greater than 120 degrees F, fog the steel forms and the reinforcement with water just prior to placing the concrete. Follow the detailed recommendations given in “Hot Weather Concreting” (ACI 305R) and in accordance with NYCBC Section 1905.13, where applicable.
 - d. Placing:

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- 1) Adequate skilled personnel and equipment shall be available to handle and place the concrete immediately upon delivery.
- 2) Dry surfaces shall be wet down before commencing placement of concrete.
- 3) Temperature of surfaces to receive concrete (earth, forms, reinforcing steel, etc.), should approximate the temperature of the concrete being placed.
- 4) Evaporation rate of water from freshly placed concrete should be held to a minimum by:
 - a) Shading of operations.
 - b) Reducing air circulation in area of operations.
 - c) Maintaining fog spray during operations.
- 5) Cold Joints shall be avoided. This can be accomplished by:
 - a) Providing adequate skilled personnel to handle and place the concrete immediately after its delivery to the forms at an acceptable temperature.
 - b) Placing in layers thin enough and areas small enough so that vibration or working of the concrete will insure complete union of adjacent layers.
 - c) Lengthening of setting time by use of approved water reducing retarders.
 - d) Placing a bulkhead at a suitable point where placement is stopped temporarily.
- 6) Loss of slump shall be kept at a minimum. This can be accomplished by:
 - a) Minimum lapse of time between mixing and placing.
 - b) Avoiding delays in batch mixing and truck dispatching.
 - c) Job conditions and equipment (chutes, access runs, etc.) being organized to prevent additional mixing.
 - d) Use of approved water reducing retarders.

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- e. Preparation of forms:
 - 1) All forms or surfaces (subgrades, reinforcing steel) to receive concrete, in addition to the normal requirements of tightness, soundness, being free of debris, etc., shall be:
 - a) Protected against excessive air currents.
 - b) Sprinkled systematically with cool water.
 - 2) Note: Wetting down around the work will cool the surrounding air and increase the humidity, thus reducing temperatures and evaporation from the concrete.
- 6. Bonding:
 - a. When specified, the surface of joints shall be prepared in accordance with Section 03 32 00 - Joints in Concrete.
 - b. The hardened concrete of joints between footings and walls or columns, between walls or columns and beams or floors they support, joints in unexposed walls and all other not mentioned below shall be dampened (but not saturated) immediately prior to placing of fresh concrete.
 - c. The hardened concrete of horizontal construction joints in exposed work; horizontal construction joints in the middle of beams, girders or joints, and slabs; and horizontal construction joints in work designed to contain liquids shall be dampened (but not saturated) then thoroughly covered with a coat of neat cement mortar of similar proportions on vertical surfaces and at least 1/2 in. thick on horizontal surfaces. The fresh concrete shall be placed before the mortar has attained its initial set.
 - d. Joints receiving an adhesive shall have been prepared and adhesive applied in accordance with the manufacturer's recommendations prior to placing of fresh concrete.
 - e. Surfaces of joints which have been obtained by the use of a chemical retarder shall have been prepared in accordance with the manufacturer's recommendations prior to placing of fresh concrete.
- 7. Concreting Under Water:
 - a. Placing concrete in water will be permitted only when approved by the Supervising Engineer for Concrete Construction. Concrete deposited under water shall be carefully placed in a compacted mass in final position by means of a tremie, a closed bottom dump bucket or other approved means, and shall not be

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disturbed after being deposited. Special care must be exercised to maintain still water at the point of deposit. Concrete shall not be placed in running water. Underwater formwork shall be reasonably watertight. The consistency of the concrete shall be carefully regulated and special care shall be exercised to prevent segregation of materials. The method of depositing concrete shall be regulated to produce approximately horizontal surfaces.

- b. When a tremie is used, it shall consist of a tube having a diameter of not less than 10 in. and constructed in sections having flanged couplings fitted with gaskets. The tremie shall be supported to permit free movement of the discharge end over the entire top surface of the work and shall permit rapid lowering when necessary to choke off or retard the flow. The discharge end shall be entirely sealed at all times and the tremie tube kept full to the bottom of the hopper. When a batch is dumped into the hopper, the tremie shall be slightly raised, but not out of the concrete at the bottom, until the batch discharges to the bottom of the hopper. The flow shall then be stopped by lowering the tremie. The flow shall be continuous until the pour has been completed.
 - c. When a bucket is used to place concrete in water, it shall have a capacity of not less than 1/2 cubic yard.
8. Protection and Cleaning of Exposed Structural Steel:
- a. The Contractor shall take all necessary precautions to prevent mortar and concrete splashes on the steel. The Contractor shall exercise care to prevent abrasion or scuffing of the paint on the structural steel while concrete is being formed, placed or stripped.
 - b. The Contractor shall thoroughly clean the structural steel of all concrete drippings or other foreign matter that may have been deposited on the steel or on any other part of the structure as a result of his operations. All the work involved in thoroughly cleaning the steel shall proceed before concrete drippings have hardened. Immediately after the concrete has been placed, the Contractor shall clean the steel with water and/or such other additional means subject to the approval of the Supervising Engineer for Concrete Construction as may be necessary to remove all mortar, concrete and other foreign matter that has been dropped, dripped, splashed or otherwise deposited on the steel as a result of his operations. It will be the Contractor's obligation and responsibility to remove all foreign matter to the satisfaction of the Supervising Engineer for Concrete Construction.

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- c. After formwork has been removed, any concrete or other foreign material that may have been previously missed and that still remains on the steel shall be removed.
 - 9. Concrete finishes shall conform to the requirements of Section 03 35 00 - Concrete Finishing.
- C. Special Conditions.
 - 1. Concreting in Hot Weather Conditions.
 - a. When the ambient temperatures will exceed 80 degrees F during placement, the provisions of ACI 305R shall be followed.
 - b. Measures such as chilled water, ice, or evaporative cooling of the aggregates shall be used to maintain the temperature of fresh concrete below 90 degrees F.
 - 2. Concreting in Cold Weather Conditions.
 - a. When the mean temperature is expected to fall below 40 degrees F during placement or within the 24 hours immediately following a placement, the provisions of ACI 306R shall be followed.
 - b. Measures such as heated water shall be used to maintain the temperature of fresh concrete above 55 degrees F.
 - c. The Contractor shall have sufficient heaters on site to prevent conveyance and mixing equipment, such as buckets and pumps, from freezing. Care shall be taken to ensure that direct heat is not inadvertently applied to fresh concrete while using heaters to maintain conveyance equipment.
- D. Concrete Curing and Protection
 - 1. General:
 - a. Curing and protection of the concrete shall begin immediately after completion of the finishing operation.
 - b. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish.
 - c. Protect all freshly deposited concrete from premature drying, from weather elements, from defacement, from flowing water, and from mechanical injury. The concrete shall be maintained with minimal moisture loss at a relatively constant temperature for a period of time necessary for the hydration of the cement and proper hardening of the concrete in accordance with the requirements specified herein.

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- d. Floors which have received their final finish shall be closed to all traffic for at least 48 hours following the completion of troweling. Thereafter, before the floor is subjected to any traffic, it shall be covered with paper covering meeting the requirements of ASTM C 171. This protection shall be maintained as long as necessary to avoid damage to the floor.
 - e. During the curing period, and thereafter as conditions may require, the concrete shall be protected from damaging mechanical disturbances, particularly excessive load stresses, heavy shock, and excess vibration. All finished concrete surfaces shall be protected from damage caused by construction equipment, materials, or methods, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.
 - f. Following removal of protective paper, the surface of concrete shall be protected from painting and other work. All stains shall be removed.
 - g. As soon as the concrete has been placed and horizontal top surfaces have received their required finish, provision shall be made for maintaining the concrete in a moist condition for at least a 7-day period thereafter except for high early strength concrete, for which the period shall be at least the first three days after placement. Horizontal surfaces shall be kept covered, and intermittent, localized drying will not be permitted.
 - h. Concrete curing shall be in accordance with NYSBC Section 1905.11.
2. Curing Methods:
- a. The Contractor shall use one of the following methods to ensure that the concrete remains in a moist condition for the minimum period stated above except that for the first 24-hours, only methods 1) or 2) below shall be used:
 - 1) Ponding or continuous fogging or sprinkling.
 - 2) Application of mats or fabric kept continuously wet.
 - 3) Continuous application of steam (under 150 degrees F).
 - 4) Application of sheet materials conforming to ASTM C 171.
 - 5) If approved by the Engineer, application of a curing compound in accordance with Article 3.02, Paragraph C.7.

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- 6) High Early Strength concrete shall be maintained above 50 degrees F and in a moist condition for at least the first 3 days. Accelerated curing of concrete shall comply with ACI 318, Section 5.11.3.
3. The Contractor shall keep absorbent wood forms wet until they are removed. After form removal, the concrete shall be cured by one of the curing methods specified in this paragraph. .
4. Any of the curing procedures specified in this paragraph may be replaced by one of the other curing procedures specified in this paragraph after the concrete is one-day old. However, the concrete surface shall not be permitted to become dry at any time.
5. Curing Concrete under Cold Weather Conditions:
 - a. Curing under cold weather conditions shall conform to the requirements of ACI 306.
 - b. Stripping time for forms and supports shall be increased as necessary to allow for retardation in concrete strength caused by colder temperatures. This retardation is magnified when using concrete made with blended cements or containing fly ash or ground granulated blast furnace slag. Therefore, curing times and stripping times shall be further increased as necessary when using these types of concrete.
 - c. The methods of protecting the concrete shall be approved by the Engineer and shall prevent local drying. Equipment and materials approved for this purpose shall be on the site in sufficient quantity before the work begins. The Contractor shall assist the Engineer by providing holes in the forms and the concrete in which thermometers can be placed to determine the adequacy of heating and protection. All such thermometers shall be furnished by the Contractor in quantity and type which the Engineer directs.
6. Curing Concrete under Hot Weather Conditions:
 - a. When air temperatures exceed 85°F, the Contractor shall take extra care in placing and finishing techniques to avoid formation of cold joints and plastic shrinkage cracking. If ordered by the Engineer, temporary sun shades and/or windbreakers shall be erected to guard against such developments, in addition to generous use of wet burlap coverings and fog sprays to prevent drying out of the exposed concrete surfaces.
 - b. Curing and protection of the concrete shall begin immediately after completion of the finishing operation. Continuous moist-

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curing, consisting of Ponding or continuous fogging or sprinkling methods or by Application of mats or fabric kept continuously wet specified in this Section is mandatory for at least the first 24 hours. However, curing by Application of mats or fabric kept continuously wet method may be used only if the finished surface is not marred or blemished during contact with the coverings.

- c. At the end of the initial 24-hour period, curing and protection of the concrete shall continue for at least four (4) additional days using one of the curing methods specified in this Section.
 - d. Curing procedures during hot weather conditions shall conform to the requirements of ACI 305.
7. Use of Curing Compound:
- a. Curing compound shall not be used on surfaces to receive subsequent coatings. Curing compound shall not be used on surfaces exposed to water in potable water storage tanks and treatment plants unless curing compound is certified in accordance with ANSI/NSF Standard 61.
 - b. When permitted, the curing compound shall maintain the concrete in a moist condition for the required time period, and the subsequent appearance of the concrete surface shall not be affected.
 - c. The compound shall be applied in accordance with the manufacturer's recommendations after water sheen has disappeared from the concrete surface and after finishing operations. The rate of application shall not exceed 300 square feet per gallon. For rough surfaces, apply in two directions at right angles to each other.
8. Early Termination of Curing:
- a. Moisture retention measures may be terminated earlier than the specified times only when at least one of the following conditions is met:
 - 1) The strength of the concrete reaches 85 percent of the specified 28-day compressive strength in laboratory-cured cylinders representative of the concrete in place, and the temperature of the in-place concrete has been constantly maintained at 50 degrees Fahrenheit or higher.

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- 2) The strength of concrete reaches the specified 28-day compressive strength as determined by accepted nondestructive methods or laboratory-cured cylinder test results.
 - 3) Tests are made of cylinders kept adjacent to the structure and cured by the same methods and reach 70 percent of the specified compressive strength f_c as determined in accordance with ASTM C 39.
 - 4) Special provisions as specified herein shall be taken when the ambient temperature during placement is above 80 degrees F or below 40 degrees F and for mass concrete.
9. Protection:
- a. Floors which have received their final finish shall be closed to all traffic for at least 48 hours following the completion of troweling. Thereafter, before the floor is subjected to any traffic, it shall be covered with paper covering meeting the requirements of ASTM C 171. This protection shall be maintained as long as necessary to avoid damage to the floor.
 - b. During the curing period, and thereafter as conditions may require, the concrete shall be protected from damaging mechanical disturbances, particularly excessive load stresses, heavy shock, and excess vibration. All finished concrete surfaces shall be protected from damage caused by construction equipment, materials, or methods, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.
 - c. Following removal of protective paper, the surface shall be protected from painting and other work. All stains shall be removed.
10. Removal of Forms and Loading of Structures.
- a. Concrete Under Construction: The erection of machinery and forms, or the landing and stowing of heavy objects upon the surface of concrete or walking or working on it, will not be permitted until an acceptable time has elapsed for the setting of the concrete and shall not interfere with the proper curing of the concrete. Wherever ordered, the Contractor shall provide at their own expense timber coverings for the protection of concrete, and platforms for landing and storing buckets and

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other heavy objects. These coverings and platforms shall have no supports on the concrete except where permitted.

- b. Backfill shall not be placed against unbraced walls, or on the top slab of structures, until all components of the structure are completed or have attained their specified compressive strength.
- c. Unless otherwise authorized by the Engineer, the minimum time for form removal, forming for subsequent placements, and loading of concrete structures shall be per the following table. The Contractor may, at their expense, take additional cylinders for compressive strength tests to demonstrate early achievement of required compressive strength. The required compressive strength for removing forms and subsequently loading the structure shall be determined by the Contractor and approved by the Engineer. Forms shall be removed as stated in Section 03 10 00 - Concrete Forming and Accessories or as approved.

Concrete Element	Stripping	Forming Next Placement	Loading
Footings and similar massive structures in compression	2 Days	2 Days	4 Days
Columns and other slender compression elements	2 Days if under 10 ft. tall; 1 Day ea. Additional 5 ft.	4 Days	7 Days before placing beam; 21 Days before placing superstructure loads
Beams and other flexural elements	8 days (bottom), 3 days (sides)	2 Days	21 Days
Walls	2 Days if less than 10 ft.; 1 Day each additional 5 ft., 5 Days max.	-	14 Days, min, before backfilling

E. Mass Concrete

- 1. "Mass Concrete" is any concrete system that approaches a maximum temperature of 158 degrees F within the first 72 hours of placement. In addition, it includes all concrete elements with a section thickness of 3 feet or more regardless of temperature.

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2. Mass concrete shall conform to the special provisions of this article in addition to all applicable provisions of other articles in this Section.
3. Mass concrete proportioning, placement, consolidation and curing shall be in accordance with ACI 304R, 309R, 211.1, and 207.1R.
4. Additional requirements for heating, cooling, curing and protecting mass concrete shall be as specified herein. Consideration shall be given to temperature rise caused by the hydration of the cement. Large differences in temperature within the concrete are not permitted. The Contractor may elect to accomplish this by proposing alternate mix designs for mass concrete placement.
5. Proportioning and Mix Design:
 - a. Materials (except those listed at the end of this paragraph) and mix proportioning for mass concrete shall be in accordance with ACI 207.1R - Mass Concrete, latest edition. Type III Portland cement and accelerating type admixtures shall not be used.
 - b. Mixes shall be designed using alternate appropriate amounts of cement which will reflect lower internal temperatures. Minimum cement factors with maximum size aggregate, air entrainment and low water cement ratios should be used, to produce workable concrete and the specified strength.
6. Placement:
 - a. Concrete with lower than usual slump may be used, provided it can be properly placed and consolidated.
 - b. Placing Temperatures - Unless otherwise approved, the temperature of the concrete when deposited at the point of placement shall not exceed 70 degrees F, nor be less than 35 degrees F. When the temperature of the surrounding air is expected to be below 40 degrees F during placing, or within 24 hours thereafter, the temperature of the concrete when deposited at the point of placement shall be in accordance with ACI 306R.1.
 - c. Concrete shall not be placed until the installation of the temperature monitoring system has been inspected and approved by the Engineer and adequate materials for the curing and thermal protection of the concrete are on the site.
 - d. The Contractor shall be responsible for installing cooling pipes or other facilities, as needed, to maintain the thermal controls specified herein.

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- e. At the completion of each pour/lift of the mass concrete; the exposed surface of mass concrete shall be roughened to promote bond with successive pour.
7. Curing and Protection:
- a. The curing period shall be a minimum of 14 days or as approved by Engineer.
 - b. Temperature Monitoring:
 - 1) Thermocouples or thermistors shall be installed in mass concrete placements in sets of two located on a grid at a maximum spacing of 25 feet on center in each direction and no closer than 6 feet from any edge or 4 feet from any opening. One thermocouple shall be placed at mid-depth of the concrete placement and the second thermocouple shall be located directly above the first and 2 inches below the surface. Additional thermocouples shall be placed at exposed edges of concrete placements at 50 feet on center, at mid-depth, and 2 inches beneath the surface. Where cooling pipes are installed, thermocouples shall be located mid-way horizontally between the pipes.
 - 2) Each temperature sensor wire lead shall extend a minimum of 6 feet out of the concrete and shall be securely labeled with the location of the corresponding sensor and a tracking number.
 - 3) Placement plans showing all temperature sensors and manufacturer's installation instructions and operating manuals for all related equipment shall be submitted to the Engineer for approval prior to concrete placement.
 - 4) Temperature monitoring shall continue during the curing period and until the internal temperature is within 25 degrees F of the ambient air temperature following the end of the curing period.
 - c. Thermal Control:
 - 1) Mass Concrete Temperature Control requirements:
 - a) Maximum temperature in mass concrete after placement shall not exceed 160 degrees F.
 - b) For mass concrete, large differentials of temperature between the interior of the concrete and the exterior of the concrete shall not be

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allowed. The maximum allowable temperature differential between the interior of the concrete (core) and the exterior of the concrete (surface) shall not be more than 35 degrees F.

- 2) At mass concrete placements, the curing water added shall not be colder than 30 degrees F below the interior temperature of the concrete to prevent large temperature gradients. If necessary, curing water shall be heated.
- 3) When the difference in temperature between the core and the surface (horizontal or vertical) exceeds 30 degrees Fahrenheit, insulation blankets shall be added in 1/2 inch layers as needed to prevent the difference from increasing. Joints in insulation blankets shall be staggered a minimum of 12 inches at adjacent layers. Insulation blankets shall be placed over curing mats and moisture retaining cover. If the addition of layers of insulation are not sufficient to limit the temperature gradient to 35 degrees Fahrenheit, the concrete placement shall be tented and heat shall be applied as needed to control the temperature gradient.
- 4) Insulate opening/s in mass concrete by suitable means as approved and ensure that temperature differential between the core and the surface does not exceed the limit specified in this Section.
- 5) Thermal controls and protection shall be maintained until the interior concrete temperature is less than 35 degrees Fahrenheit greater than the average daily ambient air temperature.
- 6) The rate of cooling within the interior of the concrete shall be regulated to control the temperature drop to not more than 1 degree Fahrenheit in any period of one hour and 10 degrees Fahrenheit in any 24-hour period.
- 7) Where insulation blankets are provided over mass concrete, at the end of the curing period they shall be removed one layer at a time at such a rate that the temperature differential between the core and the surface never exceeds 35 degrees Fahrenheit and the cooling rate specified above is not exceeded, but not more than one layer in an 8 hour period.

F. Nonpermanent Materials in Structural Concrete

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1. Wood, and other nonpermanent materials that are more compressible than concrete, may be permitted to be left in the structural concrete of the various excavations outside of the excavated surface when approved by the Engineer.
 2. The Engineer will determine if materials are tight in place, provide firm support of the rock, and do not create a continuous soft cushion between the structural concrete and the rock.
- G. Concrete Repairs
1. Defective Concrete.
 - a. Any concrete that may be found defective at any time before the completion of this Contract shall be cut out to the extent ordered by the Engineer and replaced without additional payment thereafter.
 - b. Local repairs shall be made only if explicitly permitted. If local repairs are so ordered by the Engineer, they shall be made immediately on removal of the forms. No thin patches or plastering on concrete will be permitted. Cut recesses of a shape to retain the patches and of a depth to ensure their permanency. If required, set anchor bolts in drilled holes. Embed wire mesh or other suitable devices in the patch.
 - c. Any concrete that before the completion and acceptance of all Work under this Contract, develops defects from freezing or from lack of moisture, or from any cause for which the Contractor is responsible, shall be satisfactorily repaired or replaced at the expense of the Contractor.
 2. Repair of Cracks
 - a. Cracks in concrete shall be repaired by injection of epoxy for structural cracks or by injection of hydrophilic resin for shrinkage cracks as determined by the Engineer. The resulting crack repair shall be watertight. These materials shall be applied in accordance with the manufacturer's recommendations. Initial application of the repair material shall be made in the presence of the Engineer and a representative of the manufacturer. All injection Work shall be performed by experienced personnel certified by the manufacturer.
 3. Repair of Formed Surfaces:
 - a. The following defects shall be repaired in all types of formed finishes:

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- 1) Spalls, air bubbles, rock pockets, form depressions, and other defects which are more than 1/4 inch in depth.
 - 2) Holes from tie rods and other form tie systems.
 - 3) Fins, offsets and other projections which extend more than 1/4" beyond the designated member surface.
 - 4) Stains and substances marring the surface.
- b. The following defects shall be repaired in smooth finish surfaces, in addition to those listed above:
- 1) Spalls, air bubbles, rock pockets, form depressions, and other defects which extend to more than 1/2" in width in any direction, no matter how deep.
 - 2) Spalls, air bubbles, rock pockets, form depressions, and other defects of any size which exceed 3 in number in a 12 inch square or 12 in number in a 3 foot square.
 - 3) Fins, offsets and other projections shall be completely removed and smoothed.
 - 4) Scratches and gouges in the surface.
 - 5) Surfaces that exceed allowable tolerances.
 - 6) Texture and color irregularities. At water retaining surfaces, texture and color irregularities need not be repaired when greater than 12 inches below the minimum normal operating water surface except where such defects are indicative of reduced durability.
- c. Where a smooth rubbed or grout cleaned finish is specified, minor surface defects repairable by the finishing process need not be repaired prior to the finish application, when approved by the Engineer.
4. Method of Repair of Formed Surfaces:
- a. Repair and patch defective areas with cement mortar or concrete repair mortar immediately after removal of forms and as directed by the Engineer.
 - b. Repairs made to water bearing and below grade surfaces shall be made with repair mortar only. Repairs of form tie holes in water bearing or buried surfaces shall be made with non-shrink grout as specified in Section 03 60 00 - Grouting.
 - c. Cut out honeycomb, rock pockets, voids, and holes left by tie rods and bolts, down to solid concrete but, in no case, to a depth

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of less than 1 inch for cement mortar and 1/2 inch for repair mortar. Make edges of cuts perpendicular to the concrete surface. Before placing the cement mortar, thoroughly clean and brush-coat the area to be patched with the specified bonding agent. Where concrete repair mortar is used, the surface shall be prepared and mortar placed per manufacturers recommendations. Compact mortar in place and strike off slightly higher than the surrounding surface. Cure as specified.

- d. Repairs to surfaces exposed to public view shall match the color and texture of surrounding concrete.
 - e. Provide test areas at inconspicuous locations to verify mixture, texture and color match before proceeding with the patching.
 - f. Fill holes extending through concrete by means of a plunger- type gun or other suitable device from the least exposed face, using a flush stop held at the exposed face to ensure completely filling.
 - g. Remove stains, grout accumulations, sealing compounds, and other substances marring surfaces by scrubbing, power washing, or abrasive blast using sand finer than No. 30 and air pressure from 15 to 25 psi.
5. Repair of Unformed Surfaces:
- a. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to the tolerances specified for each surface and finish according to ACI 117. Correct low and high areas as herein specified.
 - b. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having the required slope. Correct high and low areas as herein specified.
 - c. Repair finish of unformed surfaces that contain defects which adversely affect the durability of the concrete. Surface defects include crazing, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
 - d. Repair structural cracks as defined by the Engineer in all structures.
 - e. Repair non-structural cracks as defined by the Engineer which are greater than 0.01 inches wide, which are in below grade structures, or which are exposed to public view. In water retaining structures, repair any crack which shows any amount of leakage and all cracks where leakage potential cannot be determined.

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6. Methods of Repair of Unformed Surfaces:
 - a. Correct high areas in unformed surfaces by grinding, after the concrete has cured sufficiently so that repairs can be made without damage to adjacent areas.
 - b. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out the low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Where the concrete has already set and repairs are required, sawcut around the perimeter of the area to be repaired to a 1/2-inch depth and remove concrete so that the minimum thickness of the repair is 1/2 inch. Apply specified concrete repair mortar in accordance with the manufacturer's directions and recommendations.
 - c. Remove defective areas to sound concrete with clean, square cuts, to a minimum depth of 1.5 inches. Provide 3/4 inch clearance all around exposed reinforcing steel. Clean and dampen all concrete surfaces in contact with patching concrete and brush with the specified bonding agent. Place patching concrete while the bonding agent is still tacky. Mix patching concrete of the same materials and proportions to provide concrete of the same type or class and color as the adjacent finished concrete. Place, compact and finish as required to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
 - d. Where flooring material is to be installed, assure that surface is acceptable for flooring material to be installed in accordance with manufacturer's recommendations.
7. Other Methods of Repair:
 - a. Repair methods not specified above may be used with written approval of the Engineer.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Field Quality Control Testing:
 1. General:
 - a. Unless required otherwise by the Contract, all field quality control testing of materials and the resulting concrete for compliance with the technical requirements of the specifications shall be performed by the DEP's Engineering Services group of the Bureau of Engineering Design and Construction and/or the CQAS consultant.

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- b. The use of these, or any, testing services appointed by DEP and/or the CQAS consultant shall in no way relieve the Contractor of his responsibility to furnish materials and construction in full compliance with the Contract documents. The Contractor shall provide concrete of the quality specified and it is hereby emphasized that the responsibility for so doing is solely and completely his. It shall be the Contractor's responsibility to coordinate work with the Supervising Engineer for Concrete Construction and the DEP designated Testing Laboratory and to keep himself fully informed of the Evaluation of the Compression (Strength) Test results as described below in this Section
2. Testing Provided by DEP – at DEP's discretion, the following testing and inspection shall be provided.
- a. Secure production samples of materials at plants or stockpiles during the course of the work and test for compliance with the specifications unless otherwise noted in the Schedule of Mixes Proportioning and Testing stipulated in the Contract.
 - b. Provide the services of a qualified concrete technician at each location on the job site where concrete is being mixed and discharged from the mixer for the duration of the concrete placement.
 - c. Strength Tests: The Concrete Testing Laboratory provided by DEP shall conduct all strength tests (in accordance with ASTM C39). Strength tests of the concrete shall be conducted in accordance with the following procedures.
 - 1) Secure samples in accordance with ASTM C 172.
 - 2) Each strength test shall be obtained from a different batch of concrete on a representative, truly random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.
 - 3) Additional concrete test cylinders shall be made from concrete taken out of the bucket, hopper or forms as directed by the Supervising Engineer for Concrete Construction. These test cylinders shall be separate and distinct from those made from the mixer and shall be made from the same batch as the sample taken from the mixer. Where concrete is placed directly from the mixer into forms, without any intermediate conveyance, these additional cylinders will not be required.

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- 4) When pumping or pneumatic equipment is used, samples for compressive strength testing and for properties of fresh concrete shall be taken at the discharge end where practicable. If taking samples at the point of discharge creates an undue safety or operational hazard, samples shall be taken at the hopper or bucket to which the mixer discharges.
- 5) Compressive strength tests shall be conducted on a set of five specimens molded from each sample in accordance with ASTM C 31, and cured under standard moisture and temperature conditions in accordance with ASTM C 31. Cylinders for compressive strength testing may be either 4 inches by 8 inches or 6 inches by 12 inches as approved.
- 6) Test two specimens at 7 days in accordance with ASTM C 39. Test two specimen at 3 days instead of 7 days when high early strength is required, or when directed by the Engineer.
- 7) Test three specimens at 28 days in accordance with ASTM C 39. The 28-day test result shall be the average of the strengths of the three specimens, except that if one specimen in a test manifests evidence of improper sampling, molding or testing, it shall be discarded and the remaining two strengths averaged. Should more than one specimen in a test show any of the above defects, the entire test shall be discarded. When high early strength is required, the specimens shall be tested at 7 days instead of 28 days.
- 8) When the 7-day test results (3-day for high early strength) are below 65% of the specified strength and/or whenever the 28-day test results (7-day for high early strength) are below the specified strength, the specimens shall be kept intact and stored for a minimum of 30 days or until inspected by both the Supervising Engineer for Concrete Construction or his authorized representative and the Contractor.
- 9) The Engineer may direct the taking of additional cylinders for testing at 56-days curing or at other intervals if there is believed to be an issue with the concrete mix design.

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- 10) Written results of the compression test results shall be posted on the DEP's concrete database 24 hours following the test date on the following business day. The test results are available to the Supervising Engineer for Concrete Construction, the Engineer, Contractor and concrete supplier. A hard copy of the final result will be sent to the Resident Engineer.
 - 11) Unless otherwise directed, all cylinders shall only be handled by DEP designated personnel.
- d. At DEP's discretion, the following other testing shall be performed by DEP or the CQAS consultant:
- 1) Check the slump, air content, concrete temperature, unit weigh of each sample of concrete to be used in molding strength test specimens.
 - 2) Perform all other field testing of concrete as required by the Building Code of New York State .
 - 3) Slump testing shall be conducted in accordance with ASTM C 143.
 - 4) Air content testing shall be conducted in accordance with either ASTM C 231 (Pressure Method) on concrete samples from which the compressive strength test specimens are made. Air content testing of Lightweight Concrete shall be in accordance with ASTM C 173.
 - 5) Measurements of concrete temperature shall be performed in accordance with ASTM C 1064.
 - 6) Unit Weight tests shall be made with a calibrated one-half (1/2) cubic foot bucket in accordance with ASTM C 138. On obtaining the unit weight, the yield shall be immediately computed as the ratio; weight of all the ingredients batched including the water added per cubic yard (from the batching ticket) divided by the unit weight determined times 27. Over-yielding or under-yielding by more than 2% are cause for concern and should be immediately investigated.
 - 7) If requested by the Engineer, water content testing shall be conducted in accordance with AASHTO TP 318.
 - 8) Properly note and record the time of day when all tests were made and the corresponding results. Also, record from what truckloads the samples were taken, the class of concrete which the samples represent and exactly

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where the concrete represented by the sample was deposited in the structure.

- e. Frequency of Testing:
- 1) For buildings, make one strength test for each 50 Cu. Yd. or fraction thereof for each mix design placed in any one day except that a minimum of two tests will be made for each day's placement.
 - 2) The minimum number of tests shown in the following table will be made for concrete used for all structures other than buildings.

Total Cubic Yards of Concrete Placed During Day	Minimum Number of Strength Tests
Up to 100 Cu. Yds.	One for each 50 Cu. Yds.*
Over 100 Cu. Yds.	One for each 100 Cu.Yds.*
* or fraction thereof.	

- 1) The Supervising Engineer for Concrete Construction may require that additional tests be made if there is reason to believe that defective concrete has been delivered or placed.
- f. Additional Services: The testing agency appointed by DEP and/or the CQAS consultant shall provide additional services to the extent deemed necessary by DEP and shall also perform the following services.
- 1) Inspect concrete batching, mixing, and delivery operations in accordance with Inspection Requirements of the NYSBC and ASTM C94.
 - 2) Check batching and mixing operations.
 - 3) Review the manufacturer's report of each shipment of cement, aggregates and reinforcing steel and/or conduct laboratory spot checks of these materials as received.
 - 4) Inspect the location and dimension of the forms, the placing of the reinforcing steel and the placing, conveying and depositing of the concrete.
 - 5) Sample concrete at point of placement and other locations directed by the Supervising Engineer for Concrete Construction and perform required tests.

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- 6) Additional testing and inspection required because of changes in materials or mixture proportions requested by the Contractor. When required, such testing shall be performed at the Contractor's expense.
 - 7) Additional testing of materials or concrete occasioned by failure to meet specification requirements. When required, such testing shall be performed at the Contractor's expense.
3. Authority and Duties of the DEP provided Special Inspection Testing Agency and/or the CQAS consultant:
- a. Special Inspections of concrete shall be in accordance with NYSBC Table 1704.4.
 - b. Technicians representing the testing agency shall inspect the materials and the manufacture of concrete and shall report their findings to the Supervising Engineer for Concrete Construction or his authorized representative and the Contractor.
 - c. When it appears that the material furnished or work performed by the Contractor fails to fulfill specification requirements, the technician shall immediately notify the Supervising Engineer for Concrete Construction or his authorized representative, and the Contractor of such failure.
 - d. The technician shall not act as foreman or perform other duties for the Contractor.
 - e. Technicians are not authorized to revoke, alter, relax, enlarge or release any requirement of the specifications, nor to approve or accept any portion of the work.
 - f. The DEP and/or the CQAS consultant appointed testing agency shall deliver concrete test cylinders to the DEP designated testing laboratory, or such other location as designated in the Contract. Delivery methods shall be in accordance with the requirements of ASTM C 31. Deliveries shall be made such that cylinders remain at the job site (in the boxes provided for their storage) no less than 24 hours and no more than 72 hours after the casting.
4. Responsibilities and Duties of the Contractor:
- a. Submit data and test documentation on materials and design mixtures including trial batch and shrinkage test results to the Engineer at least 60 days prior to the start of field operations.

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- b. Submittal to the Supervising Engineer for Concrete Construction the procedures, methods and concrete mix designs, the name and location of the proposed concrete plant. Submit the quality assurance programs of the concrete suppliers and provide copies of all test reports to the Engineer.
- c. Provide all materials, labor and equipment necessary to assist the representatives of the DEP's testing agency in obtaining, preparing and handling test samples at the project site or at other sources of material. When directed by the Engineer, the Contractor shall be responsible for transferring strength test specimens from point of casting to curing boxes and/or to testing agency vehicles.
- d. Advise the Resident Engineer and the Supervising Engineer for Concrete Construction and the DEP provided Testing Agency and/or the CQAS consultant sufficiently in advance of operations to allow for completion of quality tests and for the assignment of personnel.
- e. Provide and maintain for the sole use of the testing agency adequate facilities for safe storage and proper curing of concrete test cylinders on the project site for the first 24 hours, as required by ASTM C 31. The Contractor shall provide an insulated box of substantial construction for use in storing cylinders on the site until such time as they are transported to the testing laboratory. The box shall be large enough to accommodate the maximum number of test cylinders which may be required for any day's concrete placement, and shall have an insulated hinged cover. Heating facilities shall be installed in the box such that the temperature within the box may be maintained at the limits specified by ASTM C 31. The box shall be of such dimensions as to permit placing the cylinders in the box one (1) high only. No stacking of cylinders will be permitted. A high-low thermometer shall be placed in the storage box and the maximum and minimum temperatures noted shall be recorded on an appropriate identification card for each test. To minimize the hazard of disturbance during curing, the storage box shall be located in an area free from vibration such as pile driving and traffic of all kinds. No concrete shall be delivered on the site until such storage curing box has been provided and any identified problems with the box addressed to the satisfaction of the Engineer. Cylinders shall remain in the curing box until ready for delivery to the testing laboratory but not less than 24 hours. Sufficient box storage capacity shall be provided by the Contractor to allow for up to 72 hours of cylinder storage.

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- f. The Contractor shall furnish copies of mill test reports of all shipments of cement, aggregates and reinforcing steel being used to Supervising Engineer for Concrete Construction and the testing agency.
 - g. The Contractor shall be responsible for:
 - 1) All testing associated with the evaluation proposed mix designs including required trial batch and shrinkage testing.
 - 2) Establishing and controlling the mix proportions during the entire progress of the work as specified in this Section..
 - 3) Testing required because of changes in materials or proportions of the mix requested by the Contractor, as well as, any extra testing of concrete or materials occasioned by failure to meet specification requirements.
- B. Evaluation of Concrete Quality:
- 1. General:
 - a. Concrete quality shall include but not be limited to satisfactory strength, durability, density (air entrainment), wearing quality, shrinkage cracks, color, physical appearance etc.
 - b. Wherever there is evidence that any of the concrete in place does not appear to produce the results required by the specifications, such concrete shall be considered questionable and evaluations shall be made as detailed below.
 - 2. Evaluation of Compressive Test Results:
 - a. Test results shall be evaluated separately, for each type and each specified strength of concrete. Evaluation shall be in accordance with the ACI 214.
 - b. The strength level of an individual class of concrete shall be considered satisfactory if both of the following requirements are met:
 - 1) Every arithmetic average of any three consecutive compressive strength tests equals or exceeds the specified compressive strength f'_c .
 - 2) No individual strength test (average of two or more cylinders from the same batch) falls below the specified compressive strength f'_c by more than 500 psi when f'_c

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is 5,000 psi or less, or by more than 0.10 f'c when f'c is more than 5,000 psi. .

- c. For evaluation of the control of the quality and uniformity, each type and specified strength of the concrete shall be represented by at least five (5) tests.
 - d. If results of a number of consecutive seven (7) day tests at any stage of the work indicate abnormalities or results of a number of twenty-eight (28) day tests are below the specified strengths, the production and testing of the concrete shall be immediately investigated and reported upon by the Evaluation Committee noted in this Section
3. Evaluation of Questionable In-Place Concrete Construction by Non-destructive Methods:
- a. Visual inspection, impact hammers, sonoscopes, microscopic examination, chemical analysis of the hardened concrete, probes or other nondestructive testing devices may be used as an indicator of the relative quality and uniformity of various areas of the structure, as an aide in evaluating concrete in place, or in determining locations of areas to be cored. Any program of nondestructive testing shall be performed as directed by and under the supervision of the Evaluation Committee noted in this Section
 - b. Nondestructive Tests:
 - 1) Test results shall be evaluated and shall be valid only if tests have been conducted by properly calibrated equipment in accordance with recognized standard procedures.
 - 2) Nondestructive tests shall not be used as the sole basis for accepting or rejecting concrete.
 - 3) Nondestructive tests such as Schmidt Hammers or Windsor Probes shall be calibrated by comparison to a destructive core test from concrete taken in the same area.
4. Evaluation of Questionable In-Place Concrete Construction from Core Tests:
- a. Core tests shall be conducted only as recommended and directed by the Evaluation Committee noted in this Section Core tests shall be evaluated and shall be valid only if tests have been conducted in accordance with specified procedures.

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- b. When core testing is required, cores shall be obtained and tested in accordance with ASTM C 42. Cores shall be tested saturated-surface-dry or shall be tested air-dry depending as to whether the area where the questionable concrete is located shall be wet or dry under service conditions. Such determination shall be made by the Committee and they shall direct the condition of the cores at the time of testing. If the cores are to be tested dry, they shall be air dried (temperature 60 to 70 degrees F and relative humidity less than 60 percent) for seven (7) days before the test. If the cores are to be tested wet, they shall be tested after moisture conditioning in accordance with ASTM C 42. The laboratory report shall state whether the cores were tested saturated-surface-dry or surface-dry.
- c. At least (3) three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Committee so as to least impair the strength of the structure.
- d. If, before testing, (1) one or more of the cores shows evidence of having been damaged subsequent to or during removal from the structure, or is obviously defective, replacement cores shall be taken.
- e. Concrete in the area represented by a core test, made and tested in accordance with the specified requirements above will be considered adequate for structural strength if the average strength of the three cores taken from the immediate area of the questionable concrete is equal to or greater than the specified strength and no single core strength is less than 85 percent of the specified strength (f_c).
- f. The Committee shall determine the area where the cores are to be taken and they shall determine the number of cores to demonstrate the adequacy of the questionable concrete. Corrections to the strength values shall be made if the length to the diameter ratio is different from (two) 2.0. No strength correction shall be made for the age of the concrete cores.
- g. If the average strength of the cores as tested is less than the required value, the Committee will make a recommendation as to whether the values obtained are acceptable or they will recommend that the values obtained be checked against a structural analysis performed by the Contractor's licensed professional engineer.

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- h. Core holes shall be plugged solid as approved by the Engineer.
- 5. Evaluation Committee:
 - a. The following shall constitute a Committee for the investigation and the evaluation of the quality of the concrete when there are indications that concrete quality is not satisfactory and the Concrete does not satisfy requirements of this Section. The Resident Engineer (who shall act as Chairman of the Committee), the Supervising Engineer for Concrete Construction or authorized representative, representatives of the Contractor, the Concrete Producer, the Testing Agency, the Architect/Engineer responsible for the design and such other members as the Commissioner may designate. Such members of the Committee as designated by the Chairman shall meet whenever request for such meeting is made by any member and/or as otherwise specified. Reports and recommendations of the Committee shall be submitted to the Contractor and the Commissioner. All viewpoints, if there is no complete agreement shall be noted in the report and reports shall be countersigned by all participating members of the Committee. The Contractor shall be responsible for the preparation and submission of reports.
 - b. The functions of the Committee and any reports, recommendations, etc., it submits shall be advisory in nature. The responsibility for the production and quality of the concrete remains solely and completely with the Contractor.
 - c. All expenses incurred due to the functioning of the Committee shall be borne by the Contractor except that all members of the Committee shall serve without fee.
- 6. Additional Curing:
 - a. If the concrete fails to meet the specified compressive strength requirement, additional curing as specified by the Supervising Engineer for Concrete Construction may be required and modifications may be required in the concrete mix design for the remaining concrete work, at the expense of the Contractor.
- 7. Acceptance of Concrete:
 - a. Concrete Strength:
 - 1) Concrete not meeting the requirements of this Section shall be considered potentially deficient. Steps shall be taken to increase the strength to ensure that the strength level will be satisfactory.

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- b. Air Content:
 - 1) Concrete not within the approved limits of air entrainment shall be rejected.
 - 2) Corrective action shall be made to control the proper air content.
 - c. Slump:
 - 1) Concrete not within the specified slump limits at the point of placement may be rejected.
 - 2) When the concrete is tested and found to be out of specifications the Contractor shall immediately adjust the mix to bring the mixture within the specified slump limits.
 - d. Acceptance of Lightweight Concrete shall be based on fresh unit weight measured in accordance with ASTM C 138. The nominal fresh unit weight shall be that corresponding to the specified maximum air-dry unit weight calculated from the formula for approximate air-dry weight in ASTM C 567. When the nominal fresh unit weight varies by more than 2 lb./ft. from the required weight, adjust the mixture as promptly as conditions permit to bring the unit weight to the desired level. Do not use any batch for which fresh unit weight varies by more than 3 lb./ft. from the desired level.
- C. Acceptance of Structure:
- 1. General:
 - a. Notwithstanding the provisions of any section of this Contract, all concrete shall conform to the requirements of the Building Code of New York State .
 - b. Completed concrete work which meets all applicable requirements will be accepted without qualification.
 - c. Completed Concrete work which fails to meet one or more requirements shall be considered potentially deficient. Potentially deficient concrete which has been repaired to bring it into compliance will be accepted without qualification. The decision as to whether it has been brought into compliance except as otherwise noted in this Section shall rest with the Engineer.
 - d. Potentially deficient concrete which cannot be brought into compliance shall be evaluated by the Evaluation Committee noted in this Section and a report submitted to the

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Commissioner. The Commissioner will then, in writing, either accept without qualification or accept subject to Retainage (as outlined in this Section) or direct that the concrete be reinforced or supplemented with additional construction to bring it into compliance after which it may be resubmitted to the Commissioner.

- e. Repair potentially deficient concrete work by removing and replacing or by reinforcing with additional construction as required by the Engineer. To bring the rejected work into compliance, use repair methods that will maintain the strength of the structure and meet all other applicable requirements for function, durability, dimensional tolerances, and appearance.
 - f. Obtain acceptance by the Engineer for repair methods and materials and for modifications needed to assure that concrete work complies with requirements in the Contract Documents.
 - g. The Contractor shall pay all costs incurred including redesign and reverification in bringing the concrete work into compliance and acceptance.
2. Dimensional Tolerances:
- a. Formed surfaces resulting in concrete outlines smaller than required by an amount exceeding the requirements of ACI 347R shall be considered deficient in strength and subject to the provisions noted in this Section.
 - b. Formed surfaces resulting in concrete outlines larger than required, by an amount exceeding the requirements of f ACI 347R may be rejected and the excess material shall be subject to removal. If removal of the excess material is permitted, it shall be accomplished in such a manner as to maintain the strength of the section and to meet all other applicable requirements of function and appearance.
 - c. Concrete members cast in the wrong location may be rejected if the strength, appearance or function of the structure is adversely affected or misplaced items interfere with other construction.
 - d. Inaccurately formed concrete surfaces exceeding the requirements of ACI 347R and which are exposed to view may be rejected and shall be repaired or removed and replaced if required.
3. Appearance:
- a. Concrete exposed to view with defects which adversely affect the appearance of the specified finish may be repaired, if

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possible. If, in the opinion of the Supervising Engineer for Concrete Construction, the defects cannot be repaired, the concrete shall be considered potentially deficient, such concrete shall be evaluated by the Committee noted in this Section and a report submitted to the Commissioner. The Commissioner will then in writing, either accept without qualification or accept subject to Retainage (as outlined in this Section) or direct that other remedial measures be taken after which it may be resubmitted to the Commissioner.

4. Strength of Structure:
 - a. The strength of the structure in place will be considered potentially deficient if it fails to comply with any requirements which control the strength of the structure, including but not necessarily limited to the following conditions:
 - 1) Low concrete compression test strength as evaluated in accordance with requirements of this Section. However, in those areas or members containing such concrete, if a structural analysis by the Professional Engineer licensed in the State of New York indicates the completed structure will be suitable for its intended use, i.e., that the stresses which will be developed under design load in the members containing below-strength concrete are less than the design stress permitted for the actual compression test strengths reported and the analysis is approved by the Engineer, the member or members will be accepted without qualification.
 - 2) Low concrete core tests as evaluated in accordance with requirements of this Section. However, in those areas or members where core tests are made in accordance with requirements of this Section, if a structural analysis by a Professional Engineer licensed in the State of New York indicates the suitability of the structure for its intended use, i.e., that the stresses which will be developed under design load in the members containing below-strength concrete are less than the design stress permitted for the actual core test strengths reported, and the analysis is approved by the Engineer, the areas or members will be accepted without qualification.
 - 3) Reinforcing steel size, quantity, strength, position or arrangement at variance with the specified requirements or the Contract Drawings.

SECTION 03 30 00 – CAST- IN-PLACE CONCRETE
CONTRACT KENS-EAST-2

- 4) Concrete which differs from the required dimensions or location in such a manner as to reduce the strength.
 - 5) Curing less than specified.
 - 6) Inadequate protection of concrete from extremes of temperature during early stages of hardening and strength development.
 - 7) Mechanical injury, construction fires, accidents or premature removal of formwork likely to result in deficient strength.
 - 8) Poor workmanship likely to result in deficient strength.
5. Action Required When Strength Is Potentially Deficient:
- a. When the strength of the structure is considered potentially deficient, the following actions may be required by the Engineer:
 - 1) Additional curing may be ordered.
 - 2) Structural analysis or additional testing or both may be required.
 - 3) Core tests may be required.
 - 4) If testing is inconclusive or impractical or if structural analysis does not confirm the Safety of the structure, load tests may be required and their results evaluated in accordance with ACI 318.
 - 5) Concrete Work rejected by structural analysis or by results of a load test shall be reinforced with additional construction as required by the Engineer/, or replaced.
 - 6) Document all repair work performed to bring strength-deficient concrete work into compliance with Contract Documents, and submit the documentation to the Engineer/Architect for acceptance.
6. Durability:
- a. The durability of the concrete work will be considered deficient and therefore the concrete work shall be rejected, if it fails to comply with any of the requirements which control the durability of the structure, including, but not necessarily limited to, the following conditions:
 - 1) Strength failing to comply with requirements of this Section.

SECTION 03 30 00 – CAST- IN-PLACE CONCRETE
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- 2) Materials for concrete not conforming with the specified requirements of this Section.
 - 3) Concrete not conforming with either the specified air-entrainment requirements or the air content limits.
 - 4) Curing not accomplished in accordance with Contract Documents.
 - 5) Inadequate protection of concrete from extremes of temperature during early stages of hardening and strength development.
7. Withholding:
- a. Where concrete is placed which is considered to be deficient, whether in strength, appearance, durability or any other quality defined, payment may be withheld at the discretion of the Supervising Engineer for Concrete Construction. If such concrete is subsequently accepted without qualification, then payment shall be made for such concrete including return of all monies withheld.
8. Retainage:
- a. Deficient concrete which cannot be brought into compliance and is nevertheless accepted by the Commissioner shall be subject to the following permanent retainage. For every cubic yard of concrete so placed, an amount equal to 10% of the unit price for concrete in place for unit price contracts or 10% of the price established in the detailed estimate for concrete in place for lump sum contracts shall be permanently retained.
9. Rejected Concrete:
- a. Concrete which has been rejected, in writing, by the Commissioner, shall be removed and replaced at no additional cost to the City. The cost of all such removed and replaced concrete shall be borne by the Contractor.
10. Protection of In-Place Concrete:
- a. Loading and Support of Concrete:
 - 1) Do not allow construction loads to exceed the superimposed load which the member, with necessary supplemental support, is capable of carrying safely and without damage. Submit for acceptance data on the amount of loading, method of distributing load, and any proposed supplemental support during construction.

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- b. Protection from Mechanical Injury:
 - 1) During the curing period, protect, the Contractor shall protect the concrete and its shoring from damaging mechanical equipment inducing shock and vibrations at all times. Protect all concrete surfaces from damage by construction traffic, equipment, materials, rain or running water, and other adverse weather conditions.

3.04 STARTUP / DEMONSTRATION

 A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

 A. Not Used

The items below are found on the following pages:

“Table 1 -- Concrete Mix Requirements”

Sample Concrete Placement Card

Mix Design Submittal (MDS) Forms

SECTION 03 30 00 – CAST- IN-PLACE CONCRETE
CONTRACT KENS-EAST-2

TABLE 1 - CONCRETE MIX REQUIREMENTS										
Classes of Concrete	Coarse Aggregate Sizes (ASTM C 33)			Minimum Cementitious Materials (lbs/cu yd.)	Cement Type (ASTM C 150)	Mineral Admixtures (%)		W/(C+P) Maximum	Specified Strength (psi)	
	A	B	C			A	B		f _c minimum field condition	f _{cr} minimum for mix design See FN3
25	#46	#67	#8	470	II	0% ²	0% ²	0.50	2,500 at 28 days	3,500 at 28 days
D	See NYSDOT Specification Section 501 – Portland Cement Concrete, table 501-3 Concrete Mixtures								3,000 at 28 days	3,750 at 28 days
40	#57 (3/4" to No. 4)	#8	---	525	II	---	---	0.42	4,000 at 28 days	5,000 at 28 days
45	#57 (3/4" to No. 4)	#8	---	525	II ⁸	0%	0%	0.42	4,500 at 28 days	5,700 at 28 days
45F	#4 (1.5" to 3/4")	#67	#8	525	II	See FN2	---	0.41	4,500 at 56 days	5,850 at 56 days
50	#57 (3/4" to No. 4)	#8	---	550	II	15%	20%	0.40	5,000 at 28 days	6,200 at 28 days
50LW	¾" to No. 4	---	---	660	II	15%	20%	0.45	5,000 at 28 days	6,200 at 28 days
50LWPG	3/8" to No. 16	#8	---	660	II	15%	20%	0.45	5,000 at 28 days	6,200 at 28 days
50F	#67 (3/4" to No. 4)	#8	---	550	II	15% ¹	20% ¹	0.40	5,000 at 28 days	6,200 at 28 days
50M	#67 (3/4" to No. 4)	#8	---	550	II	15% ¹	20% ¹	0.40	5,000 at 28 days	6,200 at 28 days
50HES	#67 (3/4" to No. 4)	#8	---	550	II	15% ¹	20% ¹	0.42	4,500 at 7 days	6,200 at 28 days

SECTION 03 30 00 – CAST- IN-PLACE CONCRETE
CONTRACT KENS-EAST-2

Note: Concrete containing coarse aggregate smaller than #67 shall only be used with the approval of the Engineer.

Footnotes (FN) to Table 1:

1. At the Contractor's option, and as approved by the Engineer, up to 15% fly ash and 20% GGBF may be used in Class 50 concrete that will not be in contact with potable water.
2. At the Contractor's option, and as approved by the Engineer, up to 15% fly ash and 20% GGBF may be used in Class 25 and Class 50F concrete that will not be in contact with potable water.
3. Minimum f_{cr} for mix design listed in this column are based on ACI 301, Table 4.2.3.1; when data are not available to establish standard deviation.
4. Aggregate susceptible to alkali-aggregate reaction shall not be used for concrete production and shall meet requirements specified in this Section.
5. It is the Contractor's responsibility to develop the specific mix designs for each class of concrete. The listing of parameters above in no way relieves the Contractor of their responsibility for furnishing concrete that meets the requirements of this Section.
6. At the Contractor's option, smaller stone may be used when pumping over large distances as required.
7. Contractor shall supply cement in accordance with the requirements furnished in Part 2 of this Section.
8. In accordance with the requirements of Cement furnished in Part 2 of this Section, the Contractor shall supply cement that is certified as meeting the requirements of ANSI/NSF 61 for concrete work which can contact with potable water. In addition, the Contractor shall note that Class 45 concrete shall be used for all Outlet Structures included in this Contract, and concrete for outlet structures shall be considered to be in contact with potable water. Accordingly, for Class 45 concrete, for outlet structures, the Contractor must furnish & use NSF approved ASTM C 150, Type II cement with an alkali content below 0.70%, at no additional cost to city

END OF SECTION

**SECTION 03 30 00 – CAST- IN-PLACE CONCRETE
CONTRACT KENS-EAST-2**

SAMPLE CONCRETE PLACEMENT CARD

Contract:	Contractor:		
Placement Date:	Concrete Mix:		
Scheduled Start Time: Approximate Quantity: cu. yds.			
Identification of Placement: Placement No:			
Item	Initials	Date	Remarks
	Inspector		
Foundations			
Construction Joint Preparation			
Forms and Blockouts			
Waterstops			
Reinforcement			
Embedments/Anchor Bolts			
Piping/Test			
Temperature Checkout			
Cleanup			
Provisions for Weather			
Contractor			
Electrical Contractor			
HVAC Contractor			
Plumbing Contractor			
Structures Contractor			



Mix Design Proportions Summary Sheet MDS

- USE ONE FORM PER MIX DESIGN -

Contract:	Mix Design Code (DEP Only):	Class (Specified Strength): PSI + %	Proposed Trial Batch Date:	Submittal Date:
Contractor:	Concrete Supplier:		Testing Laboratory:	
Mix Description (Common Name):	Concrete Supplier Address:		Testing Laboratory Address:	
	City:	State:	Postal Code:	City:
		State:	Postal Code:	State:
			Postal Code:	

Expedite: <input type="checkbox"/> Yes (Comment Req'd.) <input type="checkbox"/> No	Application: <input type="checkbox"/> Structural <input type="checkbox"/> Non-structural	Field Inspection: <input type="checkbox"/> Yes (Controlled) <input type="checkbox"/> No (Uncontrolled)	Weight Type: <input type="checkbox"/> Normal <input type="checkbox"/> Lightweight	Fly Ash: <input type="checkbox"/> Yes, List %: <input type="checkbox"/> No	Field Curing: <input type="checkbox"/> Yes, Min. Days: <input type="checkbox"/> No
---	--	--	---	--	--

Specimen Transport, Testing & Disposal Ages (Use Comments Area, If Applicable):	No. of Specimens (Per Set)	Transport Age (Days)	Test Age (No. of Specimens at Days)						Disposal Age for Unused Specimens (Days)
			Preliminary		Final		Other(s)		
			Qty	Days	Qty	Days	Qty	Days	
<input type="checkbox"/> Yes <input type="checkbox"/> No CQAP Standard	5	2	2	7	3	28	-	-	28
<input type="checkbox"/> Yes <input type="checkbox"/> No Other:									

Cement /Slag /Fly Ash		
Grade/Class:	Source:	PCY:

Cement/Slag /Fly Ash		
Grade/Class:	Source:	PCY:

Crushed Stone		
Size Number:	Source:	PCY (SSD):

Crushed Stone		
Size Number:	Source:	PCY (SSD):

Sand			
Type:	Source:	FM:	PCY (SSD):

Water		
	PCY:	GAL/CY:

Air Entraining Admixture		
Designation:	Brand:	OZ/CY:

-Range Water Reducing Agent		
Designation:	Brand:	OZ/CY:

Water-Reducing/Retarding Agent		
Designation:	Brand:	OZ/CY:

Other Admixtures		
Designation:	Brand:	OZ/CY:
Designation:	Brand:	OZ/CY:
Designation:	Brand:	OZ/CY:

Specified Slump (IN):	Specified Air Content (%):	Yield (CY):	Theoretical Unit Weight (PCF):	Water-Cement Ratio (from trial batch):
-----------------------	----------------------------	-------------	--------------------------------	--

Comments:

- SUBMIT TO NYCDEP CQAP AT 1-800-673-2816 -
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Submitted By (Print):	Testing Laboratory:	Signature:	Date:
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Mix Design Submittal of Proportions MDS

Contract:	Mix Design Code (DEP Only):	Class (Specified Strength): PSI + %	Proposed Trial Batch Date:	Submittal Date:	
Contractor:	Concrete Supplier:	Testing Laboratory:			
Cement (ASTM C150)					
Type:	Sp. Gr.:	Class/Grade:	Source:	Total Mass Per CY (PCY):	
Other Cementitious Materials (ASTM C18)					
Type:	Sp. Gr.:	Class/Grade:	Source:	Total Mass Per CY (PCY):	
Aggregate No. 1, Fine (ASTM C33)					
Type:	SSD Sp. Gr.:	Size:	Source:	Total Mass Per CY (PCY):	
Dry Rodded Unit WT (PCF):		Absorption (%):		FM:	
Aggregate No. 2, Coarse (ASTM C33)					
Type:	SSD Sp. Gr.:	Size:	Source:	Total Mass Per CY (PCY):	
Dry Rodded Unit WT (PCF):		Absorption (%):			
Aggregate No. 3, 4 Coarse (ASTM C33)					
Type:	SSD Sp. Gr.:	Size:	Source:	Total Mass Per CY (PCY):	
Dry Rodded Unit WT (PCF):		Absorption (%):			
Aggregate No. 2, Lightweight Alternative (ASTM C330)					
Type:	Sp. Gr. Factor:	Size:	Source:	Oven Dry (PCY):	
Loose Unit WT (PCF):		Estimated Wet (PCF):			
Chemical Admixtures (oz/cy)					
No. 1 ASTM C:	Type:	Source:	Name:	WT (oz):	
No. 2 ASTM C:	Type:	Source:	Name:	WT (oz):	
No. 3 ASTM C:	Type:	Source:	Name:	WT (oz):	
Water (Total)		Air Content		Total Mixture Mass and Volume	
GAL:	PCY:	CU FT:	%	CU FT:	LB/CU FT:
Comments:					
Submitted By (Print):		Company:	Signature:	Date:	



Mix Design Aggregates Gradation MDS

Sieve Size	Percent Passing Aggregate No.								Combined Gradation
	1 (Fine)		2 (Coarse) Stone Size (no): _____		3 (Coarse) Stone Size (no): _____		4 (Coarse) Stone Size (no): _____		
	Per ASTM C33:	Tested:	Per ASTM C33:	Tested:	Per ASTM C33:	Tested:	Per ASTM C33:	Tested:	
3 IN									
2 1/2 IN									
2 IN									
1 1/2 IN									
1 IN	-								
3/4 IN	-								
1/2 IN	-								
3/8 IN	100								
1/4 IN	-								
#4	95-100								
#8	80-100								
#16	50-85								
#30	25-60								
#50	5-30								
#100	0-10								
Dry Unit WT (pcf)									
Absorption (%)									
FM									

Remarks:



Mix Design Trial Batches Proportions MDS

Material (Trial Batch Proportions Per Cubic Yard)			Trial Batch No.			
			#1	#2	#3	#4
1. Cement						
Type:	Source:	LB:	LB:	LB:	LB:	
2. Other Cementitious Material						
Type:	Source:	LB:	LB:	LB:	LB:	
Grade/Class:						
3. Aggregate No. 1 (Fine) SSD						
Type:	Source:	LB:	LB:	LB:	LB:	
Sp. Gr.:	FM:	Absorption (%):				
4. Aggregate No. 2 (Coarse) SSD						
Type:	Source:	LB:	LB:	LB:	LB:	
Sp. Gr.:	Size:	Absorption (%):				
5. Aggregate No. 3 & 4 (Coarse) SSD						
Type:	Source:	LB:	LB:	LB:	LB:	
Sp. Gr.:	Size:	Absorption (%):				
6. Aggregate No. 2 (Lightweight, Alternative)						
Type:	Source:	Oven Dry:				
		LB:	LB:	LB:	LB:	
Sp. Gr.:	Size:	Absorption (%):	Wet:			
			LB:	LB:	LB:	
7. Water (Total):		LB:	LB:	LB:	LB:	
8. Water-Cementitious Ratio:						
9. Chemical Admixtures						
No. 1 Type:		WT (oz):	WT (oz):	WT (oz):	WT (oz):	
No. 2 Type:		WT (oz):	WT (oz):	WT (oz):	WT (oz):	
No. 3 Type:		WT (oz):	WT (oz):	WT (oz):	WT (oz):	
10. Total Mass		LB:	LB:	LB:	LB:	
11. Total Mass Per Cubic Foot (Theoretical Unit Weight)		PCF:	PCF:	PCF:	PCF:	



Mix Design Mixture Properties MDS

Properties	ASTM	Target Per Specification	Trial Batch No.			
			#1	#2	#3	#4
1. Fresh Concrete						
Temperature (F):	C1064					
Slump (IN):	C143					
Before Add HRWR						
End of Mixing						
15 (MIN)						
30 (MIN)						
45 (MIN)						
1 (HR)						
Unit WT (PCF):	C138					
Air Content (%):	C231/C173					
Mortar Content (%):						
Yield (CU FT/CU YD):						
Water-Cementitious Ratio						
Time of Set (MIN):	C403					
Initial (MIN):						
Final (MIN):						
Difference (MIN):						
2. Hardened Concrete						
Cylinder No.			1(A-_____)	2(A-_____)	3(A-_____)	4(A-_____)
Compressive Strength (PSI):	C39/C192					
3 Days						
Specimen 1						
Specimen 2						
Average						
7 Days						
Specimen 1						
Specimen 2						
Average						
28 Days						
Specimen 1						
Specimen 2						
Specimen 3						
Average						



Mix Design Mixture Properties MDS

Properties	ASTM	Target Per Specification	Trial Batch No.			
			#1	#2	#3	#4
56 Days (If Required by Contract Only)						
Specimen 1						
Specimen 2						
Average						
Shrinkage (%):	C157					
____ Days						
Specimen 1						
Specimen 2						
Average						
____ Days						
Specimen 1						
Specimen 2						
Average						
Observations						
Color						
Bleeding						
Heat Signature <small>(If Specified in the Specification and for the Submitted Batch Only)</small>						
Trial Batch No. (Submitted and Recommended for Approval):						
Comments:						
Laboratory Director (Print):		Company:		Signature & Seal:		Date:
CQAP WITNESS (Print):		Company:		Signature:		Date:
Contractor (Print):		Company:		Signature:		Date:
Designer Of Record (Print):		Company:		Signature:		Date:



Mix Design

Laboratory Trial Batch Mix Design Data

MDS

- TO BE COMPLETED BY CQAP -

Contract No.	Contract Name:	Basic Description of Specified Mix Design (Mix Design Common Name):	Trial Batch Date:
Batch Plant Name:	Design Trial Lab Name:	Class (Specified Strength): PSI + %	Weight Type: <input type="checkbox"/> Normal <input type="checkbox"/> Lightweight
		Concrete Type: <input type="checkbox"/> Pump <input type="checkbox"/> Conventional	

Description			Weight Per Cubic Yard			
Mix Point No.:			1	2	3	4
Cement:		LBS				
Cementitious:		LBS				
Sand:		LBS				
Stone:		LBS				
Stone:		LBS				
Water:		GAL				
Water:		LBS				
Admixture:		Air	OZ			
Admixture:		HRWR/MRWR	OZ			
Unit Weight:			PCF			

Description			Laboratory Trial Batch Weights			
Mix Point No.:			1	2	3	4
Cement:		LBS				
Cementitious:						
Sand:		LBS				
Stone:		LBS				
Stone:		LBS				
Water:		LBS				
Admixture:		Air	ML			
Admixture:		HRWR/MRWR	ML			

Description			Trial Batch Results							
Mix Point No.:			1		2		3		4	
Time:			Initial	30 MIN	Initial	30 MIN	Initial	30 MIN	Initial	30 MIN
Slump:		IN								
Water Content:		LBS								
Water Used:		LBS								
Computed Mix Water:		LBS								
Total Mix Water:		LBS								
Unit Weight:		LBS								
		PCF								
Air:		%								
Temp:		DEG								
Actual W/C Ratio										

Comments:

CQAP WITNESS (Print):	Company:	Signature:	Date:
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Mix Design Trial Batch Strength Test Results Form ASTM C39/ C192

- TO BE COMPLETED BY CQAP -

Contract No.	Contract Name:	Design Trial Lab Name:	Class (Specified Strength): PSI + %	Trial Batch Date:
--------------	----------------	------------------------	--	-------------------

Preliminary Strength Testing (See Page 1 for Preliminary Strength Age):

Age of Specimen:	Trial Batch #1 (Maximum Load / PSI)	Trial Batch #2 (Maximum Load / PSI)	Trial Batch #3 (Maximum Load / PSI)	Trial Batch #4 (Maximum Load / PSI)
Testing Date:	# 1	# 2	# 3	# 4
Specimen 1				
Specimen 2				
Specimen 3				
Average				

Comments:

CQAP WITNESS (Print):	Company:	Signature:	Date:
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Final Strength Testing (See Page 1 for Final Strength Age):

Age of Specimen:	Trial Batch #1 (Maximum Load / PSI)	Trial Batch #2 (Maximum Load / PSI)	Trial Batch #3 (Maximum Load / PSI)	Trial Batch #4 (Maximum Load / PSI)
Testing Date:	# 1	# 2	# 3	# 4
Specimen 1				
Specimen 2				
Specimen 3				
Average				

Comments:

CQAP WITNESS (Print):	Company:	Signature:	Date:
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CQAP CPM Comments (Preliminary & Final Age Testing):

CQAP CPM (Print):	Company:	Signature:	Date:
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Mix Design Trial Batch Strength Test Results Form ASTM C39/ C192

- TO BE COMPLETED BY CQAP -

Contract No.	Contract Name:	Design Trial Lab Name:	Class (Specified Strength): PSI + %	Trial Batch Date:
--------------	----------------	------------------------	--	-------------------

Additional Strength Testing:

Age of Specimen:	Trial Batch #1 (Maximum Load / PSI)	Trial Batch #2 (Maximum Load / PSI)	Trial Batch #3 (Maximum Load / PSI)	Trial Batch #4 (Maximum Load / PSI)
Testing Date:	# 1	# 2	# 3	# 4
Specimen 1				
Specimen 2				
Specimen 3				
Average				

Comments:

CQAP WITNESS (Print): _____ Company: _____ Signature: _____ Date: _____

Additional Strength Testing:

Age of Specimen:	Trial Batch #1 (Maximum Load / PSI)	Trial Batch #2 (Maximum Load / PSI)	Trial Batch #3 (Maximum Load / PSI)	Trial Batch #4 (Maximum Load / PSI)
Testing Date:	# 1	# 2	# 3	# 4
Specimen 1				
Specimen 2				
Specimen 3				
Average				

Comments:

CQAP WITNESS (Print): _____ Company: _____ Signature: _____ Date: _____

CQAP CPM Comments (Preliminary & Final Age Testing):

CQAP CPM (Print): _____ Company: _____ Signature: _____ Date: _____

SECTION 03 32 00 - JOINTS IN CONCRETE
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. The Work specified in this Section consists of providing all labor, materials, and incidentals necessary to furnish and install joints, joint materials, waterstops and embedded items as indicated on the Contract Drawings, specified herein and as needed for a complete installation.
- B. Joints shall also comply with the requirements of Section 03 10 00 - Concrete Forming and Accessories.
- C. Types of joints in concrete shall be as follows:
 - 1. Construction Joints - Joints between adjacent concrete placements continuously connected with reinforcement.
 - 2. Control Joints - Joints formed in concrete to provide a weakened plane in the concrete section to control formation of shrinkage cracks.
 - 3. Expansion Joints - Joints in concrete which allow thermal expansion and contraction of concrete. Reinforcement terminates within concrete on each side of joint.
- D. The following index of this Section is presented for convenience:

Article	Title	Section Page
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1.03	Related Sections	2
1.04	References	2
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SECTION 03 32 00 - JOINTS IN CONCRETE
CONTRACT KENS-EAST-2

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 03 10 00 - Concrete Forming and Accessories
- B. Section 03 30 00 - Cast-in-Place Concrete.

1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM C 990 - Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
 - 2. ASTM C 1016 - Test Method for Determination of Water Absorption of Sealant Backing (Joint Filler) Material.
 - 3. ASTM D 545 - Test Methods for Preformed Expansion Joint Fillers for Concrete Construction (Nonextruding and Resilient Types).
 - 4. ASTM D 994 - Preformed Expansion Joint Fillers for Concrete (Bituminous Type).
 - 5. ASTM D 1190 - Concrete Joint Sealer, Hot-Applied Elastic Type.
 - 6. ASTM D 1191 - Test Methods for Concrete Joint Sealers.
 - 7. ASTM D 1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 - 8. ASTM D 1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - 9. ASTM D 2835 - Lubricant for Installation of Preformed Compression Seals in Concrete Pavements.
 - 10. ASTM D 5329 - Test Methods for Sealants and Fillers, Hot-Applied, For Joints and Cracks in Asphaltic and Portland Cement Concrete Pavements.
 - 11. ASTM D 5973 - Elastomeric Strip Seals with Steel Locking Edge Rails Used in Expansion Joint Sealing.
 - 12. ASTM D 5898 - Guide for Standard Details for Adhered Sheet Waterproofing.
 - 13. ASTM E 1612 - Preformed Architectural Compression Seals for Buildings and Parking Structures.

SECTION 03 32 00 - JOINTS IN CONCRETE
CONTRACT KENS-EAST-2

14. ASTM E 1783 - Preformed Architectural Strip Seals for Buildings and Parking Structures.

15. ASTM F 1123 - Non-Metallic Expansion Joints.

B. American Concrete Institute (ACI):

1. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

C. 2020 Building Code of New York State (NYSBC)

D. New York State Department of Transportation (NYS DOT) Standard Specifications.

E. U.S. Army Corps of Engineers Specifications for Polyvinyl Chloride Waterstops, CRD-C572.

1.05 DESCRIPTION

A. The Contractor shall install joint material per the construction schedule submitted to and approved by the Engineer in a sequence and manner that will not damage the Work.

1.06 QUALITY ASSURANCE

A. Reviews of Shop Drawings shall be obtained before custom fabrication is started and before delivery of materials to the project site.

B. Work of this Section shall be coordinated with the work of other trades so that construction is not delayed.

C. Joint installation procedures and health and safety of the work force shall be the responsibility of the Contractor. The requirements of authorities having jurisdiction shall be complied with.

D. The final responsibility for constructing a watertight condition at expansion joints and construction joints remains with the Contractor as part of the Work under this Contract. Errors of detailing and fabrication and for the correct fit of the work shall be the responsibility of the Contractor.

E. Defective Work, as determined by the Engineer, shall be remedied by cutting and rebuilding the concrete walls and slabs, replacing the waterstop assemblies or other methods as approved by the Engineer.

F. Qualifications

1. Applicator shall have a minimum of five (5) years' experience installing joints in concrete in similar applications.

G.

1.07 SUBMITTALS

A. Contractor shall submit Shop drawings and material specifications for the approval of the Engineer. Submittals shall include, but not be limited to:

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1. Information as shown on the Contract Drawings and at the site, where necessary.
 2. Sizes, sections, reinforcement and dimension of units, the jointing, dowels, anchors, etc., and all other necessary details.
 3. Installation of joints, including various connections, anchorage details, special jointing, the Contractor's proposed construction and control joints, and other accessories as required to complete the work.
 4. PVC Waterstops
 - a. Submit manufacturer's product data for all types of waterstops and accessories to be incorporated into the Work.
 - b. Submit certified test reports of the properties of the waterstop material.
 - c. Submit the proposed procedures for making splices in the field, and the description of the equipment required for properly making such splices, to the Engineer for approval.
 5. Prior to installation, the Contractor shall submit layout drawings for approval, showing the extent of the waterstop installations that are proposed to ensure that all construction and expansion joints, in water-containing structures, will be watertight. The drawings shall include elevations, sections, etc., and all details to show that a continuous watertight installation is provided.
 6. Submit procedure for installing, inspecting, injecting, and vacuuming injection hose type waterstops.
 7. Equipment pad layout drawings.
- B. Manufacturer's specifications and installation instructions for each type of required joint and accessory shall be submitted. These include expansion joint fillers, expansion joint sealers, waterstops, shapes of waterstops, chemical retarders, adhesives, sleeves, inserts, anchors, embedded items, and similar items.
- C. The Contractor shall submit to the Engineer one sample of each type of waterstop as requested by the Engineer. Each sample shall include a splice.
- D. Method to be used to roughen construction joints and achieve bond including product identification as applicable.
- E. Applicator's Qualifications.
- F. Proof of satisfactory field service of sealants.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Materials shall be delivered to the site in original packing, in undamaged condition and in sufficient quantities to avoid delay in the Work.
 - B. Materials shall be stored and protected in a clean, properly drained location and shall be kept off the ground under a weather-tight covering permitting good air

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circulation as well as in accordance with the manufacturer's instructions. Materials shall be stored on dry wood sleepers, pallets, platforms or other appropriate supports which have slope for positive drainage. Materials shall be protected from distortion, excessive stresses, corrosion and other damage. Materials shall not be stored on the structure in a manner that might cause distortion or damage to the supporting structure. The maximum uniform distributed storage load shall not exceed 20 pounds per square foot.

- C. Materials shall be protected before, during and after installation to ensure acceptable finished Work. In-place materials and other Work in connection with the joint installations shall be protected.
 - D. Materials shall be handled in accordance with the manufacturer's instructions. In addition, material shall be handled safely in a manner that will prevent distortion or other damage. Care shall be exercised at all times to avoid damage through careless handling during unloading, storing and installing.
 - E. In the event of damage to the Work, necessary repairs or replacements shall be performed until satisfactory work is met at no expense to the City.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Concrete Bonding Agent
 - 1. The concrete bonding agent shall be:
 - a. Corr-Bond, as manufactured by The Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - b. Armatec 110, as manufactured by Sika Corporation, Lyndhurst, NJ; www.usa.sika.com
 - c. Or Approved equal
- B. Expansion joint fillers (Type I) shall be:
 - 1. Type FF-7 cross-linked, closed cell polyethylene, as manufactured by Progress Unlimited Inc., Lynbrook, NY; www.progress-unlimited.com
 - 2. Type W, cross-linked, closed cell polyethylene, as manufactured by Watson Bowman Acme, Amherst, NY; www.watsonbowmanacme.com
 - 3. Or approved equal.
- C. Joint Sealants:

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1. Type A shall be
 - a. Sikaflex-2C NS/SL as manufactured by Sika Corporation, Lyndhurst, NJ; www.usa.sika.com
 - b. Sonolastic SL1, as manufactured by BASF Corporation, Shakopee, MN; www.master-builders-solutions.basf.us
 - c. Permapol RC-270 Reservoir Sealant, as manufactured by Polymeric Systems, Inc., Elverson, PA; www.polymericystems.com
 - d. Or approved equal.
 2. Type B shall be
 - a. Magnum NS-100, as manufactured by Tamms Industries Inc., Kirkland, IL; www.tamms.com.
 - b. Sikaflex 1A, as manufactured by Sika Corporation, Lyndhurst, NJ; www.usa.sika.com
 - c. Or approved equal.
 3. Type C shall be
 - a. Sonolastic Two-part, as manufactured by BASF Corporation, Shakopee, MN; www.master-builders-solutions.basf.us
 - b. Hornflex-L, as manufactured by Tamms Industries Inc., Kirkland, IL; www.tamms.com.
 - c. Protecto-Coat EP, as manufactured by Dudick Inc. Streetsboro, OH; www.dudick.com
 - d. Or approved equal.
- D. PVC waterstops shall be:
1. Model 679 for construction joints and Model 738 for expansion joints, as manufactured by Greenstreak/Sika Corp USA, Lyndhurst, NJ; www.usa.sika.com
 2. PVC637 for construction joints and PVC938 for expansion joints, as manufactured by JP Specialities INC., Murrieta, CA; <https://jpspecialities.com/>
 3. Or approved equal.
- E. Hydrophilic Rubber Waterstops shall be:
1. Duroseal Gasket, Type 2010, as manufactured by BBZ USA, Inc, St. Louis, MO; www.bbzusa.com
 2. Adeka Ultraseal MC-2010M, as manufactured by OCM. Inc., Grayslake, IL; www.ocm-inc.com

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3. Or approved equal.
 - F. Hydrophilic Sealant shall be:
 1. Duroseal Paste, as manufactured by BBZ USA, Inc, St. Louis, MO; www.bbzusa.com
 2. Adeka Ultraseal P-201, as manufactured by OCM. Inc., Grayslake, IL; www.ocm-inc.com
 3. Sika Swell S, as manufactured by Sika Corporation, Lyndhurst, NJ; www.usa.sika.com
 4. Or approved equal.
 - G. Hydrophilic Injection Resin shall be:
 1. Duroseal Inject 1K/2K, as manufactured by BBZ USA, Inc, St. Louis, MO; www.bbzusa.com
 2. Sika Injection 29, as manufactured by Sika Corporation, Lyndhurst, NJ; www.usa.sika.com
 3. Or approved equal.
 - H. Injection Hose Waterstops shall be:
 1. Fuko Injection System, as manufactured by BBZ USA, Inc, St. Louis, MO; www.bbzusa.com
 2. Sika Swell Hose as manufactured by Sika Corporation, Lyndhurst, NJ; www.usa.sika.com.
 3. Or approved equal.
 - I. Base Seal PVC Waterstops shall be:
 1. Model 771 for construction joints, as manufactured by Greenstreak/Sika Corp USA, Lyndhurst, NJ; www.usa.sika.com
 2. JP206 for construction joints, as manufactured by JP Specialties Inc., Murrieta, CA; <https://jpspecialties.com/>
 3. Or approved equal.
- 2.02 MATERIALS / EQUIPMENT
1. Concrete Bonding Agent
 - a. The concrete bonding agent product and manufacturer shall be as specified in this Section.
 - b. Surface preparation, application and curing shall be performed in strict accordance with the manufacturer's directions.
 - B. Performed Expansion Joint Filler
 1. Preformed expansion joint filler shall be nonextruding, and shall be of the following types:

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- a. Type I Sponge Rubber, conforming to ASTM D 1752, Type I.
 - b. Type II Cork, Conforming to ASTM Designation D 1752, Type II.
 - c. Type III Self-expanding cork, conforming to ASTM Designation D 1752, Type III.
 - d. Type IV Bituminous Fiber, conforming to ASTM Designation D 1751.
2. Expansion joint fillers (Type I) product and manufacturer shall be as specified in this Section.
 3. Unless otherwise specified, Type II and Type III shall conform to the requirements of the Standard Highway Specifications of the NYC Department of Transportation..
 4. Asphaltic blown joint filler for sealing joints over Type IV preformed joint filler shall comply with the requirements of Section 2.16 of the Standard Highway Specifications of the NYC Department of Transportation.

C. Joint Sealants

1. Type A: Multi-component, non-sag, low-modulus polyurethane rubber sealant meeting ASTM C 920, Type M, Grade NS, Class 25, use NT, M, A, and O Capable of withstanding 50% in extension or compression shall be as specified in this Section
2. Type B: Single component polyurethane sealant meeting ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, A, and O, capable of withstanding 25% in extension or compression shall be as specified in this Section.
3. Type C: Multi-component chemical resistant polysulfide sealant conforming to ASTM C 920, Type M, Grade NS, Class 25 shall be as specified in this Section

D. Backer Rod

1. Backer rod shall be an extruded closed-cell polyethylene foam rod. The material shall be compatible with the sealant material used and shall have a tensile strength of not less than 40 psi and a compression deflection of approximately 25 percent at 8 psi. The rod shall be 1/8-inch larger in diameter than the joint width at joints less than 3/4-inch wide and 1/4-inch larger in diameter at joints 3/4-inch end wider.

E. PVC Waterstops

1. PVC waterstops shall be manufactured from virgin polyvinylchloride and shall conform to all requirements set forth in the U.S. Army Corps of Engineers Specification CRD C 572, except as specified herein.
2. All PVC waterstops shall be of polyvinylchloride extruded from an elastomeric plastic compound of which the basis resin shall be

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polyvinylchloride. The compound shall contain any additional resins, plasticizers, stabilizers or other materials needed to ensure qualities which will meet the requirements herein specified.

3. The required minimum physical characteristics for this material are:
 - a. Tensile strength 2,000 psi
 - b. Ultimate elongation not less than 350%.
 4. No reclaimed PVC materials shall be used for manufacture of the waterstops. The Contractor shall furnish certification that the proposed waterstops meet the above requirements.
 5. PVC waterstops for construction joints shall be flat ribbed type, 6 inches wide unless otherwise shown on the Contract Drawings, with a minimum thickness at any point of 3/8 inches.
 6. PVC waterstops for expansion joints shall be ribbed with a center bulb, 9 inches wide with a minimum thickness at any point of 3/8 inches. The center bulb shall have an O.D. not less than 1-3/8 inches.
 7. All PVC waterstops shall have an integral fastening system consisting of hog rings and grommets.
 8. PVC waterstops for all changes of direction, intersections and transitions shall be fabricated and spliced in the shop, leaving only straight butt joint splices for the field.
 9. Provide Teflon coated, thermostatically controlled waterstop splicing irons for field butt splices.
 10. PVC waterstops product and manufacturer shall be as specified in this Section.
- F. Hydrophilic Rubber Waterstop
1. Hydrophilic rubber waterstop materials shall be bentonite-free and shall expand by a minimum of 80 percent of dry volume in the presence of water to form a watertight joint seal without damaging the concrete in which it is cast. For location, see the Contract Drawings.
 2. The material shall be composed of resins and polymers which absorb water and cause an increase in volume in a completely reversible and repeatable process. The waterstop material shall be dimensionally stable after repeated wet-dry cycles with no deterioration of swelling potential.
 3. Hydrophilic rubber waterstop shall be solid rectangular shape with minimum cross sectional dimensions of 3/8-inch by 3/4-inch.
 4. Hydrophilic Rubber Waterstops product and manufacturer shall be as specified in this Section.
- G. Hydrophilic Sealant

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1. The Hydrophilic Sealants shall adhere firmly to concrete, metal and PVC in dry or damp conditions. When cured, it shall be elastic indefinitely.
2. Hydrophilic Sealants product and manufacturer shall be as specified in this Section.

H. Hydrophilic Injection Resin

1. Hydrophilic injection resin shall be acrylate-ester based. Its viscosity shall be less than 50 cps. It shall be water soluble in its uncured state, solvent free, and non-water reactive. In the cured state, it shall form a solid hydrophilic flexible material which is resistant to permanent water pressure and shall not attack bitumen, joint sealants or concrete.
2. Hydrophilic Injection Resin product and manufacturer shall be as specified in this Section.

I. Injection Hose Water Stop

1. Injection hose shall consist of a PVC or neoprene central core of sufficient strength to resist the weight of a minimum of 25 feet of fresh concrete placed upon it. Injection openings shall be provided closely spaced along the length of the hose and in a minimum of three (3) locations equally spaced around the perimeter of the hose. The openings shall be sealed by strips of closed cell foam of a consistency to act as one-way valves preventing entrance of cement paste while allowing free flow of injection material, pumped through the hose, into the concrete joint surface.
2. Injection hose system shall be appropriate for the reinjection of cement grout and/or hydrophilic injection resin. The hose shall allow for vacuuming operations and repeated use. The construction of the hose shall permit free discharge of the specified injected grout into the concrete without backwash, for the entire length of the hose.
3. Injection hose system shall be complete with components such as connection tubes, colored coded vent ends, junction boxes, anchor clips, closure plugs, all other fittings and injection connections designed to be mounted flush with the concrete surface and sealed to allow for future injections. All components for a complete reinjectable waterstop hose system shall be provided by the same manufacturer.
4. Junction boxes shall be heavy duty plastic made for embedment in concrete and of adequate size for housing and protection of the injection hose vent ends. Boxes shall be securely fitted with temporary knock-out covers to be used during concreting operations. Where exposed to view, boxes shall be fitted with covers mounted flush with the surrounding area.
5. Injection Hose Waterstops product and manufacturer shall be as specified in this Section.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

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2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Field Measurements

1. Prior to commencement of the Work, existing dimensions, elevations, locations and conditions applicable to the work shall be field verified. Variances and discrepancies from the Contract Drawings and potential interferences shall be reported promptly to the Engineer.
2. Sufficient field measurements shall be taken prior to preparation of Shop Drawings and fabrication of construction materials, where possible, to ensure proper fitting of the work. However, job progress shall not be delayed. Allow for adjustments and fittings wherever the taking of field measurements before fabrication may not be possible or might delay the work.
3. Actual field-verified conditions may require modifications to the fabrication and/or erection details indicated on the Contract Drawings. The Work shall be performed to meet actual field conditions encountered.

B. Preparation

1. The Contractor shall examine the areas and conditions under which the Work of this Section is to be performed. Conditions detrimental to the proper and timely completion of the Work shall be corrected. Work shall not be proceeded until unsatisfactory conditions have been corrected.
2. All new placement of concrete shall be in accordance with Section 03 30 00 – Cast-In-Place Concrete.
3. Concrete shall not be allowed to enter the joint or the space for the sealant and destroy the proper functions of the joint.
4. The surface of the concrete at all joints shall be thoroughly cleaned and all laitance removed by wire brushing, air or light sand blasting.
5. The joint shall be thoroughly clean and free from dirt and debris before the primer and the sealant are applied. Where the finished joint will be visible, masking of the adjoining surfaces shall be carried out to avoid their discoloration. The sealant shall be neatly tooled into place and its finished surface shall present a clean and even appearance.
6. All joints shall be sealed as shown on the Contract Drawings.

3.02 IMPLEMENTATION

A. Construction Joints

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1. Construction joints shall be as shown on the Contract Drawings where structural integrity is affected, otherwise, Contractor shall submit description of the joint and its location to the Engineer for approval.
2. Unless noted otherwise on the Contract Drawings, construction joints shall be located near the middle of the spans of slabs, beams, and girders unless a beam intersects a girder at this point. In this case, the joints in the girders shall be offset a distance equal to twice the width of the beam. Joints in walls and columns shall be at the underside of floors, slabs, beams, or girders and the top of footings or floor slabs unless noted otherwise on the Contract Drawings. Beams, girders, brackets, column capitals, haunches, and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.
3. Maximum distance between horizontal joints in slabs and vertical joints in walls shall be 45'-0" unless otherwise indicated on the Contract Drawings or as approved by the Engineer.
4. All corners shall be part of a continuous placement, and should a construction joint be required, the joint shall not be located closer than five feet from a corner.
5. Waterstop shall be provided at all joints in water retaining structures. Waterstop shall be provided at all joints below grade in walls or slabs which enclose an accessible area.
6. All reinforcing steel and welded wire fabric shall be continued across joints. Inclined dowels shall be provided as detailed or directed by the Engineer.
7. The surface of the concrete at all joints shall be thoroughly cleaned and all laitance removed. Following methods are acceptable:
 - a. The use of an approved chemical retarder applied in accordance with the manufacturer's recommendations which delays but does not prevent the setting of the surface mortar. Retarded mortar shall be removed within 24 hours after placing to produce a clean exposed aggregate bonding surface.
 - b. By roughening the surface of the concrete in an approved manner which will expose the aggregate uniformly and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface.
8. All construction joints shall be bonded by one of the following methods:
 - a. The use of an approved adhesive applied in accordance with the manufacturer's recommendations.
 - b. Use of Portland cement grout of similar proportions to the mortar in the concrete in an acceptable manner.

B. Control Joints

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1. Location of control joints shall be as shown on the Contract Drawings.
 2. Control joints shall be formed with control joint inserts.
 3. Sawcutting of control joints in lieu of forming shall not be allowed unless otherwise noted on the Contract Drawings. Where sawcutting is allowed, joints shall be sawed as soon as the concrete can support foot traffic without leaving any impression, normally the same day as concrete is placed and in no case longer than 24 hours after concrete is placed.
 4. Unless noted otherwise on the Contract Drawings, depth of control joints shall be 1-1/2 inches in reinforced concrete and 1/3 of concrete thickness in unreinforced concrete.
- C. Expansion Joints
1. Size and location of expansion joints shall be as shown on the Contract Drawings.
 2. A center-bulb type waterstop shall be provided at all expansion joints in water-retaining structures. A center-bulb type waterstop shall be provided at all expansion joints below grade in walls or slabs which enclose an accessible area. Waterstop shall be as shown on the Contract Drawings and specified herein.
 3. Expansion joint filler for use in concrete pavements and structures shall be Types I, II, or III. Expansion joint filler-for use in sidewalk and curbing shall be Type IV.
 4. Reinforcement or other embedded items bonded to the concrete (except dowels in floors bonded on only one side of joint) shall not be permitted to extend continuously through any expansion joint.
- D. Installation of Joints and Joint Filter
1. Type B joint sealant shall be used in all expansion and control joints in concrete except Type A joint sealant shall be used in all concrete pavements and floors subject to heavy traffic and Type C joint sealant shall be used in high corrosive areas unless otherwise specified or shown on the Contract Drawings.
 2. Joint fillers and sealants shall be installed in accordance with manufacturer's recommended procedures and as shown on the Contract Drawings. Prior to sealant installation, the Contractor shall arrange to have a representative of the sealant manufacturer instruct the crew doing the work as to the proper methods of surface preparation, mixing and application of the sealant. The joint filler shall be furnished with a pressure sensitive adhesive or a separate adhesive as recommended by the manufacturer.
 3. Joint filler that will be exposed after removal of forms shall be cut and trimmed to ensure a neat appearance and shall completely fill the joint except for the space required for the sealant. The filler shall be held securely

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in place and no concrete shall be allowed to enter the joint or the space for the sealant and destroy the proper functions of the joint.

4. A bond breaker of polyethylene film shall be used between filler and sealant. The joint shall be thoroughly clean and free from dirt and debris and shall receive a light sand blasting before the primer and the sealant are applied. Where the finished joint will be visible, masking of the adjoining surfaces shall be carried out to avoid their discoloration.
5. The primer and sealant used shall be supplied by the same manufacturer. Sealant shall not be placed without the use of a primer.
6. The sealant shall be neatly tooled into place and its finished surface shall present a clean and even appearance.
7. The depth of the sealant shall not exceed the width of the joint.
8. All sealants used in water retaining structures shall achieve final cure at least seven (7) days before the structure is filled with water.

E. PVC Waterstops

1. Thoroughly clean waterstops of dirt or other foreign materials that may reduce the bond in concrete.
2. PVC waterstops fabrication and splicing for all changes of direction, intersections and transitions shall be made in the shop, leaving only straight butt joint splices for the field.
3. Field joining of the waterstops shall be made by butt splices. Butt joint splices of PVC waterstop runs shall be made by heat sealing the adjacent surfaces in accordance with the manufacturer's recommendations using Teflon coated, thermostatically controlled waterstop splicing irons.
4. Lapping of waterstops, or the use of adhesives or solvents for splicing of waterstops shall not be allowed.
5. Waterstops splices shall be located a sufficient distance away from corners and elsewhere to permit adequate working room.
6. The design and location of PVC waterstops in construction joints and expansion joints shall be as specified herein and shown on the Contract Drawings.
7. Each piece of premolded PVC waterstop shall be of maximum practicable length in order that the number of end joints will be held to a minimum.
8. Joints shall develop effective watertightness fully equal to that of the continuous PVC waterstop material and shall permanently develop not less than 80 percent of the mechanical strength of the parent section and shall permanently retain its flexibility.
9. PVC waterstops shall be installed in the Work so that they are embedded to an equal depth in concrete on both sides of the joint in keyways as shown

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on the Contract Drawings and shall be kept free from oil, grease, mortar or other foreign matter.

10. PVC waterstops shall be adequately secured against movement during the pouring of concrete. To ensure their proper embedment in concrete, the waterstops shall be secured in position by means of hog rings, grommets, anchoring rings, 16- gauge tie wire, or other approved methods. Such anchorage shall be at spacing not to exceed 12 inches on center.
 11. Concrete adjacent to PVC waterstops shall be placed in 12 inch lifts and power vibrated to prevent honeycombing, voids and separation of aggregates at the surfaces of concrete separation joints.
 12. PVC waterstop fabrications for all changes of direction, intersections and transitions shall be made in the shop, leaving only straight butt joint splices for the field.
 - 13.
 14. At least three satisfactory field butt splices shall be made as samples on site. The Engineer may require tests on these splices by an approved laboratory, at the Contractor's expense, to certify the tensile strength of the joint. The strength attained shall be at least 80% of the unspliced material before any is used in the work.
 15. Placing of concrete in forms shall not be done until the secured waterstops have been inspected and approved.
- F. Hydrophilic Waterstop
1. Hydrophilic rubber waterstop or sealant shall be installed in accordance with the manufacturer's instructions and recommendations, except as modified herein.
 2. The manufacturer shall provide technical assistance in the field.
 3. The waterstop or sealant shall be located as near as possible to the center of the joint and shall be continuous around the entire joint. The minimum distance from the edge of the waterstop to the face of the member shall be 3 inches.
 4. Where a hydrophilic rubber waterstop is used in combination with PVC waterstop, the hydrophilic rubber waterstop shall overlap the PVC waterstop for a minimum of 6 inches. The contact surface between the hydrophilic rubber waterstop, and the PVC waterstop shall be filled with hydrophilic sealant.
 5. The hydrophilic rubber waterstop shall be installed in a bed of hydrophilic sealant, before skinning and curing begins, so that any irregularities in the concrete surface are completely filled and the waterstop is bonded to the sealant. After the sealant has cured, concrete nails, with washers of a diameter equal to the waterstop width shall be placed to secure the waterstop to the concrete at a maximum spacing of 18 inches.

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6. Prior to installation of hydrophilic sealant, the concrete surface shall be wire brushed or sand blasted to remove any laitance or other materials that may interfere with the bonding. Surfaces of metal or PVC to receive sealant shall be cleaned of paint and any material that may interfere with bond. When sealant alone is shown on the Contract Documents, it shall be placed in a built-up bead which has a triangle cross section with each side of the triangle at least 3/4 inch in length, unless indicated otherwise. Concrete shall not be placed until the sealant has cured in accordance with the manufacturer's recommendations.

G. Injection Hose Waterstop

1. The injection hose shall be installed in maximum lengths of 40 feet and shall be located as shown on the Contract Drawings. The hose shall be clamped into position with anchor clips spaced approximately 6 to 10 inches apart.
2. The concrete surface shall be cleaned of stones and debris prior to installation of injection hose. The injection hose shall be installed in direct contact with the face of concrete at the construction joint to prevent floating of the hose in the freshly placed concrete.
3. Where injection hose is used in combination with PVC waterstop, the hose shall overlap the PVC waterstop for a minimum of 6 inches and shall be less than 2 inches away from the PVC.
4. The injection procedure shall be performed in strict conformance with the manufacturer's recommendations. The injection shall be made by an authorized applicator as recommended by the injection system supplier.
5. The injection system supplier or his approved representative shall provide the necessary supervision to satisfy the Engineer that the application conforms strictly to the manufacturer's recommendations.
6. The injector hose and opposite hose vent for each hose length shall be terminated in the injection boxes mounted on the dry side of the wall. At the end of the injection operation, the hose shall be cleaned in accordance with the procedure recommended by the manufacturer. The injection ends and the vents shall be plugged and the box covered leaving the system ready for reinjection in the event that the joint is leaking.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. PROTECTION

1. Joints and accessories shall be protected from damage from construction operations and traffic during the entire construction period. Waterstops

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provided for adjoining future structures shall be protected from damage and corrosion.

END OF SECTION

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NO TEXT ON THIS PAGE

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PART 1 GENERAL

1.01 SUMMARY

- A. Furnish all materials, labor, and equipment required to provide finishes of all concrete surfaces specified herein and shown on the Drawings.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 03 41 00 - Precast Structural Concrete

1.04 REFERENCES

- A. Reference Standards:

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1. 2020 Building Code of New York State (NYSBC)
2. American Concrete Institute (ACI):
 - a. ACI 301 - Specifications for Structural Concrete for Buildings
 - b. ACI 302.1R - Guide for Concrete Floor & Slab Construction
 - c. ACI 303R - Guide to Cast-in-Place Architectural Concrete Practice
 - d. ACI 308.1 - Specification for Curing Concrete
 - e. ACI 318 - Building Code Requirements for Structural Concrete and Commentary
 - f. ACI 303R - Guide to Cast-in-Place Architectural Concrete Practice
 - g. ACI 347R - Guide to Formwork for Concrete

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Erect, on the site where directed, a full-size mock-up of a cast-in-place wall or panel a minimum of 4 feet high, 4 feet from the corner on two sides, 12 inches thick or as shown in the Contract Drawings conforming to ACI 303R.
1. Reinforce the panel as shown in the Contract Drawings. Use form ties the same as those approved and with the form tie pattern similar to that approved. Use one face for the panel for smooth architectural concrete including “reveal” rustication with form joints, and the opposite face for form liner concrete.
 2. Plug the tie holes as specified to determine the correct mortar mixture to match the panel color. If required, remove and replace tie hole plugging mortar until an acceptable color match is obtained. After the sample panels have been approved, intentionally damage and patch portions of the finish surface of the panels for the purpose of determining the correct mixture for patching mortar and patching technique to match the original panel color and surface.
 3. Leave the approved mock-up on the job during construction as the standard of workmanship for the project. Remove mock-up from the premises after completion of the work.
- B. Perform work in accordance with ACI 301, ACI 302.1R, ACI 308.1, ACI 318 and ACI 347R and other applicable codes.

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1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings and material specifications for the approval of the Engineer. Submittals shall include, but not be limited to:
1. Material certifications and technical data sheets.
 2. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, and appropriate uses for each type of material used in the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. General: Failure to comply with the following shall be sufficient cause for rejection of materials by the Engineer and his requiring its removal from the Site. Upon determination by the Engineer that the material is subject to rejection, the Contractor shall supply new material at no additional expense to the City.
- B. Delivery of Materials:
1. Deliver materials in manufacturer's original unopened and undamaged containers, with all labels intact and legible at the time of use.
 2. The label shall include:
 - a. Name of material and manufacturer.
 - b. Installation, handling and protection requirements.
 - c. Safety Data Sheet as required.
 3. Deliver materials in sufficient quantities to allow uninterrupted continuity of the work, minimizing the amount of time stored prior to being used on the Site.
- C. Storage of Materials:
1. Store only approved materials on project site.
 2. Store materials in original, undamaged containers with manufacturer's labels and seals intact.
 3. Store all materials in secure, enclosed, dry area, off the ground and away from all possible contact with water and in a location where temperature can be maintained above freezing. Protect stored materials as per manufacturer's instructions.
 4. Prevent damage to materials during storage primarily by minimizing the amount of time they are stored at the Site before being incorporated into construction systems.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

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1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Concrete Floor Sealer

1. Floor sealer shall be:
 - a. MasterTop TC 493 or 330, as manufactured by Master Builders Solutions Construction Systems US, LLC by BASF Corporation, Shakopee, MN; www.master-builders-solutions.basf.us
 - b. Super Diamond Clear VOX, as manufactured by The Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - c. ArmorSeal Rexthane I, as manufactured by The Sherwin-Williams Company, Cleveland, OH; www.sherwin-williams.com
 - d. Masterseal 330, as manufactured by Master Builders Solutions Construction Systems US, LLC by BASF Corporation, Shakopee, MN; www.master-builders-solutions.basf.us
 - e. Eucothane, as manufactured by The Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - f. Or approved equal.

- B. Concrete Floor Hardener

1. Liquid Floor hardener shall be:
 - a. MasterKure 300 WB, as manufactured by Master Builders Solutions Construction Systems US, LLC by BASF Corporation, Shakopee, MN; www.master-builders-solutions.basf.us
 - b. Liqui-Hard, as manufactured by W.R. Meadows Inc., Hampshire, IL; www.wrmeadows.com
 - c. Diamond Hard, as manufactured by The Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - d. Or approved equal.
2. Aggregate floor hardener shall be:
 - a. MasterTop 110ABR, as manufactured by Master Builders Solutions Construction Systems US, LLC by BASF Corporation, Shakopee, MN; www.master-builders-solutions.basf.us
 - b. Surfex, as manufactured by The Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com

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- c. Or approved equal.
 - C. Non-Slip Shake-On Aggregate and abrasion resistant floor hardener:
 - 1. Non-slip abrasion resistant floor hardener shall be:
 - a. Duraltex 1805 with Duraltex 1807 or broadcast silica sand, as manufactured by The Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - b. Amorseal 8100 with Armorseal Hi-Wear Additive, as manufactured by The Sherwin-Williams Company, Cleveland, OH; www.sherwin-williams.com
 - c. Or approved equal
 - 2. Non-slip shake-on aggregate shall be:
 - a. MasterTop 120 SR, as manufactured by Master Builders Solutions Construction Systems US, LLC by BASF Corporation, Shakopee, MN; www.master-builders-solutions.basf.us
 - b. Sikafloor 2 SynTop, as manufactured by Sika Corporation, Lyndhurst, NJ; www.usa.sika.com
 - c. Or approved equal.
- 2.02 MATERIALS / EQUIPMENT
- A. Concrete Floor Sealer:
 - 1. Sealer shall be aliphatic urethane or epoxy coating with resistance to abrasion and chemical attack.
 - B. Concrete Floor Hardener
 - 1. Liquid Floor hardener product and manufacturer shall be as specified in this Section.
 - 2. Aggregate floor hardener product and manufacturer shall be non-metallic and shall be as specified in this Section.
 - C. Non-Slip and Abrasion Resistant Floor Hardener:
 - 1. Non-slip abrasion resistant floor hardener for application for new concrete to harden and provide a non-slip walking surface, even when wet. The floor system shall contain flakes or broadcast 20/40 mesh silica sand for traction.
 - 2. Shake-on aggregate floor hardener designed for application to freshly cast concrete to harden and densify the surface for resistance to wear and abrasion.
 - a. Product shall be a non-slip and non-rusting aggregate.

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- b. Non-slip aggregate shall NOT be permitted if the base concrete mix design uses air entraining agents (exceeds 3%), fly ash, slag, fibers, water reducers, accelerators or retarders. These admixtures severely diminish and slow the availability of bleed water.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Examine substrates, areas, and conditions where concrete finishing products will be installed, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Prepare cementitious substrates according to manufacturer's published installation instructions prior to application of concrete finishing products.

3.02 IMPLEMENTATION

- A. Finishes on Formed Concrete Surfaces

- 1. After removal of forms, the finishes described below shall be applied in accordance with – “Concrete Finish Schedule” included in this Section. Unless specified in the Contract, all surfaces shall receive at least a Type I finish. The Engineer shall be the sole judge of acceptability of all concrete finish work.

- a. Type I - Rough or Board Form Finish: All fins, burrs and other projections left by the forms shall be removed. All holes left by removal of ties, and all other holes, depressions, or voids shall be filled solid with cement grout after first being thoroughly wetted. Honeycombs shall be chipped back to solid concrete as directed, prior to patching with cement grout. Holes shall be filled with a small tool that will permit packing the hole solidly with cement grout. Cement grout shall consist of one part cement to three parts sand, and the amount of mixing water shall be as little as consistent with the requirements of handling and placing. Color of cement grout shall match the adjacent wall surface. The surface shall be thoroughly cleaned of all stains or discolorations that will interfere with the final finish.
- b. Type II - Smooth Form Finish: Concrete shall be cast against forms constructed of plywood not less than 5/8 inch thick, or of

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boards lined with tempered hardboard not less than 3/16 inch thick, or other approved materials. Form material shall not have torn grain, worn edges, patches of holes from previous use, or other defects which would impair the texture of the concrete surface. Form material shall utilize sheets as large as practicable in an orderly and symmetric configuration. Other aspects of the finish shall conform to the requirements of the rough form finish.

- c. Type III - Grout Cleaned: Where this finish is required, it shall be applied after completion of Type II finish. After the concrete has been predampened, a slurry consisting of one part cement (including an appropriate quantity of white cement in order to produce a color matching the surrounding concrete) and 1-1/2 parts sand passing the No. 30 sieve, by damp loose volume, shall be spread over the surface with clean burlap pads or sponge rubber floats and scrubbed into the surface using a rotary motion. Any surplus material shall be removed by scraping and then rubbing with clean burlap. The finish shall be kept damp for at least 36 hours after application.
- d. Type IV - Smooth Rubbed: Where this finish is required, it shall be applied after the completion of the Type II finish no later than one day following form removal. Nor rubbing shall be done before the concrete is thoroughly hardened and the mortar used for patching is firmly set. A smooth, uniform surface shall be obtained by wetting the surface and rubbing it with a carborundum stone to eliminate irregularities. Unless the nature of the irregularities requires it, the general surface of the concrete shall not be cut into. Corners and edges shall be slightly rounded by the use of the carborundum stone. Brush finishing or painting with grout or neat cement will not be permitted.
- e. Type V - Textured: Use textured forms or textured form liners of plastic, wood, or sheet metal. Secure liner panels in forms by cementing or stapling, not by methods which will permit impressions of nail heads, screw heads, washers, or the like to be imparted to the surface of the concrete. Seal edges of textured panels to each other or to divider strips to prevent bleeding of cement paste. Use a sealant that will not stain the concrete surface.
- f. Type VI - Aggregate transfer: Produce aggregate transfer and other special finished that duplicate mock-ups or sample panels prepared in advance and accepted.
- g. Type VII - Exposed Aggregate: Expose aggregate using one of the following methods. Provide a concrete surface that will duplicate a mock-up or a sample panel prepared in advance and accepted.

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- 1) For a scrubbed finish, cast concrete against form faces which have been coated with a chemical retarder used in accordance with the manufacturer's recommendations. Wet the partially hardened concrete surface thoroughly and scrub with fiber or wire brushes, using water freely until the surface mortar is removed and the aggregate is uniformly exposed. Then rinse the surface with clear water. If portions of the surface have become too hard to permit uniform aggregate exposure, use dilute hydrochloric acid (one part commercial muriatic acid diluted with 4 to 10 parts water) to remove the excess surface mortar after the concrete is at least 2 weeks old. Remove the acid from the finished surface with clean water within 15 minutes after application.
 - 2) For a blast finish, sandblast or waterblast the concrete surface to a degree sufficient to expose fine aggregates with occasional exposure of coarse aggregate, and to produce a uniform color with a maximum reveal of 1/16 inch unless specified otherwise in the Contract Documents. All surfaces with the same specified blast finish shall be done at approximately the same time after placing concrete. Use stainless steel or plastic reinforcement supports and spacers near concrete surfaces to be blasted. Protect adjacent materials and inserts during blasting operations.
 - 3) For a tooled finish, dress the thoroughly cured concrete surface with electric, air, or hand tools to a uniform texture removing surface mortar as specified in the Contract Documents. Then provide the surface with a hand tooled, rough or fine pointed, crandalled, or bush-hammered surface texture, as specified by Contract Documents.
- h. Type VIII - Applied: When finishes of stucco, cementitious coatings, or similar troweled materials are required or permitted, prepare the surface of the concrete to ensure permanent adhesion of the finish. If the concrete is less than 24 hours old, roughen it with a heavy wire brush or scoring too. If the concrete is older, roughen the surface mechanically or by acid etching. After roughening, wash the surface free of all dust, acid, chemical retarder, and other foreign material before any final finish is applied.

B. Slab and Floor Finishes

1. The finishes described below shall be applied to floors, slabs, flow channels and top of walls in accordance with – “Concrete Finish

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Schedule” included in this Section. The Engineer shall be the sole judge of acceptability of all such finish work.

- a. Type “A” - Screeded: This finish shall be obtained by placing screeds at frequent intervals and striking off to the surface elevation required.
- b. Type “B” - Scratched: Following completion of Type “A” finish, roughen the surface with stiff brushes or rakes before final set.
- c. Type “C” - Floated: Following completion of Type “A” finish, do not work the concrete further until it is ready for floating. Begin floating with a hand float, a bladed power float equipped with float shoes, or a powered disc float as soon as the water sheen has disappeared and the surface has stiffened sufficiently to permit operation. During or after the first floating, check flatness of surface with a 10 ft straightedge applied in two or more directions. Eliminate high spots and low spots during this procedure to produce a conventional, straight edge finish, then refloat the slab immediately to a uniform texture.
- d. Type “D” - Troweled: Following completion of a Type “C” finish and sufficient hardening of the concrete to prevent excess fine material from working to the surface, the surface shall be compacted and smoothed with a power trowel. Following the power trowel, hand trowel to provide a smooth, dense surface, free from defects, trowel marks, and blemishes. For surfaces exposed to wear as indicated in the Contract Documents, continue hand troweling until a ringing sound is produced as the floor is troweled.
- e. Type “E” - Broom or Belt: This finish shall provide the surface with a transverse scored texture by drawing a broom or burlap belt across the surface immediately after completion of a Type “C” finish.
- f. Type “F” - Liquid Hardened Finish: Liquid hardened finish shall be provided by application of a liquid floor hardener. Floors to receive this finish shall have previously received a Type “D” finish. Liquid hardener shall be applied between 30 to 60 days after concrete placement. Surface to be treated shall be dry, clean and free of all loose dust, dirt, oil, wax, sealers and curing compounds. Application procedure shall be in accordance with manufacturer's instructions and shall consist of a three-coat treatment.
- g. Type “G” - Dry Shake Hardened Finish: Aggregate hardened finish shall be provided by applying an aggregate floor hardener concurrently with the application of a Type “D” finish.

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Application procedure shall be in accordance with manufacturer's instructions.

- h. Type "H" - Non-Slip Finish: This finish shall be provided by applying a non-slip shake-on aggregate concurrently with the application of a Type "D" finish. Application procedure shall be in accordance with manufacturer's instructions.

C. Sealing of Concrete Floor

- 1. After installation of all equipment and piping, and after completion of other related construction activities, all floor slabs which are to remain unpainted and not intended to be immersed, and all equipment pads, shall be sealed with a floor sealer unless the slab has had liquid hardener applied or stated otherwise. Remove all dirt, droppage, grease, asphalt or other foreign matter with caustics and detergents as required prior to application. Sealer shall be applied in accordance with the manufacturer's recommendations.

D. Finishes on Equipment Pads

- 1. Formed surfaces of equipment pads shall receive a Type II finish.
- 2. Top surfaces of equipment pads, except those surfaces subsequently required to receive non-shrink grout and support equipment bases, shall receive a Type "D" finish, unless otherwise noted. Surfaces which will later receive non-shrink grout shall, before the concrete takes its final set, be made rough by removing the sand and cement that accumulates on the top to the extent that the aggregate will be exposed with irregular indentations in the surface up to 1/2 inch deep.

E. Concrete Finish Schedule

Item	Finish Type
All concrete surfaces not exposed to public view including utility spaces	I
All exterior surfaces and interior vertical surfaces exposed to public view	IV
All interior overhead surfaces exposed to public view and interior walls of tanks	II
Surfaces to be painted	III
Architectural finish	V, VI, VII, or VIII as indicated in the contract documents
Surfaces to receive bonded cementitious mixtures	B
Drives, interior stairs, surfaces to receive waterproofing, roofing insulation, or	C

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Item	Finish Type
terrazzo, and floors of tanks	
Floors for walking surfaces in manufacturing, storage, and warehousing areas, and floors to receive coverings	D
Sidewalks	E
Garage and storage area floors	F or G
Exterior stairs, platforms, landings and ramps and interior ramps	E or H

- F.
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

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NO TEXT ON THIS PAGE

**SECTION 03 35 16 – HEAVY-DUTY CONCRETE FLOOR FINISHING
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes systems of multi-component concrete topping consisting of epoxy and vinyl ester resins, curing agents, aggregates and inorganic pigments.
- B. All systems include required substrate preparations, bond coats, reinforcements, underlayment fills, binder coats, top coats and other components and system accessories recommended by the manufacturer for cast-in-place concrete floor slabs, curbs, equipment pads and similar cast-in-place concrete items which may be subject to operational traffic and use, including manufacturer’s recommended details for conditions encountered in the work and a Field Quality Control Report including procedures, test methods, results of tests, remedial recommendations and actions.
- C. Provide complete technical services as available from the specified manufacturer and on-site technical representation by manufacturer's Technical Representative during the time of material delivery, storage, job mock-up, substrate preparation and the advancement of installation to thirty percent of floor areas receiving concrete topping and during the start of field quality control testing.
- D. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish, install, and place into satisfactory service all concrete topping work.
- E. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements for the work of this Section are implemented to the fullest extent.
- F. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. NYSBC - New York State Building Code
- B. ASTM C109 - Compressive Strength of Hydraulic Cement Mortars, Standard Test Method for
- C. ASTM C150 - Portland Cement, Standard Test Method for
- D. ASTM C321 - Bond Strength of Chemical-Resistant Mortars, Standard Test Method for
- E. ASTM C413 - Absorption of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing's, and Polymer Concretes Standard Test Method for
- F. ASTM C501 - Relative Resistance to Wear of Unglazed Ceramic Tile By the Taber Abraser, Standard Test Method for
- G. ASTM C531 - Linear Shrinkage and Coefficient of Thermal Expansion Of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing's, and Polymer Concretes, Standard Test Method for
- H. ASTM C580 - Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing's and Polymer Concretes, Standard Test Method for
- I. ASTM D635 - Rate of Burning and/or Extent and Time of Burning of

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- Plastics in a Horizontal Position, Standard Test Method for
- J. ASTM D638 - Tensile Properties of Plastics, Standard Test Method for
- K. ASTM D696 - Coefficient of Linear Thermal Expansion of Plastics
Between -30 Degrees C and 30 Degrees C with a
Vitreous Silica Dilatometer, Standard Test Method for
- L. ASTM D790 - Flexural Properties of Unreinforced and Reinforced
Plastics and Electrical Insulating Materials, Standard
Test Method for
- M. ASTM D1044 - Resistance of Transparent Plastics to Surface Abrasion,
Standard Test Method for
- N. ASTM D1308 - Effect of Household Chemicals on Clear and Pigmented
Organic Finishes, Standard Test Method for
- O. ASTM D2047 - Static Coefficient of Friction of Polish-Coated Floor
Surfaces as Measured by the James Machine, Standard
Test Method for
- P. ASTM D2240 - Rubber Property - Durometer Hardness, Standard Test
Method for
- Q. ASTM D4060 - Abrasion Resistance of Organic Coatings by the Taber
Abraser, Standard Test Method for
- R. ASTM E84 - Surface Burning Characteristics of Building Materials,
Standard Test Method for
- S. ASTM E831 - Linear Thermal Expansion of Solid Materials by
Thermomechanical Analysis, Standard Test Method for
- T. MIL-D-3134J - Military Specifications, (Navy) Deck Covering
Materials
- U. South Coast Air Quality Management District (SCAQMD) Rule 1113,
Architectural Coatings.
- 1.05 DESCRIPTION
- A. Sustainable Design Requirements
1. VOC Content: Products applied on site and within the building's
weatherproofing system shall comply with VOC limits of authorities having
jurisdiction and the following VOC limits of when calculated according to
SCAQMD Rule 1113:
- a. Industrial Maintenance Coatings (i.e. Concrete Topping): VOC not
more than 100 g/L.

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b. Primers, Sealers, and Under-coaters: VOC not more than 100 g/L.

B. Environmental Conditions:

1. Contractor to remove all chemicals, compounds and other materials from substrates when such materials are unacceptable to the manufacturers of concrete topping systems specified at no additional expense to the City.
2. Proceed with concrete topping work only when temperature and moisture content of concrete slabs, building air temperature, relative humidity and other conditions comply with the concrete topping manufacturer's written recommendations and when no damaging environmental conditions are forecasted for the time when the materials will be subject to such environmental damage.
3. Maintain substrate temperature and room temperature before, during and after installation above 50 F and rising in accordance with concrete topping material manufacturer's instructions. Provide adequate ventilation during application and curing periods.
4. Do not begin concrete topping work until buildings are enclosed and manufacturer's recommended environmental conditions can be maintained and only when manufacturer and installer are willing to guarantee the work as required and without additional reservations and restrictions.
5. Site Facilities: Supplemental heat sources as may be required should Contractor wish to continue concrete topping work in cold weather is not available at the project site. Provision of all supplemental heat, energy sources and equipment is the exclusive responsibility of Contractor, as is the requirement that the source of supplemental heat shall not emit contaminants which will adversely affect the color, cure or performance of the concrete topping. Concrete topping systems so affected shall be removed and replaced with new at no additional expense to the City.
6. Record decisions, conditions and agreements to proceed with the Work when environmental conditions might be unfavorable. State the reasons for proceeding, with the names of the persons involved along with the changes, if any, or revisions, requirements or terms of the Contract. Include all information in final Field Quality Control Report.

C. Scheduling and Coordination:

1. Review installation procedures under this and other related specification and or Contracts and coordinate them with the work specified herein.
2. Notify other Contractors in advance of the installation of work to provide them with sufficient time for installation and coordination of interrelated items that are included in their contracts and that must be installed in conjunction with the concrete topping work.

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3. Proceed with the concrete topping and associated work after projections and penetrations through the substrates have been installed, and when the substrate construction and framing of openings is complete.
4. If substrate modifications (such as scarification, gridding, or filling) to the green concrete slab are required to meet a manufacturer's installation guidelines, the Contractor shall provide this at no additional cost to the City. The Contractor shall coordinate and schedule scarification, grinding and filling of cast-in-place concrete with cementitious underlayment's, in order to bring substrate within tolerances specified, and abrasive blasting of substrates and installation of concrete topping before equipment and similar items are installed to avoid later difficulty or delay in performing the concrete topping work. In order to advance the work be prepared to schedule multiple visits of the concrete topping installer to the project site for the purpose of installing concrete topping in areas that will become inaccessible with the installation of other work as may be required for proper sequencing of the work.
5. Coordinate required thickness of cementitious underlayment's with doors, thresholds, piping and equipment, adjacent materials and similar items in order to provide smoothly aligned transitions acceptable to Engineer and in compliance with governing authorities.

D. Substitutions:

1. Do not change products, system components, colors or manufacturers after Shop Drawing and Samples approvals by Engineer.
Clearly identify, in a manner which is highlighted to Engineer, all proposed substitutions, modifications, variations, unspecified features and "or approved equal" products. Provide complete comparative data with specified products at time of Shop Drawing submission.

1.06 QUALITY ASSURANCE

A. Installer Qualifications:

1. Engage a single installer skilled, trained and with successful experience in the application of each product who is an approved applicator of the manufacturer, or who can submit evidence in writing of being acceptable to the manufacturer for production of guaranteed construction and who agrees to employ only tradesmen with specific skill and successful experience in this type of work. Submit name and qualifications to Engineer along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owners, architects or engineers responsible for projects.
 - b. Approximate contract cost of the concrete topping.
 - c. Amount of area installed.

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2. Submit proof of acceptability of installer by manufacturer to Engineer.
- B. Performance Criteria:
1. Contractor's Review: Accompanying approval request, submit to Engineer a written statement signed by Contractor, stating that the Contract Drawings and Contract Specifications have been reviewed with an agent of the concrete topping material manufacturer and that he is in agreement that the selected systems are proper, compatible and that the details used for the work are not in conflict with the manufacturer's details.
 2. Statement of Application: Upon completion of the concrete topping work, submit a notarized statement to Engineer signed by Contractor stating that the work complies with the requirements of these Sections, was installed in compliance with manufacturer's written recommendations and that the installation methods were proper and adequate for the conditions of installation and use.
- C. Allowable Installation Tolerances:
1. Do not install work until substrate preparation and tolerances have been approved by Engineer, concrete topping manufacturer's Technical Representative and the concrete topping installer and Contractor has verified to Engineer that substrates are within tolerances specified and acceptable to produce approved work. Work advanced for any reason without such verification shall be stopped, removed and replaced with new material after substrate is approved, at no additional expense to the City.
 2. Substrate Tolerances:
 - a. Out-of-Plane: 1/8 inch maximum in 10 foot - 0 inches and 1/16 inch maximum in any 12 inches measured along the plane.
 - b. Maximum Offset in Plane Alignment: 1/16 inch.
 - c. Variation From Slope: 1/8 inch maximum in 10 foot - 0 inches.
 3. Concrete Topping Tolerances:
 - a. Finished concrete topping level to 1/8 inch in 10 feet - 0 inches with smooth continuous uniformly sloped-to-drain planes.
 - b. Provide smooth continuous color with no color streaks or inconsistencies with smoothly textured non-slip finish.
- D. Requirements of Regulatory Agencies:
1. Materials and equipment submitted for DEP's approval by the Contractor shall have met, at the time of their submittal, the certification and material acceptance requirements of the NYC Department of Buildings, unless otherwise required by the Authority Having Jurisdiction over the Work.
 2. All material provided under this Section shall comply with the Contract.

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3. Comply with all applicable requirements of governing authorities and codes for all work.
- E. Testing Agency: Engage a testing laboratory regularly engaged in the testing of construction materials, and who complies with ASTM E329.
- F. Pre-installation Meeting:
1. Before erecting job mock-up, Contractor, his concrete topping installer, and Technical Representative of the concrete topping system manufacturer shall meet on-site with Engineer to discuss approved products and workmanship to ensure proper application of concrete topping system components and substrate preparation requirements for the work.
 2. Record the discussions of the conference and the decisions and agreements or disagreements reached, and furnish a copy of the record to each party attending. Review foreseeable methods and procedures related to the concrete topping work, including, but not necessarily limited to, the following:
 - a. Review project requirements (Drawings, Sections and other Contract Documents).
 - b. Review required submittals, both completed and yet to be completed.
 - c. Review status of substrate work, including approval of surface preparations, drying, structural loading limitations and similar considerations.
 - d. Review requirements of field quality control testing and requirements for preparing field quality control report as specified herein.
 - e. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - f. Review required inspection, testing and certifying.
 - g. Review environmental conditions, other job conditions, and procedures for coping with unfavorable conditions.
 - h. Review regulations concerning code compliance, environmental protection, health, safety, fire and similar considerations.
 - i. Review procedures needed for protection of concrete topping during the remainder of the construction period.
 3. Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration.
 4. Record any revisions or changes agreed upon, reasons therefor, and parties agreeing or disagreeing with them.

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G. Job Mock-Up:

1. Prior to the installation of concrete topping systems, but after Engineer's approval of Shop Drawings submittals, erect stepped-back job mock-ups using substrate preparation, materials and application techniques specified for final work. Provide all components of the concrete topping systems showing the correct installation, substrate preparation and the workmanship quality which shall be achieved in the work. Build mock-ups at the site, in location approved by Engineer, of full thickness and approximately 12 foot - 0 inches square. Indicate the proposed workmanship to be expected in the finished work. Include methods of installation typical to the work including penetrations, crack and joint sealer system and cove details using all system components required for the Work. Obtain Engineer's acceptance of mock-up before start of work. Retain and protect mock-up before start of work. Retain and protect mock-up during construction as a standard of judging completed work. Do not alter or destroy mock-up until given written permission by Engineer.
2. Build as many job mock-ups as necessary in order to achieve Engineer's acceptance of the work.

H. Concrete topping work which proceeds without an approved job mock-up shall be stopped, removed and re-installed, after job mock-up approval, at no additional expense to the City.

1.07 SUBMITTALS

A. Contractor shall submit Shop Drawings for approval by the Engineer. Submittals shall include, but not be limited to:

1. Samples: Submit for approval the following:
 - a. Stepped-back concrete topping system applied to a 12-inch by 12-inch by 2-inch thick concrete sample showing each system component and demonstrating required surface preparation to be used on job mock-up and required thickness of concrete topping. Apply concrete topping to only one-half of the sample board, leaving the other half visible and with required substrate preparation.
 - b. Full selection of manufacturer's standard and custom colors for selection by Engineer. Engineer will preliminarily select a maximum of twelve colors for consideration for use in the work.
 - c. Prepare 12-inch by 12-inch samples of each color. From these Engineer will select a maximum of eight colors to be used in the work. Engineer will provided Contractor with locations of each color after this final selection.
 - d. In addition to color, provide range of textures from smooth to heavily non-slip for selection for use on job mock-up panel.

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- e. Samples will be reviewed by Engineer for color selection, general appearance and as examples of the types of components to be installed on the job mock-ups.
 - f. Compliance with other requirements is the responsibility of Contractor.
2. Shop Drawings: All products, systems and installation recommendations submitted shall be subject to approval at the time of field quality control testing. Submit for preliminary approval the following:
- a. Copies of specifications, technical information, test results, installation instructions and general recommendations from the concrete topping manufacturer, for each type of concrete topping product required. Include requirements for environmental conditions and other conditions required for an acceptable installation providing features and performance as stated in manufacturer's literature.
 - b. Drawings showing extent of each component of each system used in the Work including all items receiving concrete topping such as equipment pads, curbs, sumps, pipe trenches and similar items and surfaces and all details required for the Work referencing required system components provided as samples to Engineer. Provide Shop Drawings coordinated with cast-in-place concrete and showing all construction, and other conditions encountered in the work and manufacturers approved and recommended details appropriate to construction, expansion and seismic joints as required for full concrete topping system performance whether or not specific indication is made on the Contract Drawings to the details of the specified manufacturer.
 - c. Show interface details with other items such as thresholds, curbs, coves, equipment pads, expansion and seismic joint cover assemblies, floor hatches, heating registers, ramps, steps and stair nosing's.
 - d. Copies of Material Safety Data Sheets for all products used in the Work and copies of transmittals indicating receipt of MSDS by concrete topping systems installer.
 - e. Maintenance Manual: Upon completion of the Work, furnish copies of a detailed maintenance manual for each product, including the following information:
 - 1) Product name and number.
 - 2) Name, address and telephone number of manufacturer and local distributor.
 - 3) Detailed procedures for routine maintenance and cleaning.

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- 4) Detailed procedures for light repairs such as dents, scratches and staining.
 - 5) Material Safety Data Sheets.
3. Test Reports: Submit for approval the following:
 - a. Copies of test reports verifying compliance with physical properties specified herein.
 - b. Copies of testing agencies background and experience in performing similar tests to those specified.
 - c. Copies of final Field Quality Control Test Report as specified. Final payment for the concrete topping Work is contingent upon Engineer's approval of final Field Quality Control Report and recommendations for, and completion of, all remedial work.
4. Certificates: Submit for approval the following:
 - a. Copies of certificates stating that the concrete topping systems installer has been approved, or is a licensee of the concrete topping manufacturer.
 - b. Evidence of installer's experience.
 - c. Evidence prior to delivery that materials and components furnished conform to the Sections and are as approved on Shop Drawings submittals.
 - d. Evidence of acceptance of the substrate by the concrete topping installer and manufacturer's Technical Representative.
5. Contractor's Review: Accompanying approval request, submit:
 - a. Specified statement to Engineer.
 - b. Show by copy of transmittal form that a copy of the statement has been transmitted to the manufacturer.
6. Statement of Application: Upon completion of the concrete topping work, submit:
 - a. A notarized statement to Engineer as specified.
7. Sustainable Design Submittals:
 - a. VOC Reporting Form. Provide the following information:
 - 1) For all concrete topping and sealer, applied on site and within the building's weatherproofing system, provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.
8. Field Quality Control Report, see Article 3.03 (Field Testing/Quality Control) for field quality control requirements.

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1.08 DELIVERY, STORAGE, AND HANDLING

- A. General: Failure to comply with the following shall be sufficient cause for rejection of materials by Engineer and removal of rejected materials from the Site. Supply new material at no additional expense to the City.
- B. Delivery of Materials:
 - 1. Deliver materials in concrete topping manufacturer's original unopened and undamaged containers, with information accurately representing container contents as approved by Engineer at time of Shop Drawings submission.
 - 2. Include the following information on the label:
 - a. Name of material and supplier.
 - b. Installation, handling and protection requirements.
 - 3. Deliver materials in sufficient quantities to allow uninterrupted continuity of the Work.
- C. Storage of Materials:
 - 1. Store only approved materials on project site.
 - 2. Store materials in original, undamaged containers with manufacturer's labels and seals intact.
 - 3. Store all materials in a dry, enclosed area, off the ground and away from all possible contact with water and in a location where temperature can be constantly maintained between 60 F and 75 F and out of direct sunlight.
 - 4. Prevent damage to materials during storage primarily by minimizing the amount of time they are stored at the job-site before being incorporated into construction systems.
- D. Handling of Materials:
 - 1. Do not handle, open or mix component materials unless concrete topping can be properly handled as recommended by the manufacturer of the concrete topping.
 - 2. Do not open containers, or expose materials to detrimental conditions. Materials which are so exposed shall be removed from the site and shall not be incorporated into the work.
 - 3. Handle materials carefully and in a manner which prevents contamination and inclusion of foreign materials.
 - 4. Do not open packages or containers until all necessary preparatory work is complete, approved and installation will begin immediately.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

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1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Concrete Topping
 - a. STONCLAD UF system in Pewter as manufactured by Stonhard Incorporated, Maple Shade Township, NJ. www.stonhard.com
 - b. HERMETIC Stout Flooring Systems in Medium Grey as manufactured by Elite Crete Systems, Incorporated, Valparaiso, IN. www.elitecrete.com
 - c. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Concrete Topping: Provide the following three-component, troweled mortar flooring system consisting of a two-component, penetrating, moisture tolerant epoxy primer, epoxy resin, curing agent and selected, graded aggregates blended with inorganic pigments.
1. Bond or Base Coat: As recommended by the manufacturer.
 2. Aggregate: A silica quartz media, or as recommended by the manufacturer.
 3. Binder or Body Coat: As recommended by the manufacturer
 4. Top Coats: Two-component epoxy, ester, or urethane coating.
 5. Termination Strips and Control Joints: White metal, neoprene filled type as recommended by the manufacturer.
 6. Primer: Two-component, penetrating, moisture-tolerant epoxy primer.
 7. Colors: To match colors outlined in approved Manufacturers, or by approval from the Engineer.
 8. Textures: Non-slip surface.
 9. Physical Properties: The completed installation when thoroughly cured shall have the following physical properties:
 - a. Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing, ASTM C 307: 800 psi.
 - b. Standard Test Method for Tensile Properties of Plastics, ASTM D638: Not less than 2.0% elongation.
 - c. Flexural Modulus of Elasticity, ASTM, C 580: 2,500 (psi) pounds per square inch.
 - d. Indentation, MIL-D-3134: No indentation.

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- e. Bond Strength, ASTM C 321: 100 pounds per square inch minimum.
 - f. Flammability, ASTM D 635: Self-extinguishing.
 - g. Coefficient of Friction, ASTM D 2047: Not less than 0.5.
 - h. Resistance to Elevated Temperature, MIL-3134J: No Slip or flow.
 - i. Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concrete, ASTM C531: 1.7×10^{-6} inches per inch per F maximum, temperature range, -12 F to 140 F.
 - j. Abrasive Resistance, ASTM D-4060, CS-17: No less than 80 mg
 - k. Flexural Strength Modulus of Elasticity, ASTM D 790: 4500 pounds per square inch minimum.
 - l. Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes, ASTM C 579: 6,000 pounds per square inch minimum.
 - m. Surface Hardness, ASTM D 2240: Minimum 80- Maximum 85.
 - n. Water Absorption, ASTM C 413: 0.02 percent.
10. Sealer: Two-component, solvent-based coating formulated from a solid bisphenol A epoxy resin and a polyamide curing agent.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Source Quality Control:

- 1. Engage a single manufacturer who shall provide the services of a Technical Representative who shall assist Contractor, Engineer and the City by providing technical opinions on the adequacy of materials and methods of installation and field quality control testing based on Shop Drawings approved by Engineer.
- 2. Provide such services during the time of delivery, storage, job mock-up construction, installation, and field quality control testing of all concrete topping components.
- 3. Provide a manufacturer who will provide complete technical services including preparation and review of Shop Drawings, installation methods and proposed detailing for the work. Where the manufacturer requires additions, or changes to the Contract Drawings and Contract Specifications these shall be made at no additional expense to the City and only as acceptable to Engineer.

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4. Provide only the highest quality materials, environmental features, and methods of construction and installation as recommended by the manufacturer and as acceptable to Engineer.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Contractor shall examine the surfaces to receive concrete topping, and the conditions under which the trowel-applied concrete topping work is to be performed, and notify Engineer in writing of all conditions detrimental to the proper and timely completion of the work and the performance of the concrete topping systems. Do not proceed with the concrete topping work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.
- B. Substrate Preparation
 1. Scarification and Acid Etching: All areas to receive the work of this Section shall be given a heavily scarified finish as determined by the Engineer and manufacturer's representative to insure maximum topping adhesion.
 2. Provide cast-in-place concrete slabs free from voids and sharp projections before placing any concrete topping system. Remove surface irregularities on cast-in-place concrete and fill all holes, honeycombs, spalls and cracks using manufacturer's recommended cementitious underlayment. Repair areas of unacceptable consolidation. Green cast-in-place concrete slabs shall be finished to the type stated on the contract drawings and parameters outlined in Section 03 35 00 – Concrete Finishing.
 3. Fill or grind concrete substrate as may be required to achieve a uniform, level finished appearance on finished work.
 4. Prior to start of applying flooring, vacuum surfaces to be covered and inspect the subfloor.
 5. Primer: Apply primer as recommended by concrete topping manufacturer, prior to application of the base coat. Apply in accordance with manufacturer's directions as approved by Engineer at time of Shop Drawing submission.

3.02 INSTALLATION

- A. Do not power trowel concrete topping unless manufacturer provides written certification approved by Engineer that material shall experience no loss in compressive strength or tensile strength.
- B. Apply termination and expansion joint strips at the junction of the flooring with other materials and at expansion joints as recommended by the manufacturer.
- C. Mix materials and apply bonding coat in accordance with manufacturer's instructions.

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- D. Apply epoxy and vinyl ester mortar floor topping body coats to not less than 1/4-inch dry cured minimum thickness. Apply epoxy and vinyl ester mortar floor topping body coats of greater wet film thickness to compensate for any loss of volatile compounds during curing.
- E. Apply glass reinforcement as specified by the manufacturer.
- F. Apply grout coats to smooth body coat.
- G. Power sand to remove trowel marks.
- H. Apply top coat sealer material for maximum chemical resistance as recommended by the manufacturers. Apply a final top coat, to match the texture and color of the approved job mock-up.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Before general installation of concrete topping work commences, perform the following field quality control tests and include procedures and results in final Field Quality Control Report. Incorporate installation or system improvements, as may be recommended based on test results, into the remainder of the Work at no additional expense to the City.
 - 1. Concrete Topping: Before commencement of installation, and after approval of job mock-up and substrate preparations, test concrete topping system for a period of one month by installing a 200 square foot section within the plant in a location directed by Engineer. Installation shall be supervised and approved by manufacturer's Technical Representative as an acceptable installation. Subject this test area to the full range of wear which is likely to be seen in the finished work. At the completion of test the flooring shall show no signs of delamination, premature wearing, deterioration in excess of manufacturer's approved test data, and no signs of cracking, crazing or color changes. If the test area demonstrates these features the concrete topping material shall be rejected by Engineer and another test may be performed at the expense of Contractor. If the concrete topping fails to perform according to Section at the completion of this second test, the concrete topping system shall be rejected and an "approved equal" product shall be submitted for approval by Contractor. Test "approved equal" product as specified herein.
 - 2. At the end of the quality control test periods and before general installation commences, the installer, Contractor, Technical Representative and Engineer shall make final inspections of concrete topping systems and Contractor shall prepare a written report to Engineer describing all methods, observations, results and deterioration or damage found in the Work with recommendations for correcting such damage. Include photographic record of all test areas before, during and after the tests and photos of damages and physical changes in the concrete topping. The report shall contain all comments made by all parties, test results, and manufacturer's performance claims as preliminarily approved by Engineer at time of Shop Drawing

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submittal as compared to the actual results of the field testing. Make changes to report as required by Engineer for approval of the work. Include quality control test report as part of final Field Quality Control Report.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Protection:

1. Protect materials against damage by construction activities.
2. Do not install concrete topping when adequate protection of the work is not, or cannot, be made available.
3. Upon completion of the work, the installer shall advise Contractor of recommended procedures for his surveillance and protection of the concrete topping work during the remainder of the construction period.
4. Do not allow construction traffic which is not associated with the installation of the concrete topping and related materials in the area of work. Concrete topping shall be kept free of all traffic for a minimum of 72 hours after completion of top coating. Protect installed concrete topping from damage, by use of heavy Kraft paper or other covering so that concrete topping is without damage, or unusual or accelerated wear at time of Final Acceptance.
5. Concrete topping damaged in any manner shall be replaced at no additional expense to the City.
6. Only the installer shall replace deteriorated or defective Work found at the time of final inspection. The installer shall repair damages to the concrete topping work which occurred subsequent to concrete topping installation and prior to final inspection. Replace the work so that there will be no question as to the condition of concrete topping and associated work at the time of Final Acceptance.

B. Cleanup

1. After construction work is completed in the areas of concrete topping, and before Final Acceptance by the City, clean all floors and other surfaces containing concrete topping using methods recommended by the concrete topping manufacturer.
2. The concrete topping at the time of Final Acceptance shall be clean and without damage, and shall not be soiled in any way. Vacuum and wet mop areas which become soiled after initial cleaning, up to the time of Final Acceptance by the City.

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END OF SECTION

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NO TEXT ON THIS PAGE

SECTION 03 41 00 – PRECAST STRUCTURAL CONCRETE
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PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all labor, materials, equipment, design, services, engineering, and perform all operations required for complete furnishing, fabrication, delivery, unloading, handling, storing, installation, and erection of all precast, reinforced and prestressed, structural concrete Work as shown on the Contract Drawings and specified herein. The Work shall include the following, but is not limited to:

1. Solid concrete slabs and planks
2. Hollow core concrete slabs and planks.
3. Concrete wall and header panels.
4. Concrete troughs.
5. Concrete removable slabs and planks.
6. Prestressed structural concrete members.
7. Formwork.
8. Hardware, metal inserts, embedments, anchor plates, shear connectors.
9. Grouting, patching, and caulking of joints.
10. Handling and transportation of precast components.
11. Design, furnishing, and placement of prestressed and bar reinforcement.
12. Incorporating openings indicated on the Contract Drawings.
13. All supplementary parts, members, connections, and engineering necessary to complete the Work, regardless of whether all such items are specifically shown or specified on the Contract Drawings.
14. Concrete materials, mixing and placing concrete, including design and testing of the concrete mix.
15. Surface finishing.
16. Erection of all precast units.

B. Extent of precast structural concrete Work is shown on the Contract Drawings, including schedules, notes, and details that show size and location of members, and typical connections.

C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 03 10 00 - Concrete Forming and Accessories
- B. Section 03 21 00 - Reinforcing Steel
- C. Section 03 30 00 - Cast-in-Place Concrete
- D. Section 03 35 00 - Concrete Finishing.
- E. Section 03 60 00 - Grouting
- F. Section 04 05 00 - Common Work Results for Masonry
- G. Section 05 12 00 - Structural Steel Framing.
- H. Section 05 05 23.01 - Welding.

1.04 REFERENCES

- A. Definitions
 - 1. Anchorage: A device used to anchor the tendon to the concrete member.
 - 2. Bonded tendon: A prestressing tendon which is bonded to the concrete either directly or through grouting.

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3. Coating: Material applied to unbonded tendons to protect them from corrosion; or material applied to either bonded or unbonded tendons to lubricate them during stressing.
 4. Coupling: Any device designed to transfer the prestressing steel wires, bars or strands that comprise a tendon.
 5. Element diameter: The diameter of the individual prestressing steel wires, bars, or strands that comprise a tendon.
 6. Prestressing steel: That element of a post-tensioning tendon which is elongated and anchored to provide the necessary permanent prestressing force.
 7. Sheathing: An enclosure in which post-tensioned tendons are encased to prevent bonding during concrete placement, such as a paper plastic jacket for unbonded tendons, or metal conduit for bonded tendons.
 8. Tendon: An assemblage of steel elements such as wire, bar, or strand, complete with anchorage or anchorage devices used to impart prestress to concrete when the assembly is tensioned.
 9. Unbonded tendon: A tendon which is not bonded to the concrete.
- B. Reference Standards:
1. American Society for Testing and Materials (ASTM)
 - a. ASTM A 36 - Carbon Structural Steel.
 - b. ASTM A 53 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - c. ASTM A 276 - Stainless and Heat-Resisting Steel Bars and Shapes.
 - d. ASTM A 325 - Structural Bolts, Steel, Heat Treated, 120/105 ksi: Minimum Tensile Strength.
 - e. ASTM A 416 - Steel Strand, Uncoated Seven-Wire for Prestressed Concrete.
 - f. ASTM A 615/A - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
 - g. ASTM A 666 - Austenitic Stainless Steel, Sheet, Strip, Plate and Flat Bar for Structural Application.
 - h. ASTM C 31 - Making and Curing Concrete Test Specimens in the Field.
 - i. ASTM C 33 - Concrete Aggregates.
 - j. ASTM C 109 - Test Method for Compressive Strength of Hydraulic Cement Mortars.

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- k. ASTM C 138 - Test method for Unit Weight, Yield, and Air Content of Concrete.
 - l. ASTM A 143 - Test Methods for Slump of Hydraulic Cement Concrete.
 - m. ASTM C 150 - Portland Cement.
 - n. ASTM C 185 - Test Method for Air Content of Hydraulic Cement Mortar.
 - o. ASTM C 191 - Test Method for Tensile Strength of Hydraulic Cement Mortars.
 - p. ASTM C 260 - Air-Entraining Admixtures for Concrete.
 - q. ASTM C 330 - Lightweight Aggregates for Structural Concrete
 - r. ASTM C 494 - Chemical Admixtures for Concrete.
2. American Concrete Institute (ACI):
- a. ACI 301 - Specifications for Structural Concrete and Commentary.
 - b. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 - c. ACI 309R - Guide for Consolidation of Concrete.
 - d. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary.
 - e. ACI 533R - Guide to Precast Concrete Walls and Panels.
3. American Welding Society (AWS):
- a. B2.1 - Specification for Welding Procedure and Performance Qualification.
 - b. D1.1 - Structural Welding Code – Steel.
 - c. D1.4 - Structural Welding Code – Reinforcing Steel.
 - d. QC1 - Qualification and Certification of Welding Inspectors.
4. American Association of State Highway and Transportation Officials (AASHTO):
- a. M251 - Specification for Plain and Laminated Elastomeric Bridge Bearings.
5. 2020 Building Code of New York State (NYSBC).
6. International Building Code, 2018 Edition (IBC).
7. Precast/Prestressed Concrete Institute (PCI):

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- a. MNL-116 - Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.
 - b. MNL-120 - PCI Design Handbook.
 - c. MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete.
 - d. MNL 124 - Design for Fire Resistance of Precast Prestressed Concrete.
 - e. MNL 126 - Manual for the Design of Hollow Core Slabs.
 - f. MNL-127 - Recommended Practice for Erection of Precast Concrete.
 - g. MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction.
8. Steel Structures Painting Council (SSPC).
- a. Painting Manual, Volume I and II.
 - b. PA 1 – Shop, Field, and Maintenance Painting of Steel.
 - c. SP 3 – Power Tool Cleaning.

1.05 DESCRIPTION

A. Performance Requirements

- 1. Load Calculations: Precast and precast prestressed units shall be engineered, detailed, and fabricated to withstand loads as shown on the Contract Drawings, in addition to handling and erection forces. If loading criteria is not shown, they shall not be less than the loading requirements of the NYSBC. Structural properties of the units shall be calculated in accordance with ACI 318.
- 2. Dimensions and Tolerances: Precast and precast prestressed units shall be fabricated to dimensional tolerances in accordance with PCI-MNL-120.
 - a. Units shall be designed to accommodate construction tolerances, building movement, thermal movement, deflection of building structural members, and clearances of intended openings.
- 3. The design shall properly account for the concentration and distribution of loads due to openings. Design steel plank support headers when such headers are determined necessary by the manufacturer's Professional Engineer.
- 4. All members and components shall be designed for the fire ratings indicated on the architectural drawings.
- 5. Design joints to accommodate the critical load combination as indicated on the Contract Drawings to prevent internal stress, failure, deterioration, or failure of weather seals or precast.

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1.06 QUALITY ASSURANCE

- A. A qualified precast, prestressed concrete manufacturer and erector shall meet the requirements of PCI-MNL-116.
1. All manufactured precast, prestressed concrete units shall be produced by an experienced manufacturer regularly engaged in the production of such items. All manufactured precast, prestressed concrete and site-cast units shall be free of defects, checks, and cracks. Care shall be taken in the mixing of materials, casting, curing and shipping to avoid any of the above. The Engineer may elect to examine the units at the casting yard or upon arrival of the same at the site. The Engineer shall have the option of rejecting any or all of the precast, prestressed work if it does not meet with the requirements specified herein or on the Contract Drawings. All rejected work shall be replaced at no additional cost to the City.
 2. The precast, prestressed concrete manufacturing plant shall have a minimum of 5 years of successful experience in the fabrication of structural precast concrete units for projects of similar size and complexity, and shall be certified by the Prestressed Concrete Institute, Plant Certification Program, in category C3, prior to the start of production. The manufacturing plant shall have sufficient production capacity to produce, transport, and deliver required units without causing delay in the Work. The manufacturer shall retain a Professional Engineer, registered in the state of New York, to certify that manufacturing is in accordance with the design requirements. In lieu of such certification, the manufacturer, at his expense, shall meet the following requirements:
 - a. Retain independent testing or consulting firm approved by the Engineer and/or City.
 - b. Perform basis of inspection in accordance with the requirements of PCI-MNL-116.
 - c. Precast, prestressed plant shall be inspected at two-week intervals during production and issue a report, certified by a Professional Engineer verifying that materials, methods, products and quality control meet all the requirements of the specifications, drawings, and PCI-MNL-116. If the report indicates to the contrary, the Engineer, at the precaster's expense, will inspect and may reject any or all products produced during the period of non-compliance with the above requirements.
 3. The precast, prestressed Erector shall have a minimum of 5 years of successful experience in the erection of structural precast concrete units for projects of similar size and complexity, and shall be certified by the Prestressed Concrete Institute, Erector Certification Program, in category S2, prior to the start of production. The Erector shall retain a Professional Engineer, registered in the state of New York, to certify that erection is in accordance with the design requirements.

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- B. Plant production, design, engineering, and erection shall be under the direct supervision and control of a Professional Engineer, registered in the state of New York, who possesses a minimum of five years of experience in precast, prestressed concrete work, for projects of similar size and complexity.
- C. A qualified welder shall meet the requirements of ANSI/AASHTO/AWS Structural Welding Code, D1.1.
- D. Quality Assurance
 - 1. Materials shall be tested in accordance with the following requirements. Detailed description of test procedures and apparatus, as well as test results shall be included in the report.
 - 2. Assembly shall be tested in accordance with Paragraphs 1.06D.3 and 1.06D.4 below, on a third sample for tendons that are not bonded, two samples of each tendon size at least 10 ft in length and complete with standard production quality anchorages.
 - 3. Prestressing steel sample shall be tested in accordance with the appropriate ASTM Specification of Paragraph 2.02D 1. Tendon assembly shall be tested with a method that will allow accurate determination of the yield strength, ultimate strength, and elongation of the specimen to ensure compliance with Paragraphs 2.02F, or 2.02I and 2.02K.
 - a. For unbonded tendons, a dynamic test shall be performed on a representative tendon assembly which shall withstand without failure 500,000 cycles from 60 to 66 and back to 60 percent of its guaranteed minimum ultimate strength. A prototype tendon assembly may be used provided the assembly has not less than 10 percent of the full size tendon strength. Single element tendons using one strand, bar, or wire shall be tested as a complete tendon assembly. Systems utilizing multiple strands, wires, or bars may be tested using a prototype tendon with sufficient number of elements to duplicate the behavior of a full-sized tendon.
 - b. Grout shall be tested for strength and shrinkage in accordance with the requirements of Section 03 60 00 - Grouting.
 - 4. Following tolerances shall be complied with:
 - a. The bearing surface between anchorage and concrete shall be concentric with the tendons and perpendicular to the intended direction of the tendon within \pm one degree.
 - b. Tendons, sheathing, and anchorage shall be placed within the tolerances of ACI 117 for reinforcement placement, distance between reinforcement, and concrete cover as noted on the Contract Drawings. These tolerances shall apply separately to both vertical and horizontal dimensions and may be different for each direction except that in slabs the horizontal tolerance shall not exceed 1 inch in 15 ft of tendon length.

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1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings and reference materials for the approval of the Engineer. Submittals shall include, but not limited to:
1. Placing Drawings for manufacture and erection of precast, prestressed concrete units and provide the following information in addition to that required by Sections 03 10 00 – Concrete Forming and Accessories 03 21 00 – Reinforcing Steel.
 2. Unit shapes, including elevations and sections, member piece marks and dimensions, and anticipated cambers at time of erection.
 3. Plans and elevations locating and defining all products furnished by the manufacturer, with all openings shown.
 4. Finishes.
 5. Relationship to adjacent materials.
 6. Reinforcement, joints, weld plates, connection details, edge conditions and support conditions of all precast members.
 7. Erection schedules and sequences, assembly techniques, and marking of members.
 8. The location of tendons and sheathing throughout their length.
 9. Size, details, location, materials, and stress grade (where applicable) for all tendons and accessories.
 10. Jack clearances, jacking procedures, stressing sequence, initial tensioning forces, gauge pressures, and tendon elongation.
 11. Locations and type of lifting and erection inserts. Certified reports for lifting inserts indicating allowable design loads shall also be submitted.
 12. All dead, live, and applicable loads and design criteria. When reinforcement design is not detailed on the Contract Drawings, drawings shall be stamped by a Licensed New York State Professional Engineer.
 13. Location, dimensional tolerances, and details of anchorage devices that are embedded in or attached to structure or other construction.
 14. Other items cast into units.
 15. Handling procedures, plans and/or elevations showing precast, prestressed concrete unit location and sequence of erection and lifting for special conditions.
 16. Fire rating.
 17. Dimensions, size, and location of openings.
- B. Product Data - The following information shall be submitted:
1. Typical stress-strain curve of the prestressing steel.

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2. Test results of ultimate strength, yield strength, elongation, and composition for all material not produced in accordance with an ASTM specification.
 3. Structural design calculations, including load tables, signed and sealed by a New York State Professional Engineer.
 4. Values of the wobble coefficient and the curvature coefficient, and anchorage seating device set data.
 5. Test data substantiating the expected coefficients and anchorage slip.
- C. Field Data – The following information, prior to installation on actual materials to be used, shall be submitted:
1. Stress-strain curve for a sample representing the production lot from which the prestressing tendons will be taken.
 2. Notarized mill test reports for the tendons.
 3. Results of all tests required in Paragraph 1.07C.2 including compliance with Paragraphs 2.02H to 2.02J for anchorage and couplings.
- D. Samples: The following shall be submitted, as requested by the Engineer:
1. Samples shall be representative of finished exposed face showing typical range of color and texture. Samples shall be submitted and approved prior to commencement of manufacture.
 2. Sample size: 12 inches by 12 inches by thickness indicated on the Contract Drawings, representative of the proposed finished product.
- E. Quality Control Submittals: The following items shall be submitted:
1. Concrete mix designs in accordance with the requirements of Section 03 30 00 – Cast-in-Place Concrete and the NYSBC.
 2. Reports for all test results in compliance with the requirements of Paragraph 1.06D.
 3. Air content tests and test reports for laboratory cured concrete cylinders in accordance with the requirements of Section 03 30 00 - Cast-in-Place Concrete.
 4. Independent laboratory tests for grout shall be in accordance with the requirements of Section 03 60 00 - Grouting. Grout exposed to the weather shall be free of discoloration and shall not require special surface treatments.
 5. Structural design calculations for planks, beams, wall panels, slabs, troughs, structural concrete members, connections, and coping prepared and sealed by a Professional Structural Engineer licensed in the State of New York.
 6. Welder Certifications in accordance with Section 05 05 23.01 - Welding.

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1.08 DELIVERY, STORAGE, AND HANDLING

- A. All precast, prestressed structural concrete materials and appurtenances shall be properly protected in accordance with the manufacturer's requirements so that no damage or deterioration will occur from the time of shipment until installation is completed. All products and materials shall be delivered, stored and handled as follows:
1. All precast, prestressed concrete units shall be delivered to the project site in such quantities and at such times to maintain continuity of erection.
 2. Precast, prestressed members shall not be transported away from the casting yard until the concrete has reached the minimum required 28 day compressive strength and a period of at least 5 days has elapsed since casting, unless otherwise permitted by the Engineer.
 - a. Precast, prestressed members shall not be transported from the plant to the job site prior to approval of that member by the plant inspector. This approval will be stamped on the member by the plant inspector.
 3. Units shall be handled and transported in a position consistent with their shape and design in order to avoid stresses which could cause cracking or damage.
 4. Transportation, site handling and erection shall be accomplished using acceptable equipment and methods by qualified personnel so that units shall not be damaged.
 5. During handling, transporting, and storing, precast, prestressed concrete members shall be lifted and supported only at the lifting or supporting points as indicated on the Shop Drawings.
 6. Nonstaining resilient spacers of even thickness shall be placed between each unit.
 7. Units shall be supported during shipment and storage on nonstaining shock-absorbing material.
 8. Units shall be stored and protected so as to prevent contact with soil, staining, or physical damage.
 - a. Units shall be stored on firm, level, and smooth surfaces to prevent cracking, distortion, warping or other physical damage.
 - b. Stored units shall be placed so that identification marks are discernible, and so that product can be inspected.
 - c. Units shall not be placed directly on ground.
 - d. Stacked precast, prestressed units shall be separated by battens across full width of each bearing point. Units shall be stacked so that lifting devices do not get damaged and are accessible.

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- e. The top of tier stack shall not be used as storage.
- 9. Factory assembled parts and components shall not be dismantled for shipment unless written permission is received from the Engineer.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
 - A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
 - A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Solid concrete slabs and planks, concrete wall and header panels, prestressed structural concrete members:
 - 1. Oldcastle Precast Building Systems, South Bethlehem, NY; www.oldcastleprecast.com.
 - 2. United Concrete Products, Inc.; www.unitedconcrete.com
 - 3. New York Precast, LLC, Kingston, NY; www.nyprecast.com
 - 4. BPD L Beton Prefabriques, Alma, (Quebec) Canada; www.bpd l.com
 - 5. Jersey Precast, Hamilton, NJ; www.jerseyprecast.com.
 - 6. High Concrete Group LLC, Denver, PA; www.highconcrete.com.
 - 7. Boccella Precast, Berlin, NJ; www.boccellaprecast.com
 - 8. Fabcon Precast, LLC, Mahanoy City, PA; www.fabconprecast.com
 - 9. Blakeslee Prestress, Inc., Branford, CT; www.blakesleeprestress.com
 - 10. Coreslab Structures Inc., Thomaston, CT; www.coreslab.com
 - 11. Northeast Precast, Vineland, NJ; www.northeastprecast.com
 - 12. Or approved equal.
- B. Anchor plates and connections between precast structural concrete members:
 - 1. Peikko USA, Inc., Lebanon PA; www.peikkousa.com
 - 2. Halfen USA, Inc., San Antonio TX; www.halfenusa.com
 - 3. Meadow Burke, Riverview, FL; www.meadowburke.com
 - 4. SureBuilt Concrete Forms & Accessories, Bellwood, IL; www.surebuilt-usa.com
 - 5. JVI, Inc., Lincolnwood, IL; www.jvi-inc.com
 - 6. Dayton Superior Corp., Miamisburg, OH; www.daytonsuperior.com

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7. ALP Supply, Fairless Hills, PA; www.alpsupply.com

8. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Concrete shall conform to the requirements of Section 03 30 00 - Cast-in-Place Concrete with the color and finish matching that for structural concrete.

1. For precast and prestressed concrete items, minimum compressive strength of concrete at 28 days shall be 5,000 psi unless otherwise specified on the Contract Drawings. Minimum compressive strength of concrete at transfer of prestressing force shall be 3,500 psi unless otherwise specified.

2. Required concrete density is indicated on the Contract Drawings.

B. Concrete reinforcement shall be in accordance with ASTM A615, Grade 60. See Section 03 21 00 - Reinforcing Steel.

C. Weldable deformed steel reinforcement shall be in accordance with ASTM A706, Grade 60. See Section 03 21 00 – Reinforcing Steel.

D. Prestressing Strands:

1. Prestressing strands shall be 7-wire, stress-relieved, high-strength strands Grade 250K or 270K in conformance with one of the following: ASTM A 416, ASTM A 421 and ASTM A 722.

2. Strands, wire, and bars not specifically listed in ASTM A 416, ASTM A 421, or ASTM A 722 are permitted to be used provided they conform to the minimum requirements of this Specification and do not have properties that make them less satisfactory than those listed in ASTM A 416, ASTM A 421, or ASTM A 722.

3. Tendons shall be clean and free of excessive rust, scale, and pitting. A light oxide coating is permissible.

E. Grease, wax, plastic, or bituminous material may be used as coating material for unbonded tendons. Throughout the range of temperatures anticipated for the structure, the coating material shall remain ductile and free from cracks and shall not become fluid. The coating shall be chemically non-reactive with the tendon, concrete, and the material used for sheathing. The coating shall adhere to and be continuous over the entire tendon length to be unbonded.

F. Sheathing for Bonded Tendons

1. Sheathing and duct-forming materials shall not react with alkalis in the cement, shall be strong enough to retain their shape and resist damage during construction, and shall prevent the intrusion of cement paste from the concrete. Sheathing and duct-forming material left in place shall not cause electrolytic action or deterioration.

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2. The inside diameter of the sheathing or duct shall be at least 1/4 in. larger than the wire, bar, or strand tendon and shall have an inside cross-sectional area at least twice that of the net area of the tendon.
 3. Sheathing shall have grout holes or vents at each end and at all high points except where curvature is small and the sheathing as determined by the Engineer is relatively level. Drain holes shall be provided at all low points if the tendon may be subjected to freezing after placing and before grouting.
- G. Sheathing for unbonded tendons shall have sufficient tensile strength and water resistance to prevent damage or deterioration during transportation, storage at job site, and installation. The sheathing shall be continuous over the unbonded length of the tendons. The sheathing shall prevent the intrusion of cement paste and the escape of coating material. The sheathing may be a continuous tube or spiral wrapping.
- H. Sheathing at joints shall be connected with leak-tight sleeves or gaskets.
- I. Bonded tendon anchorage tested in an unbonded state shall develop 90 percent of the minimum specified ultimate strength of the prestressing steel, without exceeding anticipated set at time of anchorage, and without slip. Anchors which develop less than 100 percent of the minimum specified ultimate strength shall be applied only where the bond length is equal to or greater than, the bond length required to develop 100 percent of the minimum specified ultimate strength of the tendon. The required bond length between the anchorage and the zone where the full prestressing force will be developed under service and ultimate loads shall be provided. Bond length shall be determined by testing a full-sized tendon. If in the unbonded state, the anchorage develops 100 percent of the minimum specified ultimate strength, it need not be tested in the bonded state.
- J. Unbonded tendon anchorages when permitted by the Engineer shall develop the minimum specified ultimate strength of the prestressing steel with an amount of permanent deformation which will not decrease the expected ultimate strength of the assembly. The total elongation under ultimate load of the tendon shall be not less than 2 percent when measured over a minimum gage length of 10 ft.
- K. Couplings shall be used only at locations indicated on the Contract Drawings. All couplings shall develop the minimum specified ultimate strength of the prestressing steel without exceeding anticipated set of either the coupling or the prestressing steel, and shall not reduce the ductility of the tendon below the minimum 2 percent strain specified in Paragraph 2.02J. Couplings in housings which permit necessary movements during stressing shall be enclosed. For bonded tendons, fittings shall be provided to allow complete grouting of all the coupling components.
- L. Grout shall conform to Section 03 60 00 - Grouting.
- M. Bearing pads shall be provided as shown on the Contract Drawings.
1. Bearing pads not susceptible to movement beyond that of flexure of the member shall be AASHTO grade 100% chloroprene (neoprene) or

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- approved equivalent meeting the requirements of AASHTO standard specifications for Highway Bridges.
2. Elastomeric pads shall be AASHTO M251, plain, vulcanized, 100% polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 50 to 70 shore A durometer.
 3. Random oriented fiber-reinforced elastomeric pads shall be preformed, randomly oriented synthetic fibers set in elastomer, surface hardness of 70 to 90 shore A durometer, and a compressive stress of 3000 psi with no cracking, splitting, or delaminating in the internal portions of the pad. One specimen shall be tested for each 200 pads used in the project.
 4. High-density plastic bearing pads shall be multi-monomer plastic strips which are non-leaching and support construction loads with no visible overall expansion, manufactured specifically for the purpose of bearing precast, prestressed concrete.
- N. Fine and coarse aggregates for exposed finish shall be obtained from a single source for the entire job. Aggregate shall be clean, hard, strong, durable and inert, shall be free of staining or deleterious material and shall conform to ASTM C 33 or C 330..
- O. Anchors, clamps, dowels and similar ties for anchoring precast, prestressed concrete shall be of Type 316 stainless steel, of the sizes and types shown.
- P. Mortar shall conform to Section 04 05 00 - Common Work Results for Masonry and shall match adjacent masonry work.
- Q. Welded studs shall be in accordance with AWS D1.1, type B headed studs, cold-finished carbon steel bars.
- R. Structural steel plates and shapes shall be in accordance with 05 12 00 – Structural Steel Framing. Unless otherwise indicated on the Contract Drawings, structural steel shapes shall be embedded in the precast and shall be used if prestressing or bar reinforcement is inadequate to support the loads indicated on the Contract Drawings and to frame large openings in the precast slab. The manufacturer's Professional Engineer is responsible for the complete design of all structural steel framing embedded in all precast members.
- S. Provide forms and, where required, form facing materials of metal, plastic, wood, or other acceptable material that is non-reactive with concrete and will produce required finish surface.
- T. Deformed-steel wire bar anchors shall be ASTM A496.
- U. Welding electrodes shall be in accordance with AWS requirements. See Section 05 05 23.01 - Welding .
- V. Curing compound shall be in accordance with ACI 533R. See Section 03 30 00 – Cast-In-Place Concrete.

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- W. Sealing compound shall be in accordance with Section 03 30 00 – Cast-In-Place Concrete.
- X. Shop-Primed Finish: Prepare surfaces of interior steel items, except those with galvanized finish, stainless steel, or items to be welded, or those surfaces to be embedded in concrete, according to the requirements of SSPC-SP 3, and shop-apply primer according to SSPC-PA 1.
 - 1. Primer shall be fast-curing, lead and chromate free, VOC conforming, universal modified alkyd primer with good resistance to normal atmospheric corrosion.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Fabrication

- 1. Structural precast, prestressed concrete units shall be manufactured in accordance with PCI-MNL-116.
- 2. Cover for reinforcing steel shall be a minimum of 3/4-inch. Metal chairs, with or without coating, shall not be used on the finished face.
- 3. Because of the critical nature of the bond development length in prestressed concrete unit construction, if the transfer of stress is by burning of the fully tensioned strands at the ends of the member, each strand shall first be burned at the ends of the bed and then at each end of each member before proceeding to the next strand in the burning pattern.
- 4. Rigid molds shall be used to maintain units within specified tolerances conforming to the shape, lines and dimensions shown on the approved shop drawings. Molds shall be constructed to withstand vibration method selected.
- 5. Concrete shall be conveyed from the mixer to place of final deposit by methods which will prevent separation, segregation or loss of material. All concrete shall be consolidated in the mold by high frequency vibration, either internal or external, or a combination of both, to eliminate unintentional cold joints, honeycombing and to minimize entrapped air on vertical surfaces.
- 6. Precast, prestressed concrete units shall be cured in accordance with Section 03 30 00 - Cast-in-Place Concrete until such time as the compressive strength is high enough to ensure that stripping does not have any effect on the performance or appearance of the final product.
- 7. Each precast, prestressed concrete unit shall be marked corresponding to identification mark on Shop Drawings for unit location. Each precast, prestressed concrete unit shall be marked with the date of casting.
- 8. Structural precast, prestressed concrete units which do not meet the color and texture range or the dimensional tolerances shall be rejected if they cannot be satisfactorily corrected.

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9. The Contractor shall coordinate the communication of all necessary information concerning openings, sleeves, or inserts to the manufacturer of the precast, prestressed members.
10. Finishing shall be in accordance with Section 03 35 00 - Concrete Finishing. Bottom surface shall be flat and uniform, without chips, spalls, and imperfections.
11. Manufacturer shall provide for openings on all sides and as clearly shown on the architectural and structural drawings. They shall be located by the trade requiring them. Round and small openings (less than 10 inches) shall be drilled or cut by the respective trades after grouting. Openings requiring cutting of prestressing strand shall be approved by the precast plank manufacturer before drilling or cutting.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Contractor shall verify that areas to receive precast, prestressed structural concrete units are properly prepared and completed to final elevations as shown on the Contract Drawings.

3.02 IMPLEMENTATION

- A. Installation

1. Structural precast, prestressed concrete shall be installed in accordance with the manufacturer's recommendations and approved Shop Drawings.
2. Precast, prestressed concrete units shall be set level, plumb, square and true within allowable tolerances in accordance with PCI-MNL-120 and Paragraph 1.06.D.4.
3. Temporary supports and bracing shall be provided as required to maintain position, stability and alignment as units are being permanently connected.
4. Non-loadbearing units shall be set dry without mortar. Specified joint dimensions shall be attained with steel or plastic spacing shims.
5. Precast, prestressed concrete units shall be fastened in place by bolting or welding or both, completing dry-packed joints, grouting sleeves and pockets, and placing cast-in-place concrete joints as indicated on the approved erection drawings. Precast, prestressed concrete units shall be fastened in place in accordance with details shown on the Contract Drawings.
6. Temporary lifting and handling devices cast into the precast, prestressed concrete units shall be completely removed. If protectively treated,

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however, devices not visible in the finished work may be left in place only where they do not interfere with the work of any other trade.

7. All anchors, clamps, dowels and similar ties shall be furnished and set for proper erection.
 8. All joints shall be a uniform thickness as shown on the Contract Drawings.
- B. Placement and Protection of Tendons and Accessories
1. A visual inspection shall be conducted to ensure that materials meet requirements of the Specification. The inspection shall include, but not be limited to, the following:
 - a. Cleanliness of material and forms
 - b. Location of materials and forms
 - c. Proper tensioning of prestressing materials
 2. Preparation
 - a. A dependable high-pressure water supply of sufficient volume before beginning grouting shall be provided. Sheathing shall be freed of dirt and other foreign substances by thorough flushing with water immediately prior to grouting.
 - b. Tendons and Concrete
 - 1) Tendons shall be kept dry and water shall be kept out of the conduit until flushing tendons prior to grouting. Concrete around grouted tendons shall be maintained at a temperature of 40 °F or higher from the time of grouting to at least 3 days after grouting.
 - 2) Sheathing for use with bonded tendons shall be kept free of grease, oil, paint, and other foreign matter. A light coat of rust is permissible, provided loose rust has been removed and the surface of the steel is not pitted.
 - 3) Tendons for use in unbonded construction shall be kept clean and undamaged, and protected with a permanent coating specified in Paragraph 2.02E.
 - 4) Tendon shall be covered with an additional field-applied coating of acceptable material.
 - 5) End anchorage shall be permanently protected with concrete free of loose rust, grease, oil, and other foreign matter except paint.
 - 6) Grout fittings and sheathing for bonded tendons shall be protected from collapse and other damage. Prior to placing concrete, sheathing and grout fittings shall be examined for holes, and any holes found shall be repaired. If the tendon

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remains ungrouted for more than 28 days from the time of tendon placement, temporary corrosion protection shall be provided.

3. Placement
 - a. Tendons and anchorage shall be installed to meet tolerances of Paragraph 1.06D.4. Tendons, sheathing, and anchorage shall be firmly supported to prevent displacement during concrete placement.
 - b. Grout
 - 1) For bonded-tendon construction, grout shall be injected into all voids between prestressing tendons, sheathing, and anchorage fittings. Flow shall be continued until grout of the same consistency as the grout injected flows without the presence of air bubbles from vent openings. Vent openings shall be closed progressively in the direction of the flow. After all vent openings have been closed, the grouting pressure shall be raised to at least 50 psi and plug the injection hole.
 - 2) In the event of a blockage or an interruption of grouting, all grout shall be removed from the tendon sheath by flushing with water.
4. Tensioning and Other Operations Involving Tendons
 - a. Tendons shall be stressed in the sequence, at the concrete strength, and at the construction stage as indicated on the Contract Drawings.
 - b. Tendons composed of multiple strands, wires, or bars in a common sheath shall be tensioned simultaneously unless the effects of interference between the elements are considered.
 - c. Prestressing force shall be determined by measuring tendon elongation and checking jack pressure with a calibrated gauge or dynamometer. Gauge or dynamometer shall be calibrated within six months prior to use; correct any discrepancy which exceeds 5 percent. Elongation requirements shall be based on load-elongation curves for the steel used. For each tendon a record of the measured elongation and the gauge pressure or dynamometer readings shall be kept and submitted to the Engineer.
 - d. The total loss of prestress force in any tendon due to unreplaced broken elements shall not exceed 2 percent of the total prestress force.
 - e. Tendons shall not be subjected to excessive temperatures, welding sparks, or electric ground currents. Burning and welding operations

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shall not be conducted in the vicinity of tendons without prior acceptance, except as permitted by Paragraph 3.02 B. 4. f..

- f. Superfluous extension of tendons beyond anchorage may be removed by rapid oxyacetylene burning, unless these procedures are contrary to the recommendations of the manufacturer of the prestressing steel.

C. Repair

- 1. Concrete shall be repaired in accordance with the requirements of Sections 03 30 00 - Cast-in-Place Concrete. Where required, and subject to the approval of the Engineer, damaged exposed exterior surfaces shall be repaired to match color and texture of surrounding concrete and to minimize shrinkage.

D. Cleaning

- 1. After installation and joint treatment, precast, prestressed concrete surfaces shall be cleaned with detergent and water, using soft fiber brushes and sponges. Units shall be rinsed thoroughly with clean water in accordance with the precast, prestressed concrete manufacturer's recommendation. Cleaning materials and processes shall be used which will not change the character or color of exposed concrete finishes.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Protection

- 1. Precast, prestressed structural concrete units shall be protected from all damage and abuse from all other Contractors and installers involved in the work until final acceptance by the City.
- 2. Remove debris on precast slabs resulting from Work upon completion prior to topping slab concrete pour.

END OF SECTION

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NO TEXT ON THIS PAGE

SECTION 03 60 00 - GROUTING
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PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all materials, labor, and equipment required to provide all grout used in concrete Work and as bearing surfaces for base plates as specified herein and shown on the Contract Drawings.

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete

1.04 SECTION 03 41 00 - PRECAST STRUCTURAL CONCRETE REFERENCES

A. ASTM C109 - Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or 50 mm Cube Specimens).

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- B. ASTM C531 - Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing.
- C. ASTM C579 - Test Method for Compressive Strength of Chemical-Resistant Mortars and Monolithic Surfacing.
- D. ASTM C939 - Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
- E. ASTM C1107 - Packaged Dry, Hydraulic Cement Grout (Nonshrink).
- F. US Army Corps of Engineers Specification for Non-shrink Grout, CRD-C621

- G. American National Standards Institute/National Science Foundation (ANSI/NSF) Standard 61 - "Drinking Water System Components - Health Effect"

1.05 DESCRIPTION

- A. Services of Manufacturer's Representative
 1. The Contractor shall provide the services of a qualified manufacturer's technical representative who shall instruct the Contractor's personnel in the mixing, proper use and application of the non-shrink grout and epoxy grout.
 2. The manufacturer's representative shall provide written certification that materials have been mixed and applied properly and surfaces to receive these products have been prepared properly, all in conformance with manufacturer's requirements.
 3. The on-site time required for the manufacturer's representative to achieve a successful installation shall be at the expense of the Contractor. The manufacturer's representative shall sign in and out at the office of the Resident Engineer and provide written verification of the areas he has approved on each day he is at the project.

- B. Grout Uses
 1. The different types of grout shall be used for the applications stated below unless noted otherwise specified herein or on the Contract Drawings. Where grout is called for in this Section or on the Contract Drawings which does not fall under any of the applications stated below, non-shrink grout shall be used.
 - a. Cement grout shall be used for grout toppings and for patching of fresh concrete.
 - b. Non-shrink grout shall be used for grouting beneath base plates of equipment and structural metal framing.
 - c. Epoxy grout shall be used for bonding new concrete to hardened concrete.

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2. New concrete surfaces to receive cement grout shall be as specified in Section 03 30 00 – Cast-in-Place Concrete, and shall be cleaned of all dirt, grease and oil-like films.
 - a. Existing concrete surfaces shall likewise be cleaned of all similar contamination and debris, 4 protection of cement grout shall be as specified in Section 03 30 00 – Cast-in-Place Concrete.
 - b. Curing and protection of cement grout shall be as specified in Section 03 30 00 – Cast-in-Place Concrete.
3. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

1.06 QUALITY ASSURANCE

A. Testing Agency:

1. Testing of materials and of resulting grout for compliance with the technical requirements of the specification will be performed by QA/QC consultant employed and paid by the City.
 - a. The Contractor shall be charged by the City for the cost of any additional tests and investigation on work performed which does not meet the specifications.

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings and material specifications for the approval of the Engineer. Shop drawings shall include, but not be limited to:
 1. Material certifications and technical data sheets.
 2. Samples of all materials to be used.
- B. The Contractor shall also submit the following:
 1. Certified test results verifying the compressive strength, shrinkage and expansion requirements specified herein.
 2. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, curing and appropriate uses for each type of grout used in the work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The grout materials and their manufactures listed in this paragraph below are furnished for the information of the Contractor.
- B. The Contractor shall note that the grout used for concrete work that can contact potable water, shall be certified as meeting the requirements of ANSI/NSF 61 for contact with potable water when in the finished concrete. Accordingly, Contractor must select and furnish grout materials (i.e., either NSF approved materials or regular non-NSF approved materials) that is appropriate for the Work and satisfy requirements of this specification and has Engineer's approval.
- C. Epoxy grout:
 - 1. Sikadur 32 Hi-Mod, as manufactured by Sika Corporation, Lyndhurst, NJ; www.usa.sika.com
 - 2. Euco #452, as manufactured by The Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com.
 - 3. Duralcrete LV, as manufactured by Tamms Industries Inc., Kirkland, IL; www.tamms.com
 - 4. Or approved equal.
- D. Non-shrink grout shall be:
 - 1. Euco N-S, as manufactured by The Euclid Chemical Company, Cleveland, OH; www.euclidchemical.com
 - 2. Masterflow 713, as manufactured by BASF Corporation, Shakopee, MN; www.master-builders-solutions.basf.us
 - 3. SikagROUT 212, as manufactured by Sika Corporation, Lyndhurst, NJ; www.usa.sika.com
 - 4. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Cement Grout
 - 1. Cement grout shall be composed of Portland cement, sand and water. The sand to be used shall be selected to suit the spacing for placement. Where sand is not usable, the grout shall be composed of cement and water only. The minimum 28-day compressive strength of cement grout shall be indicated on the Contract Drawings and shall not be less than 4000 psi.
 - 2. Gradation of sand and mix proportioning shall be in accordance with the following table for grouts using natural sands and having a minimum 28-day compressive strength of 4,000 psi. For higher strength grouts or those using manufactured sands, strength shall be established by trial mixes.
 - a. Gradation for Natural Sand:

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Sieve Size	Spaces less than one (1) inch	Spaces one (1) inch or more
Passing 3/8		100
Passing 4	100	95-100
Passing 8	95-100	80-100
Passing 16	70-100	50-85
Passing 30	40-75	25-60
Passing 50	10-35	10-30
Passing 100	2-15	2-10
Passing 200	--	--

b. Mix Proportioning:

By Weight	Non-Air Entrained Grouts (Maximum 4 Percent Entrapped Air)		Air Entrained Grouts (Air 8 Percent to 10 Percent)	
	Spaces less than one (1) inch	Spaces one (1) inch or more	Spaces less than one (1) inch	Spaces one (1) inch or more
Cement (bags)	10.8	10.5	11.3	11.0
Sand (lb)	2150	2240	1930	1990
Maximum water (gals)	59.5	57.8	57.5	55.8
Maximum water (gals per bag)	5.5	5.5	5.1	5.1

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	Non-Air Entrained Grouts (Maximum 4 Percent Entrapped Air)		Air Entrained Grouts (Air 8 Percent to 10 Percent)	
	Spaces less than one (1) inch	Spaces one (1) inch or more	Spaces less than one (1) inch	Spaces one (1) inch or more
By Volume				
Cement	1	1	1	1
Sand (dry rodded)	1.85	2.10	1.6	1.7
Sand (damp & loose)	2.30	2.35	2.0	2.1
Maximum water (gals per bag)	5.5	5.5	5.1	5.1

3. Water shall be kept to a minimum, the amounts noted in the preceding table are the maximum for grout. Proportioning by volume shall be limited to small quantities mixed at the job site.
4. White Portland cement shall be mixed with the Portland cement as required to match the color of adjacent concrete.

B. Non-Shrink grout

1. The grout material shall be an approved ready to use mixture requiring only water for use at the job site. The minimum compressive strength of 2-inch cubes shall be 3,000 psi at 7 days. The minimum compressive strength at 28 days is indicated on the Contract Drawings and shall not be less than 4000 psi.
2. Non-shrink grout shall conform to CRD-C 621 and ASTM C1107, Grade B or C when tested at a maximum fluid consistency of 30 seconds per ASTM C939 at temperature extremes of 45 degrees Fahrenheit and 90 degrees Fahrenheit and an extended working time of 15 minutes.
3. Non-shrink grout product and manufacturer shall be as specified in this Section.
4. Non-shrink grouts depending on oxidation to limit shrinkage and containing additives such as iron or steel particles shall not be used.

C. Epoxy Grout

1. Epoxy grout shall be modified as required for each particular application with aggregate per manufacturer's instructions.

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2. Epoxy grout product and manufacturer shall be as specified in this Section.

D. Dry Pack

1. Dry pack (to be packed or tamped in place) shall be made at no slump consistency.
2. When mixing the batch, only enough water shall be added to the dry materials to produce a rather stiff mixture, then additions of water may be made in small increments until the desired consistency is obtained.

E. Curing Materials

1. Curing materials for cement grout shall be as specified in Section 03 30 00 – Cast-in-Place Concrete and as recommended by the manufacturer for prepackaged grouts.

F. Water

1. Use only potable water for preparation of grout.

- G. The Contractor shall note that concrete for all Outlet Structures included in this Contract shall be considered to be in contact with potable water. Accordingly, for all concrete work of outlet structures, the Contractor must furnish & use only NSF approved grout materials at no additional cost to the City.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 IMPLEMENTATION

- A. Installation

1. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency shall be such that the grout is plastic and moldable but will not flow.
2. Measurements for cement grout shall be made accurately by weight or by volume using containers. All measurements shall be made in a manner satisfactory to the Engineer. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

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3. Grout shall be placed quickly and continuously, shall completely fill the space to be grouted, be thoroughly compacted and free of air pockets. The grout may be poured in place, pressure grouted by gravity, or pumped.
4. For grouting beneath base plates, grout shall be poured from one side only and shall flow across to the open side to avoid air-entrapment.
5. The use of pneumatic pressure or dry-packed grouting requires approval of the Engineer.

3.03 FIELD TESTING / QUALITY CONTROL

A. Field Tests:

1. Compression test specimens will be taken during construction from the first placement of each type of grout and at intervals thereafter as selected by the Engineer to ensure continued compliance with these Specifications.
2. Compression tests and fabrication of specimens for cement grout and non-shrink grout will be performed as specified in ASTM C109 at intervals during construction as selected by the Engineer. A set of three specimens will be made for testing at 7 days, 28 days, and 56 days, and any additional time period as appropriate.
3. Compression tests and fabrication of specimens for epoxy grout shall be performed as specified in ASTM C579, Method B, at intervals during construction as selected by the Engineer. A set of three specimens will be made for testing at seven days and any other time period as appropriate.

- B.** All grout which has already been placed and which fails to meet the requirements of this Section is subject to removal and replacement by the Contractor at no additional cost to the City.

3.04 STARTUP / DEMONSTRATION

- A.** Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A.** Not Used

END OF SECTION

SECTION 04 05 00 – COMMON WORK RESULT FOR MASONRY
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PART 1 GENERAL

1.01 SUMMARY

- A. Mortar and masonry grout as specified herein include, but are not limited to, Portland Cement, lime, sand, coarse aggregate, admixtures for use in mortar and masonry grout, and appurtenances.
- B. Mortar and masonry grout shall be provided as indicated on the Contract Drawings, specified herein, or as required for a complete installation.
- C. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Section 04 22 00 - Concrete Unit Masonry

1.04 REFERENCES

A. ASTM:

1. C91 - Standard Specifications for Masonry Cement
2. C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
3. C144 - Standard Specification for Aggregate for Masonry Mortar
4. C150 - Standard Specification for Portland Cement
5. C207 - Standard Specification for Hydrated Lime for Masonry Purposes
6. C260 - Standard Specification for Air-Entraining Admixtures for Concrete
7. C270 - Standard Specification for Mortar for Unit Masonry
8. C404 - Standard Specification for Aggregates for Masonry Grout
9. C476 - Standard Specification for Grout for Masonry
10. C595 - Standard Specification for Blended Hydraulic Cement
11. C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
12. C979 - Standard Specification for Pigments for Integrally Colored Concrete
13. C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for use in Concrete and Mortars.
14. C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength
15. C1093 - Standard Practice for Accreditation of Testing Agencies for Unit Masonry.
16. C1157 - Standard Performance Specification for Hydraulic Cement.
17. C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.

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18. C1384 - Standard Specification for Admixtures for Masonry Mortars
19. C1329 - Standard Specification for Motor Cement
20. C1019 - Standard Test Method for Sampling and Testing Grout
21. C1586 - Standard Guide for Quality Assurance of Mortar.
22. C1714 - Standard Specification for Pre-blended Dry Mortar Mix for Unit Masonry.
23. E514 - Standard Test Method for Water Penetration and Leakage Through Masonry.

B. International Masonry Industry All-Weather Council (IMIAC):

1. Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
2. Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

C. National Concrete Masonry Association (NCMA):

1. TEK Bulletin #8-2A - Removal of Stains from Concrete Masonry.
2. TEK Bulletin #8-3A - Control and Removal of Efflorescence..

D. 2020 Building Code of New York State (NYSBC).

E. International Building Code, 2018 Edition (IBC).

1.05 DESCRIPTION

- A. Where questions of compliance with the requirements of this Section arise, the specifications for mortar properties shall take precedence over the specification for mortar proportions.
- B. No change shall be made in the proportions established for mortar approved under the specifications for mortar properties nor shall material with different physical characteristics be utilized in mortar used in the Work unless compliance with the specifications for mortar properties are re-established by Shop Drawing data submission to Engineer.
- C. Two different air-entraining materials shall not be combined in mortar or grout.
- D. Sustainable Design Requirements:
 1. Recycled Content of Mortar and Masonry Grout Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 15 percent.
- E. Project-specific system/ design requirements will be provided in the Contract, if necessary, to supplement requirements given herein or Contract Drawings.

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1.06 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- C. The Contractor shall engage an independent testing agency to conduct tests specified herein and as follows:
 - 1. Mortar: Mortar tests shall be performed in accordance with ASTM C270.
 - 2. Grout: Grout tests shall be performed in accordance with ASTM C1019.
- D. Requirements of Regulatory Agencies: Wherever a fire-resistance classification is shown or scheduled for unit masonry construction (4-hour, 3-hour and similar designations), proportion mortar and masonry grouts to comply with the requirements established by UL and other governing authorities having jurisdiction at the Project Site

1.07 SUBMITTALS

- A. The Contractor shall submit the Shop Drawings for the approval of the Engineer. Submittals shall include, but not be limited to:
 - 1. Product Data: Manufacturer's specifications and installation instructions for proprietary materials.
 - 2. Certificates: Notarized certificates that the following comply with the specified requirements:
 - a. Portland Cement
 - b. Hydrated lime
 - c. Mortar and grout aggregates
 - 3. Design Mix: Certified design mix for mortar and grout.
 - 4. Test Results: Results of mortar and grout tests as specified herein and as specified in referenced standards.
 - 5. Samples:
 - a. Each type of colored mortar in metal channels at least 6-inches long, showing the range of color that can be expected in the finished Work.
 - b. Complete selection of standard and custom colors of epoxy grout used for pointing mortar, for final selection by Engineer.

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- c. Label samples to indicate type and amount of colorant used. Engineer’s review will be for color only. Compliance with all other requirements is the responsibility of Contractor.
 - 6. Construction: Weight slips for grout materials at time of delivery.
 - 7. Schedule of locations where each mortar and grout type will be used in the Work.
 - B. Sustainable Design Submittals:
 - 1. Environmental Materials Reporting Form (EMRF) Recycled Content. Provide the following information:
 - a. Name of Product and Manufacturer.
 - b. Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
 - c. The percentage (by weight) of post-consumer and pre-consumer recycled content.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Delivery of Materials:
 - 1. Materials shall not be delivered to the Site before the time of installation.
 - 2. Materials delivered and stored at the Site shall be from approved manufacturers and sources only.
 - 3. Materials shall be delivered in sufficient quantities to allow continuity of the Work.
 - B. Storage of Materials:
 - 1. Materials shall be stored in original, undamaged containers with manufacturer's labels and seals intact.
 - 2. Cement shall be stored in weathertight containers that exclude moisture and contaminants.
 - 3. Hydrated lime shall be stored in weathertight containers that exclude moisture and contaminants.
 - 4. Aggregates shall be kept clean and free from other materials during transportation and handling. Aggregate shall be stockpiled in a manner to prevent segregation.
 - 5. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the Site before being incorporated into construction systems.
 - C. Handling of Materials:
 - 1. Materials shall be handled in such a manner to avoid damage or breakage.

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2. Materials shall not be exposed to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the Site and shall not be incorporated into the Work.
3. Materials shall be handled in such a manner to prevent inclusion of contaminants.
4. Packages or containers shall not be opened until all preparatory Work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Mortar and masonry grout materials shall be as manufactured by:
1. Spec Mix, Inc., Eagan, MN; www.specmix.com.
 2. The Quikrete Companies, Atlanta, GA; www.quikrete.com.
 3. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Portland Cement:
1. Provide Type I or III Portland Cement that conforms to the requirements of ASTM C150.
 2. Provide nonstaining Portland Cement of natural color or of the color required to be compatible with the required colored mortar pigment selected by Engineer.
- B. Hydrated Lime: Provide Type S hydrated lime that conforms to the requirements of ASTM C207.
- C. Sand for Mortar: Provide natural sand that conforms to the requirements of the following:
1. ASTM C144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.
 2. White Mortar Aggregates: Provide natural white sand or ground white stone for Portland cement-lime mortars, as required for compatibility with mortar colors selected by Engineer.
 3. Colored Mortar Aggregates: Provide ground marble, granite or other sound stone, as required to match the sample approved by Engineer for Portland Cement-lime mortars.

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- D. Aggregates for Grout: Provide fine and coarse aggregates that conform to the requirements of ASTM C404, ASTM C476.
 - E. Coloring Additive: A mineral-oxide pigment, harmless to mortar set and strength shall be provided. Colors shall be as selected by the Engineer.
 - F. Epoxy Pointing Mortar:
 - 1. Provide a two-component non-sag epoxy resin and hardener with mineral filler complying with ANSI A118.3.
 - 2. Colors: Complete selection of standard and custom colors for final selection by Engineer.
 - 3. Provide epoxy mortar capable of water-cleanup during installation but which, after curing, is waterproof.
 - G. Water: Provide clean and potable water from approved sources.
- 2.03 FABRICATION / ASSEMBLING / FINISHES
- A. Mixes for Mortar: Provide mortar that conforms to the requirements of ASTM C270, except as modified herein, and of the type and color specified in the Contract Drawings.
 - 1. Provide a cement-lime mortar; masonry cement mortars are not acceptable.
 - 2. Calcium chlorides are not permitted.
 - 3. Admixtures shall not be used unless specifically directed by the Contract Drawings.
 - 4. Grout: Provide grout that conforms to the requirements of ASTM C476, ASTM C404 for fine or coarse grout.
 - B. Mixes for Grout: Provide grout that conforms to the requirements of ASTM C476, ASTM C404 for fine or coarse grout.
 - 1. Fine grout shall be used for filling spaces with openings less than 2 inches.
 - 2. Course grout shall be used for filling spaces with openings greater than 2 inches.
 - C. Measurement of Materials:
 - 1. Cement and Hydrated Lime: Batched by the bag.
 - 2. Sand: Batched by volume in suitably calibrated containers. Make allowance for bulking and consolidation, and for weight per cubic foot of contained moisture.
 - 3. Proportion of Volumetric Mixtures: One 94-pound sack of Portland cement and one 50-pound sack of hydrated lime constitute nominal one cubic foot.
 - 4. Shovel measurement: Not permitted.
 - D. Mortar:

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1. All cementitious materials and aggregates shall be mixed between three and five minutes in a mechanical batch mixer with a sufficient amount of water to produce a workable consistency. Mortar shall not be hand mixed.
2. When required, cement and pigment shall be mixed for colored mortar prior to mixing in mortar. The maximum percentage by weight of cement for pigment shall be limited to 10 percent.
3. Limit batch size to avoid retempering.
4. Mortar that has begun to stiffen or is not used within two hours after initial mixing shall not be used.
5. The mixer drum shall be completely emptied before recharging the next batch.

E. Mortar Temperature:

1. For temperatures below 40 degrees F mortar materials shall be heated to protect both mortar and completed Work from freezing.
2. When outside air temperature is:
 - a. 25 to 40 degrees F: Mixing water and sand shall be heated to produce mortar temperature between 40 and 120 degrees F. Temperatures of mortar on boards shall be maintained above freezing.
 - b. Below 25 degrees F: Masonry shall not be installed.
3. Ideal mortar temperature is 70 degrees F \pm 10 degrees F. Mixing temperature selected shall be maintained within 10 degrees F.
4. Antifreeze compounds or calcium chloride in mortars shall not be used to lower the freezing point or accelerate setting.

F. Grout: Grout shall be mixed in accordance with the requirements of ASTM C476.

G. Epoxy Pointing Mortar: Epoxy pointing mortar shall be mixed in strict accordance with the manufacturer's instructions.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Prior to placing mortar or grout, remove laitance, loose aggregate and any substance that may prevent mortar or grout from bonding to the foundation.

3.02 INSTALLATION

A. Installation of mortar and grout shall be in accordance with the requirements of Section 04 22 00 – Concrete Unit Masonry

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- B. Installation of epoxy grout shall be in accordance with the manufacturer's instructions and recommendations.
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Mortar shall be prepared and tested for preconstruction and construction evaluation in accordance with the requirements of ASTM C780. Specimens for construction evaluation shall be prepared a minimum of every 500 square feet of masonry construction.
 - B. Grout shall be prepared and tested for construction evaluation in accordance with the requirements specified in ASTM C1019 and NYCBC Section BC 2104. Specimens shall be prepared a minimum of every 100 cubic feet of grout placed.
- 3.04 STARTUP / DEMONSTRATION
- A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
- A. If any adjustments are needed after installation, the Contractor shall make those adjustments with care, to maintain consistency with the Work completed.
 - B. It is the Contractor's responsibility to protect all completed Work in and around the site. Any damage done to the completed Work during construction shall be fixed at no extra charge to the City.
 - C. The Contractor is also responsible for cleaning up after the Work under this Section has been completed, to maintain a clean and neat site.

END OF SECTION

SECTION 04 05 00 – COMMON WORK RESULT FOR MASONRY
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NO TEXT ON THIS PAGE

SECTION 04 22 00 – CONCRETE UNIT MASONRY
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Unit masonry as specified herein includes, but is not limited to, face brick, structural glazed brick, concrete masonry units, ground face concrete masonry units, glazed structural tile, reinforcement, anchorage, and all accessories and appurtenances.
- B. Unit masonry shall be provided as indicated on the Contract Drawings, specified herein, or as required for a complete installation.
- C. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

SECTION 04 22 00 – CONCRETE UNIT MASONRY
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1.03 RELATED SECTIONS

- A. Section 03 30 00 - Cast-In-Place Concrete
- B. Section 04 05 00 - Common Work Results for Masonry
- C. Section 05 50 00 - Metal Fabrications
- D. Section 07 62 00 - Sheet Metal Flashing and Trim

1.04 REFERENCES

A. American Concrete Institute (ACI):

- 1. 216.1 - Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies.
- 2. 318 - Building Code Requirements for Structural Concrete and Commentary
- 3. SP-66 - Detailing Manual.

B. ASTM.

- 1. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- 2. A167 - Standard Specification for Stainless and Heat-Resisting Chromium-nickel Steel Plate, Sheet, and Strip
- 3. A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
- 4. A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- 5. A641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
- 6. A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- 7. A951 - Standard Specification for Steel Wire for Masonry Joint Reinforcement
- 8. A1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- 9. C55 - Standard Specification for Concrete Building Brick
- 10. C90 - Standard Specification for Load-Bearing Concrete Masonry Units
- 11. C126 - Standard Specification for Ceramic glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units

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- 12. C129 - Standard Specification for Nonloadbearing Concrete Masonry Units
 - 13. C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale)
 - 14. C270 - Standard Specification for Mortar for Unit Masonry.
 - 15. C476 - Standard Specification for Grout for Masonry.
 - 16. C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
 - 17. C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
 - 18. C1384 - Standard Specification for Admixtures for Masonry Mortars
- C. Masonry Standards Joint Committee (MSJC):
- 1. TMS 402/ACI 530/ASCE 5 - Building Code Requirements for Masonry Structures
 - 2. TMS 602/ACI 530.1/ASCE 6 - Specification for Masonry Structures
- D. 2020 Building Code of New York State (NYSBC).
- E. International Building Code, 2018 Edition (IBC).

1.05 DESCRIPTION

- A. Provide masonry accessories of sizes, dimensions and configurations coordinated with unit masonry construction system component sizes, dimensions and configurations.
- B. Where continuous horizontal cavity wall reinforcement is specified as providing restraint for cavity wall insulation, coordinate dimensions with thickness of cavity wall insulation specified for proper clearances.
- C. Where structural steel will be provided with fireproofing do not use welded-on channel slots. Coordinate required offset of welded-on wire ties with depth of fireproofing.
- D. Concrete Masonry Units: Limit total moisture absorption until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity as reported by the United States Weather Bureau Station nearest the Site and the corresponding percentage of total linear drying shrinkage of the concrete masonry units.
- E. Comply with ASTM C90 Climatic Map establishing criteria for percent annual mean relative humidity.

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- F. Structural elements of masonry shall conform to the requirements of TMS 402/ ACI 530/ASCE 5 for materials and installation.
- G. Masonry materials and installation shall conform to the requirements of TMS 602/ACI 530.1/ASCE 6.
- H. Sustainable Design Requirements:
 - 1. Recycled Content of Unit Masonry: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 15 percent.
 - 2. Regional Materials: Unit Masonry shall be manufactured within 500 miles of Project site, from materials that have been extracted, harvested, or recovered within 500 miles of Project site.
- I. Project-specific system design requirements will be provided in the Contract Drawings, if necessary, to supplement requirements given herein.

1.06 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Wherever a fire-resistance classification is shown or scheduled for unit masonry construction (4-hour, 3-hour and similar designations), provide masonry accessories, masonry units and unit masonry construction complying with the requirements established by UL and other governing authorities having jurisdiction at the Project Site.
- B. Source Quality Control: Provide all metal sheet, wire, plate and bar stock masonry accessories from the same manufacturer.
- C. Sample Panel: The Contractor shall erect a composite 4 feet long by 3 feet high sample panel.
 - 1. The sample panel shall include facing veneer, bond pattern, mortar color, tooled joints, insulation, reinforcing, and backup.
 - 2. Upon approval, the sample panel shall remain in place for the duration of masonry construction and shall be used as a basis of comparison for all masonry Work.
 - 3. After final approval of finished masonry Work by the Engineer, the Contractor shall demolish the sample panel, and shall perform all site restoration Work.
 - 4. Masonry Work shall not be started until the specified sample panel has been approved. The sample panel shall be used as a standard for comparison of masonry Work. Sample panel shall be destroyed only after all masonry Work has been completed and approved by the Engineer.

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings and other material for the approval of the Engineer. Submittals shall include, but not be limited to:
 - 1. Catalog cuts, drawings and reference materials.

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2. Samples: The Contractor shall submit three samples each of face brick, structural glazed brick, glazed structural tile and decorative concrete masonry units that are representative of the full range of color, shading and texture of the material to be provided.
 3. Test Reports: The Contractor shall submit material test reports or manufacturer's certificate of compliance for face brick, structural glazed brick, concrete masonry units, and glazed structural tile.
- B. Shop Drawings: Submit for approval the following:
1. Copies of manufacturer's specifications and installation instructions for each masonry accessory required. Include data substantiating that materials comply with specified requirements.
 2. Provide drawings and material schedules showing all dimensions and sizes of masonry accessories coordinated with unit masonry construction Work, and other Work in which masonry accessories will be embedded, be supported from, or restrain.
 3. Indicate methods for identifying and coordinating, at the Site, the location and accurate placement of each masonry accessory in unit masonry construction as the Work progresses. Indicate by letter of transmittal that items which must be installed in the shop have been received in time for proper sequencing of the Work to avoid delays.
 4. Explanation of where each masonry accessory will be used in the Work, quantities purchased and intended spacings indicating compliance with code requirements.
 5. Complete layout of all masonry Work showing modular planning, coursing, and all special shapes to be used in the Work. Show all details for each condition encountered in the Work. Provide plan and elevation views drawn at 1/4-inch scale and details drawn at 1-1/2-inch scale. Show all items required to be built into unit masonry construction.
 6. Masonry control joint locations and details.
 7. Drawings showing the location, extent and accurate configuration and profile of all items shown, specified and required by this and other Sections to be built into the unit masonry construction as the Work progresses. Provide elevations drawn at 1/4-inch scale and all details drawn at 1-1/2-inch scale.
 8. Drawings for fabrication, bending, and placement of reinforcing bars. Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcing for unit masonry construction.
- C. Sustainable Design Submittals:
1. Environmental Materials Reporting Form (EMRF) Recycled Content and Regional Materials. Provide the following information:

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- a. Name of Product and Manufacturer.
- b. Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
- c. The percentage (by weight) of post-consumer and pre-consumer recycled content for the submitted product.
- d. Indicate the location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. General: All products and materials shall be delivered, stored, and handled as follows.
- B. Delivery and Storage: Masonry materials delivered and stored at the site shall be from approved manufacturers and sources only.
- C. Masonry Units:
 1. Masonry units shall be handled in a manner which prevents undue breakage or chipping.
 2. Face brick and concrete masonry units shall be unloaded using brick clamps.
 3. All masonry units shall be stored on platforms under shelter or in another approved manner so as to protect these materials from soil and weather.
- D. Rejection: Face bricks, structural glazed bricks, glazed structural tile, concrete masonry units, and ground face concrete masonry units that are warped, cracked or of inferior quality will be rejected. Such items shall be removed from the site and not offered again for inspection.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers of unit masonry items shall be:
 1. Taylor Concrete Products, Inc., Watertown, NY; www.taylorconcrete.com
 2. Kingston Block & Masonry, Kingston, NY; www.kingstonblock.com
 3. Cemex, Houston, TX; www.cemexusa.com
 4. Or approved equal.
- B. Partition Top Anchors (PTA):

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1. Hohmann & Barnard Inc., Hauppauge, NY; www.h-b.com
 2. Blok-Lok, Woodbridge, ON, Canada; www.blok-lok.com
 3. Heckmann Building Products, Norwalk, CT; www.heckmannanchors.com
 4. Or approved equal.
- C. Compressible Fillers, Expansion and Control Joints:
1. Hohmann & Barnard Inc., Hauppauge, NY; www.h-b.com
 2. Heckmann Building Products, Norwalk, CT; www.heckmannanchors.com
 3. Or approved equal.
- D. Masonry Ties and Horizontal Joint Reinforcement:
1. Hohmann & Barnard Inc., Hauppauge, NY; www.h-b.com
 2. Blok-Lok, Woodbridge, ON, Canada; www.blok-lok.com
 3. Heckmann Building Products, Norwalk, CT; www.heckmannanchors.com
 4. Or approved equal.
- 2.02 MATERIALS / EQUIPMENT
- A. Face Brick: Face brick shall conform to ASTM C216 Grade SW Type FBX.
- B. Structural Glazed Brick: Structural glazed brick shall meet the requirements of ASTM C126 for finish properties and shall conform to ASTM C216 Grade SW Type FBX for durability. Structural glazed brick shall meet UL requirements for zero flame spread and zero smoke developed. Face dimensions and custom colors shall be as specified in the Contract Drawings.
- C. Concrete Masonry Units: Concrete masonry units shall be manufactured with lightweight aggregate and shall be provided as follows:
1. Hollow Load-Bearing Units: Hollow units shall conform to ASTM C90, Type I for exterior walls, foundation walls, interior load-bearing and nonload-bearing walls and partitions. Units shall have a compressive strength as indicated on the Contract Drawings.
 2. Solid Load-Bearing Units: Solid load-bearing units shall conform to ASTM C90, Type I, except units exposed to weather shall be Grade U. Solid units shall be provided for masonry bearing under structural framing members and for fireproofing of steel structural members. Units shall have a compressive strength as indicated on the Contract Drawings.
 3. Special Shapes: Special shapes, such as closures, header units, and jamb units shall be provided as necessary to complete the Work. Special shape units shall conform to the applicable provisions for the units with which they are used.
- D. Glazed Structural Tile: Glazed structural facing tile shall be of Selected Size Quality (Grade SS ground ends) in size as specified in the Contract Drawings, and shall conform to the requirements of ASTM C126, Type I. Glazed structural tile

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walls and partitions shall be provided with bullnose shapes for external corners, sills, and jambs, and shall have coved base courses.

- E. Metal Accessories:
1. For interior walls and partitions, and as required to secure masonry to adjoining construction, the Contractor shall provide hot-dipped galvanized metal anchors, ties and reinforcements conforming to ASTM A153/A153M, Class B2 that are galvanized after cutting.
 2. For exterior walls, the Contractor shall provide Type 316 stainless steel for anchors, anchor slots, ties and horizontal reinforcement.
- F. Deformed reinforcing bars shall conform to ASTM A615/A615M Grade 60.
- G. Horizontal Joint Reinforcement: Horizontal reinforcing shall be 2 inches less in width than the actual thickness of the wall or partition in which it is to be placed.
1. Solid interior or exterior masonry walls: Walls shall be reinforced horizontally with truss type, standard 9 gauge (.148-inch) by 9 gauge (.148-inch). Reinforcing shall be spaced at 16-inch centers vertically.
 2. Exterior Cavity Walls: Walls shall be reinforced horizontally with truss type 9 gauge (.148-inch) by 9 gauge (.148-inch) reinforcing in the inner wythe with rectangular pintle and seismic clip to continuous 9 gauge wire reinforcing in the outer wythe. Reinforcing system shall include insulation clip washers. Reinforcing shall be spaced at a minimum of 16-inch centers vertically.
 3. Corners: Corners shall be reinforced with the same type as wall reinforcing, standard 9 gauge (.148 inch) by 9 gauge (.148-inch), spaced in the same course as the wall reinforcing.
 4. Intersections: Intersections between walls and partitions shall be reinforced horizontally with same type as wall reinforcing, standard 9 gauge (.148-inch) by 9 gauge (.148-inch), spaced in the same course as the wall reinforcing.
- H. Rebar Positioners: The Contractor shall provide vertical and horizontal rebar positioners spaced at 48-inch centers maximum.
- I. Dovetail Anchors: Dovetail anchors shall be 1/8-inch by 1-inch by 2-inch with 3/16-inch diameter wire.
- J. Rigid Anchors: Rigid steel anchors shall be 1 inch wide (minimum), 3/16 inch thick, and 18 inches long between bent ends. Each end shall be bent down 3 inches (minimum) into mortar filled masonry cells.
- K. Column Anchors: Masonry shall be anchored to columns at 24-inch centers with stainless steel anchors.
- L. Metal Fastenings: Bolts, metal wall plugs or other approved metal fastenings for securing items to masonry and elsewhere shall be provided and installed as necessary.

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- M. Weep Holes: Weep holes shall be provided where shown, and shall consist of clear polyethylene, medium density plastic, rectangular tubes, 3/8 inch wide, 1-1/2 inches high, 3-1/2 inches deep.
 - N. Weep Vents: Weep vents shall be provided where shown, and shall be an offset T-shaped vent injection molded from flexible polyvinyl chloride. The vents shall be provided in a custom size and color to match brick and mortar as specified in the Contract Drawings.
 - O. Mortar Net: Mortar net shall be of high density polyethylene and shall be one inch nominal thickness.
 - P. Mortar Materials: Mortar materials shall be in accordance with Section 04 05 00 – Common Work Results for Masonry.
- 2.03 FABRICATION / ASSEMBLING / FINISHES
- A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

1. Environmental Conditions: Materials and surrounding air temperature shall be maintained at a minimum 50 degrees F prior to, during, and 72 hours after completion of masonry Work. Masonry shall not be erected when the ambient temperature is below 32 degrees F with a rising or falling temperature, or when there is a probability of such a condition existing within 48 hours, unless special provisions are made for heating the materials and protecting the Work from freezing. Work will not be permitted with or on frozen materials. Use of masonry units having a film of frost on their surfaces will not be permitted.

3.02 INSTALLATION

A. General

1. Build chases and recesses as shown or required by others. Provide not less than 8 inches of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.
2. Leave openings for equipment, piping, ducts, and other items to be installed subsequent to starting of unit masonry construction. After installation of said items, complete unit masonry construction to match Work immediately adjacent to openings.
3. Use full size units without cutting wherever possible. Provide special unit masonry shapes for all transitions and intersections. Do not field-cut

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special shapes from regular unit masonry shapes or substitute other alternatives for the use of special unit masonry shapes.

4. Build interior masonry walls, visible from both sides in the finished Work, using two wythes of masonry. Glazed structural tile and filled ground face masonry units shall be continuous over the entire plan of the wall including walls which continue behind fixtures, equipment, furniture, lockers and similar items.
5. Coursing: Masonry walls shall be carried up level and plumb all around. Do not carry up one section of the walls in advance of the others, unless specifically approved. Heights of masonry shall be checked with an instrument at each floor, and at sills and heads of openings, to maintain the level of walls. Masonry courses shall be maintained to a uniform dimension. Vertical and horizontal joints shall be formed to a uniform thickness. Concrete masonry units shall be laid in running bond. One unit and one mortar joint shall be coursed to equal 8 inches. Mortar joints shall be tooled to be concave.
6. Placing and Bonding: Solid masonry units shall be placed in a full bed of mortar, with full head joints, and shall be uniformly jointed with other Work.
 - a. Mortar Removal: Excess mortar shall be removed as the installation progresses.
 - b. Corners and Intersections: Intersections and external corners shall be interlocked. Horizontal reinforcing shall be spliced at intersections and corners with a 6-inch overlap of side rods.
 - c. Adjustment: Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, mortar shall be removed and replaced with new mortar.
 - d. Cutting: Job site cutting of exposed masonry units shall be performed with power masonry saws to provide straight, clean, unchipped edges. All glazed brick and glazed structural tile shall be cut using a continuous rim wet cutting diamond blade suitable for cutting these material types. Broken masonry unit corners or edges shall not be allowed.
 - e. Flush Joints: Mortar joints shall be cut flush where ceramic wall tile is to be installed.
 - f. Control Joints: Nonload-bearing masonry partitions shall be isolated from vertical and horizontal structural framing members with control joints.
 - g. Placing Metalwork: Structural steelwork, bolts, anchors, inserts, plugs, ties, lintels and miscellaneous metalwork specified in other Sections, shall be placed and built into position as the installation progresses.

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- h. Extent of Masonry: Masonry partitions and walls shall extend from the floor to the bottom of floor or roof construction above, unless otherwise indicated.
 - i. Bonding and Anchoring: Walls and partitions shall be structurally bonded or anchored to each other and to concrete walls, beams, columns, and wall and roof diaphragms. Nonload-bearing walls and partitions shall be anchored to construction above in a manner that provides appropriate lateral stability and vertical movement of floor and roof construction above.
 - j. Preparation for New Work: Unfinished masonry shall be stepped back for joining with new masonry. Tothing will not be permitted.
- 7. Weeps and Mortar Nets: Weep holes shall be installed in veneer at bottom of walls at spacing indicated on the Contract Drawings or specified herein. Mortar nets shall be installed at bottom of cavities to maintain open weeps.
- 8. Horizontal Joint Reinforcement and Anchorages: Horizontal joint reinforcement and anchorages shall be constructed as follows:
 - a. Reinforcement Spacing: Horizontal joint reinforcement shall be spaced at a minimum of 16 inches on center, measured vertically.
 - b. Reinforcement Placing: Masonry joint reinforcement shall be placed in the first horizontal joint above and below openings. Reinforcement shall be extended a minimum of 16 inches on each side of openings. Joint reinforcement shall be placed continuously in the first joint below the top of all walls. Joint reinforcement ends shall be lapped a minimum of 6 inches. Joints at corners and intersections shall be reinforced with strap anchors at 16-inch centers.
 - c. Veneer Anchorage: Dovetail anchorage shall be provided in concrete for bonding veneer at a maximum of 16-inch centers vertically and horizontally. Anchors shall be placed within 8 inches of all openings.
- 9. Waterproofing Course: A waterproofing course of flashing as specified in Section 07 62 00 - Sheet Metal Flashing and Trim, and as shown on the Contract Drawings, and at the following locations: at the bottom of masonry walls, at points where roofs adjoin exterior masonry walls, at lintels, below louver sills and window sills, and at other locations shown on the Contract Drawings.
 - a. Surface Condition: Surfaces to receive waterproofing course shall be smooth, dry, and free from loose material before applying the waterproofing course.
 - b. Application: Flashing shall project 2 inch from the outside face of the wall and shall be built into the walls as indicated. Flashing shall

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extend a minimum of 8 inches beyond the line of the jamb, with the ends turned up 2 inches to form a pan at the heads and sills of louver and window openings, and at the heads of door openings.

10. Control Joints: Preformed control joint material shall be installed in continuous lengths. Butt and corner joints shall be sealed in accordance with manufacturer's instructions. Control joints shall be sized as indicated on the Contract Drawings. Horizontal joint reinforcement shall not continue through control joints.
 11. Built-In Work: Metal door and window frames, fabricated metal frames, louvered openings, anchor bolts, pipes, ducts, conduits, plates and items specified in other sections shall be built in as the Work progresses. Items shall be built in plumb and level. Frame voids shall be filled solid with grout. Adjacent masonry cores shall be filled with grout for a minimum of 12 inches beyond the framed openings. Do not build in organic materials subject to deterioration.
 12. Tolerances: Masonry Work shall meet the tolerances specified in ACI 530.1/ASCE 6-95/TMS 602.
 13. Cutting and Fitting: Masonry shall be cut and fit for chases, pipes, conduit, sleeves, grounds, and other items specified elsewhere. The Work shall be coordinated to provide correct size, shape, and location.
- B. Laying Masonry Walls, General
1. Mortar Types: Unless otherwise indicated, use mortar as specified in Section 04 05 00 – Common Work Results for Masonry and as follows:
 - a. Use Type M mortar for all structural reinforced masonry walls.
 - b. Use Type S mortar for all exterior and all load-bearing walls.
 - c. Use Type N mortar for all interior non-load-bearing walls.
 - d. Use epoxy pointing mortar for all glazed structural tile and all filled ground face concrete masonry unit joints.
 - e. Use grout fill for structural requirements and for grouting reinforcing steel in unit masonry construction.
 - f. Do not use mortar which has begun to set or if more than 2 hour has elapsed since initial mixing. Retemper mortar during the 2-hour period only as required to restore workability.
 2. Lay out walls in advance for accurate spacing of surface pattern bond with uniform joint widths and to properly locate openings, masonry control joints, returns and offsets. Avoid the use of less than half size units at corners, jambs and wherever possible at other locations.
 3. Lay-up walls plumb and true to comply with specified tolerances, with courses level, accurately spaced and coordinated with other Work.
 4. Mortar Color and Texture:

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- a. Lay all concrete unit masonry using mortar of natural color.
 - b. Lay all glazed structural tile and filled ground face concrete unit masonry Work using mortar of natural color. Rake as specified to receive pointing mortar.
 - c. Lay all structural glazed brick using mortar colors selected by Engineer at time of sample panel erection.
5. Hand select glazed structural tile and ground face masonry units to assure uniform continuity of finished surfaces from unit to unit. Glazed structural tile with misaligned face ceramic glazing shall be permanently removed from the Site.
- C. Face Brick
1. Bond: Brickwork shall be laid in common bond, unless indicated otherwise on the Contract Drawings.
 2. Joints: All joints between bricks shall be completely filled with mortar. Bed joints shall comprise a thick layer of mortar, smoothed or furrowed lightly. Head joints shall be formed by applying, to the brick to be laid, a full coat of mortar on the entire end, or on the entire side, as the case requires, and then shoving the mortar-covered end or side of the brick tightly against the brick laid previously.
 3. Closure Brick: Closure brick shall be laid with a bed joint and with head joints. Brick shall be carefully placed so as not to disturb the brick previously laid.
 4. Test: Clay or shale brick shall be tested daily on the job, prior to laying, to determine if they will require wetting.
- D. Structural Glazed Brick
1. Bond: Structural glazed brick shall be laid in bond as indicated on the Contract Drawings.
 2. Joints: All joints between bricks shall be completely filled with mortar. Bed joints shall comprise a thick layer of mortar, smoothed or furrowed lightly. Head joints shall be formed by applying, to the brick to be laid, a full coat of mortar on the entire end, or on the entire side, as the case requires, and then shoving the mortar-covered end or side of the brick tightly against the brick laid previously.
 3. Joint Treatment: Mortar joints shall be tooled or struck when they are thumb print hard. All mortar joints in structural glazed brick shall be tooled concave using a non-metallic tool of a size as specified in the Contract Drawings.
 4. Special Joints: Special joints in structural glazed brick shall consist of control joints, which shall be constructed as detailed and specified, and accent joints, which shall have mortar raked back 2 inch, and shall then be

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caulked to match the appearance of control joints. Control and accent joints shall be installed where shown on the Contract Drawings.

5. Weep and Mortar Nets: Provide rows of weep vents in the head joints of the first and third courses of masonry immediately above all concealed flashings. Space weep vents 16 inches on centers horizontally. Provide rows 8 inches on center vertically. Stagger rows.
6. Horizontal Joint Reinforcement and Anchorages
 - a. Reinforcement Spacing: Continuous horizontal joint reinforcement shall be spaced as follows:
 - 1) For multi-wythe walls, solid or cavity, where continuous horizontal reinforcing also acts as structural bond or tie between wythes, space reinforcing as required by governing authorities having jurisdiction at the Project Site, but not more than 24-inches on centers, vertically.
 - 2) For single wythe walls, space reinforcing at 16 inches on centers vertically.
 - 3) For parapets, space reinforcing at 8 inches on centers vertically for large square structural glazed brick.
7. Reinforce all walls with continuous horizontal joint reinforcement unless specifically noted or specified to be omitted.
8. Waterproofing Course:
 - a. Application: Flashing shall terminate flush with outside face of walls and shall be built into the walls as indicated. Flashing shall extend a minimum of 8 inches beyond the line of the jamb, with the ends turned up 2 inches to form a pan at the heads and sills of louvers and window openings, and at the heads of door openings in masonry.
 - b. Place through-wall flashing on bed of mortar and cover with mortar.
 - c. Interlock metal 3-way sawtooth flashings and overlap at seams as recommended by the manufacturer, with minimum lap of 4 inches.
9. Lintels and Bond Beams
 - a. Provide stainless steel lintels where shown and as specified in Section 05 50 00 - Metal Fabrications.
 - b. Provide masonry lintels and bond beams where shown and wherever openings of 16 inches or more are shown without structural stainless steel lintels. Provide formed-in-place masonry lintels and bond beams. Temporarily support formed-in-place lintels and bond beams.
 - 1) Unless otherwise shown, provide one horizontal No. 6 deformed reinforcing bar for each 4 inches of wall thickness.

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- 2) For hollow masonry unit walls, use specially formed AU@ shaped lintel and bond beam units with reinforcing bars placed as shown, filled with grout as specified in Section 04 05 00 – Common Work Results Masonry.
 - c. Provide minimum bearing at each jamb, of 4 inches for openings less than 6 feet wide, and 8 inches for wider openings.
 - d. On concrete and clay unit masonry walls where pattern bond remains visually exposed, increase minimum bearing of masonry lintels to maintain continuity of joint pattern of wall and install to be indistinguishable from surrounding masonry.
 10. Collar Joints: Fill the vertical space between wythes solidly with mortar by parging the in-place wythe and shoving units into the parging, for all exterior multi-wythe walls (except do not fill cavity of cavity wall construction) and interior multi-wythe walls and partitions.
 11. Structural Glazed Brick Bond: Structural glazed brick shall be laid in bond patterns as follows:
 - a. Norman (6S Series): 1/3 running bond; 4-inch nominal offset between courses above and below.
 - b. Large Squares (6Y Series): Stacked bond; vertical joints in each course aligned with joints in course above and below.
- E. Concrete Masonry Units
 1. Bed and Head Joints: The first course of concrete masonry units shall be laid in a full bed of mortar for the full width of the unit. Bed joints of concrete masonry units shall be formed by applying the mortar to the entire top surfaces of the inner and outer face shells, and head joints shall be formed by applying the mortar for a width of about 1 inch to the ends of the adjoining units laid previously. Joints shall be mortared smooth, not furrowed, and of such thickness that mortar will be forced out of the joints as the units are being placed in position. Where anchors, bolts, reinforcing and ties occur within the cells of the units, such cells shall be filled solid with grout as the Work progresses.
 2. Concrete Brick: Concrete brick shall be used for topping out walls under sloping slabs, distributing concentrated loads, backing brick headers, and elsewhere as indicated.
 3. Unit Condition: Concrete masonry units shall be placed dry with no previous wetting.
- F. Glazed Structural Tile
 1. Glazed Structural Tile: Glazed structural tile shall be installed in accordance with the general requirements for masonry installation specified herein. Mortar joints in glazed structural tile walls shall be raked back a minimum of 1/4 inch, allowed to cure for a minimum of 24 hours,

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and then shall be pointed using an epoxy grout as specified in Section 04 05 00 – Common Work Results for Masonry.

G. Cavity Walls

1. **Construction:** Cavity walls shall be constructed using a masonry backing separated from a masonry exterior wythe by a continuous air space and insulation as indicated. The two wythes shall be securely tied together with a seismic horizontal joint reinforcement system, placed as indicated.
2. **Insulation:** Insulation board shall be secured to the backup construction using insulation clip washers as specified to hold the insulation in place. The insulation board shall be job fabricated as necessary, using a knife or saw, to fit around obstructions, such as reinforcing and vents. Joints between the obstructions and the insulation shall be sealed with mastic. All joints in the insulation shall be shoved tight. Insulation shall be installed in strict compliance with the manufacturer's recommendations.
3. **Cavity:** The space between the wythes shall be kept clear and clean of mortar droppings by use of wood strips, slightly narrower than the cavity, laid on horizontal reinforcing. The wood strips shall be lifted out and cleaned when horizontal joint reinforcing is placed. Mortar shall not be allowed to drop into cavity while cleaning wood strips. Weep holes shall be provided at the base of the wall cavity, where the cavity is closed over with masonry or flashing, and at other locations as indicated. A continuous mortar net shall be set on top of the base flashing.

H. Reinforced Masonry

1. **Setting Masonry:** Masonry for vertically reinforced masonry units shall be laid with core cells vertically aligned. Core cells shall be clear of mortar and unobstructed. Mortar shall be placed in masonry unit bed joints and shall be back 1/4 inch from the edge of the unit grout spaces, and beveled back and upward. Mortar shall be cured 7 days before placing grout.
2. **Reinforcing:** Concrete masonry unit cores shall be reinforced with reinforcement bars and grout as shown. Vertical reinforcement shall be kept in position using rebar positioners at top and bottom of cells and at intervals not exceeding 48 inches. Reinforcement shall be spliced in accordance with ACI 530/ASCE 5-95/TMS 402, but splice lap shall be not less than 24 bar diameters.
3. **Grouting:** Masonry unit surfaces in contact with grout shall be wetted just prior to grout placement. Spaces less than 2 inches in width shall be grouted with fine grout using low lift grouting techniques. Spaces 2 inches or greater in width shall be grouted with coarse grout using high or low lift grouting techniques. When grouting is stopped for more than one hour, grout shall be terminated 1-1/2 inches below top of upper masonry unit to form a positive key for subsequent grout placement.

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4. Low Lift Grouting: The first lift of grout shall be placed to a height of 16 inches and then shall be rodded for grout consolidation. Subsequent lifts shall be placed in 8-inch increments and rodded for grout consolidation.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Adjusting

1. During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point up all joints at corners, openings and adjacent Work to provide a neat, uniform appearance, properly prepared for application of sealant compounds.

- B. Protection

1. Protection of Finished Work: Protective boards shall be provided at exposed external corners susceptible to damage by construction activities, without damaging completed Work.
2. Remove and replace masonry units that are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
3. At all times, surfaces of masonry on which Work is not being performed shall be protected. When rain or snow is imminent and Work is discontinued, tops of exposed masonry walls and similar surfaces shall be covered with a strong waterproof membrane, well secured in place.

- C. Cleanup

1. General: After mortar has set, new masonry Work shall be cleaned as follows:
 - a. All masonry: All excess mortar and mortar smears shall be removed. Any defective mortar shall be removed and replaced, matching adjacent Work. Nonmetallic tools shall be used in all cleaning operations.
 - b. Structural Glazed Brick, Concrete Masonry, Ground Face Concrete Masonry Units, and Glazed Structural Tile: Units shall be washed with clean water and soap powder using soft fiber brushes.
 - c. Brick: Brickwork, other than glazed brick, shall be cleaned using a solution comprising 1-part commercial grade muriatic acid and 9 parts water, cleaning areas not exceeding 10 to 20 square feet at a time. Area to be cleaned shall be soaked with water, then scrubbed with the acid solution, followed by a rinse with clean water. Fiber

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brushes shall be used to apply the acid solution and to wash the brickwork. Do not allow the acid solution to come in contact with metalwork. Brickwork and stonework below the area being cleaned shall be kept wet during the cleaning process.

END OF SECTION

SECTION 05 05 13.01 – GALVANIZING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all labor, materials, equipment, services, and perform all operations required for complete furnishing, delivery, unloading, handling, storing and repair of coating of all iron or steel materials which are to be galvanized as shown on the Contract Drawings.
- B. All galvanizing shall be done by the hot-dip process. The Work shall include all incidental and miscellaneous items that may not be specified but required for completing the Work of this Section..
- C. The following index of this Section is presented for convenience:

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TABLE 1 - Schedule of Hot-Dip Galvanizing Requirements		10

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Definition:

- 1. Not Used.

- B. Reference Standards:

- 1. American Society for Testing and Materials (ASTM):

- a. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
 - b. ASTM A90 - Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
 - c. ASTM A111 - Zinc-Coated (Galvanized) "Iron" Telephone and Telegraph Wire
 - d. ASTM A116 - Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric
 - e. ASTM A121 - Zinc-Coated (Galvanized) Steel Barbed Wire
 - f. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - g. ASTM A143 - Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
 - h. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - i. ASTM A239 - Test Method for Locating the Thinnest Spot in a Zinc (Galvanized) Coating on Iron or Steel Articles by the Preece Test (Copper Sulfate Dip)
 - j. ASTM A384 - Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
 - k. ASTM A385 - Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
 - l. ASTM A392 - Zinc-Coated Steel Chain-Link Fence Fabric
 - m. ASTM A475 - Zinc-Coated Steel Wire Strand
 - n. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

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- o. ASTM A780 - Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
 - p. ASTM A896 - Practice For Conducting Case Studies of Galvanized Structures
 - q. ASTM A924 - General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
 - r. ASTM B6 - Specification for Zinc
 - s. ASTM D6386 - Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
 - t. ASTM E376 - Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Test Methods
 - u. ASTM E536 - Test Methods for Chemical Analysis of Zinc and Zinc Alloys
 - 2. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated
 - 3. American Galvanizers Association (AGA):
 - a. Inspection of Products Hot-dip Galvanized After Fabrication.
 - b. The Design of Products to be Hot-dip Galvanized After Fabrication.
 - c. Recommended Details of Galvanized Structures.
 - d. Quality Assurance Manual.
 - 4. American Welding Society (AWS):
 - a. Welding Zinc-Coated Steel.
 - 5. Canadian Standards Association (CSA):
 - a. CAN/CSA G164-M92 - Hot Dip Galvanizing of Irregularly Shaped Articles.
- 1.05 DESCRIPTION
- A. Tests
 - 1. General: Samples of galvanized articles shall be taken as specified in the appropriate ASTMs listed in Table 1. Galvanized articles shall be tested to determine the following qualities of the coating:
 - a. Thickness of coating
 - b. Adherence
 - c. Uniformity.

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2. Thickness of the zinc coating may be tested either by the weighing or stripping methods in conformity with the requirements set forth in Table 1.
3. Adherence of zinc coating shall be tested by the method indicated in the appropriate ASTMs listed in Table 1.
4. Uniformity:
 - a. Galvanized articles will be subjected to visual examination to determine uniformity of work.
 - b. In the event the Engineer determines that such examination is not conclusive, the article shall be given the Preece test in conformity with ASTM A239.

1.06 QUALITY ASSURANCE

A. Qualifications

1. Galvanizing shall be done in a plant having sufficient facilities to produce the quality of coatings herein specified and ample capacity for the volume of work required.
2. The plant shall follow the procedures in the Quality Assurance Manual of the AGA.

1.07 SUBMITTALS

A. The Contractor shall submit Shop Drawings for approval by the Engineer. The submittals shall include, but not be limited to:

1. The producer's or supplier's certification that the galvanized articles were manufactured, sampled, tested and inspected in accordance with the applicable standards specified herein and that the articles meet these requirements.
2. Method for repair of Galvanized Coating

B. A report of the test results shall be furnished to the Engineer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Handling

1. Galvanized articles shall be shipped and handled in a manner which will avoid damage to the zinc coating.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

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PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Coating Applicator Plants:

1. Valmont Coatings – American Galvanizing, Folsom, NJ;
www.valmontcoatings.com
2. V&S Lebanon Galvanizing, Jonestown, PA; www.hotdipgalvanizing.com
3. Steel Creek Galvanizing, Blacksburg, SC; www.steelcreekgalv.com
4. South Atlantic LLC – Shannon Plant, Shannon, MS;
www.southatlanticllc.com
5. Connecticut Galvanizing, Glastonbury, CT; www.ctgalv.com
6. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Zinc used for galvanizing shall conform to ASTM B6, and shall be at least equal to the grade designated as Prime Western.
- B. Maximum amount of aluminum added to a galvanizing bath shall not exceed 0.01 percent.
- C. Material for galvanizing to be geometrically suitable for galvanizing as described in ASTM A384 and A385. Steel materials suitable for galvanizing include structural shapes, pipe, sheet, fabrications, and assemblies. Comply with the following requirements for steel to be hot-dip galvanized: carbon below 0.25%, phosphorous below 0.04%, manganese below 1.3%, either individually or in combination, and silicon below 0.04%. Notify the galvanizer if steel does not meet these requirements so that suitability for galvanizing may be determined and whether special processing techniques are required.
- D. Steel materials that are chemically suitable for galvanizing.
 1. Structural shapes and plates: ASTM A36, A242 TYPE 2, A283, A441, A500, A501, A529, A572, A588, and A992.
 2. Fasteners:
 - a. Bolt materials: A307 grade A or B, A325 type 1, A394, A499, A354 Grade BC.
 - b. Nut materials: A563 Grades A, DH, and C.
 3. Sheet for sheet metal articles: ASTM A569 or A570.
 4. Steel for pipe or tubing: ASTM A53, A120, A595 Grade A or B.
- E. Avoid use of steel with an ultimate tensile strength greater than 150 ksi.
- F. Intentionally ungalvanized areas are required as noted on the Contract Drawings. Masking may be performed to accomplish this process during the galvanizing process. Additional work may still be required to remove unwanted zinc in

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intentionally ungalvanized areas. Contractor is solely responsible and shall perform all necessary operations at no additional cost to the City. Materials for preventing Hot-Dip Galvanizing:

1. Galva Stop, Puma Chemical, 1650 Morgan Creek Road, Marble, NC 28905, www.pumachemical.com
2. Maskote Zinc Stop-Off, ZYP Coatings, Inc., 120 Valley Court, Oak Ridge, TN 37830, www.zypcoatings.com
3. Or approved equal.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Fabricate structural steel in accordance with Class I, II, III guidelines as described in AGA's Recommended Details for Galvanized Structures.
- B. Fabrication practices for products to be in accordance with the applicable portions of ASTM A143, A384, and A385, except as specified herein. Avoid fabrication techniques that could cause steel distortion or embrittlement.
- C. The Fabricator shall consult with Engineer and hot-dip galvanizer regarding potential concerns, including handling issues, during the galvanizing process that may require design modification before fabrication proceeds.
- D. Remove all welding slag, splatter, anti-splatter compounds and burrs prior to delivery for galvanizing.
- E. Provide holes and/or lifting lugs to allow for handling during galvanizing.
- F. Avoid unsuitable marking paints. Consult with galvanizer about removal of grease, oil, paint and other deleterious material prior to fabrication.
- G. Remove by blast-cleaning, or other methods, surface contaminants and coatings that are not removable by the normal chemical cleaning process in the galvanizing operation.
- H. Where possible, as approved, the Contractor can request to use slip joints to minimize field welding of material.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Preparation of Materials
 1. Structural steel products shall be safeguarded against embrittlement in accordance with ASTM A143.
 2. Casting surfaces to be galvanized shall be sand blasted or ground smooth. When a smooth cast is required, castings shall be tumbled and all high

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spots ground flush. Castings shall be normalized to prevent cracking. Malleable iron shall be safeguarded against embrittlement by pre-annealing.

3. Steel work shall be pre-cleaned utilizing a caustic bath, acid pickle and flux or shall be blast cleaned and fluxed to obtain an acceptable surface for quality hot dip galvanizing.
4. Handle all articles to be galvanized in such a manner as to avoid any mechanical damage and to minimize distortion.

3.02 IMPLEMENTATION

A. Hot-Dip Galvanizing Requirements

1. The Work shall conform to the requirements in Table 1 - Schedule of Hot-Dip Galvanizing Requirements.
2. Quality of Coating:
 - a. The zinc coating shall meet the standards defined in Table 1. The coating shall adhere firmly to the surface of the base metal, be continuous, uniform in thickness, and of the quality of finish specified.
 - b. All rejected materials shall be stripped and re-galvanized before resubmitting for inspection and test.

B. Repair of Galvanized Coating

1. Galvanized coatings that are abraded or damaged by welding, flame cutting, or during handling, transport or erection shall be repaired by one of the approved methods in accordance with ASTM A780. Minimum thickness requirements for the repair are those described in ASTM A123, Section 6.2
2. The maximum area to be repaired is defined in accordance with ASTM A123, section 6.2.
3. The extent of the area to be repaired and the method of repair to be used shall be approved by the Engineer.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Unless otherwise specified in this specification or on Contract drawings, all galvanized components shall be subjected to post-galvanizing inspection in accordance with procedure PGI-1 in Table 2.
- B. The results of post-galvanizing inspection shall be recorded. These records shall be made available to the Engineer on request.
- C. If cracking is identified, then the component and all similarly shaped components fabricated with similar materials and weld details shall be identified and quarantined as non-conforming products. A photographic record of the cracking shall be made and appropriate techniques such as eddy current or alternating

**SECTION 05 05 13.01 – GALVANIZING
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current field measurements test shall be used to characterize flaws. The results shall be submitted to the Engineer. Quarantined components may only be repaired for use in the Works with the agreement of the Engineer.

- D. Visual examination and tests shall be in accordance with ASTM A123, A153, or A767, as applicable, to determine the thickness of the zinc coating on the metal surface.

Table 2: Post-galvanizing inspection

Reference	Visual inspection	Magnetic Particle Testing ¹
PGI-1	100% of all surfaces with special attention to areas around copes, welded connections and joints	Not required
PGI-2A	Already required by PGI-1	On 10% of welded connections or node points of welded joints
PGI-2B	Already required by PGI-1	On specified areas
¹ Magnetic Particle Testing is possible through the galvanizing but the thickness of the deposited zinc layer will reduce the sensitivity of the inspection. For coatings thicker than 100µm locally, the sensitivity of the NDT procedure shall be verified.		

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

SECTION 05 05 13.01 – GALVANIZING
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NO TEXT ON THIS PAGE

**ATTACHMENT 1 -- SECTION 05 05 13.01 – GALVANIZING
CONTRACT KENS-EAST-2**

TABLE 1 - SCHEDULE OF HOT-DIP GALVANIZING REQUIREMENTS

CLASS OF WORK	ZINC		TEST OF ZINC COATING				COATING THICKNESS
	Slab and Chemical Analysis	Coating	Thickness		Adherence	Uniformity	Oz. Per Sq. Ft.
			By Weight	By Stripping			Minimum
IRON & STEEL STRUCTURAL <ul style="list-style-type: none"> • Rolled, pressed and forged, shapes, castings, plates, bars and strips • Gratings, iron and steel 	B6, E536	A123	A123	A90, G164-M92	A123	A123, A239	Table 1, A123
SHEETS <ul style="list-style-type: none"> • Iron and steel 	B6, E536	A653	A653, A924	A90, A924	A653	A239	Table 1, A653
HARDWARE <ul style="list-style-type: none"> • Castings of malleable iron and steel • Rolled, pressed, forged articles • Threaded fasteners • Very small work: rivets, nails, tacks, pins, small bolts and screws, stove bolts • Turnbuckles and similar work • Chain 	B6, E536	A153	A153	A90,	A153	A153, A239	Table 1, A153
WIRE <ul style="list-style-type: none"> • Line wire • Fencing wire • Fencing fabric, chain link • Barbed wire • Strand wire 	B6, E536 B6, E536 B6, E536 B6, E536 B6, E563	A111 A116 A392 A121 A475	-- -- -- -- --	A90 A90 A90 A90 A90	A111 -- -- -- A475	A111 -- -- -- A475	Table 1, A111 Table 3, A116 Tables 1 and 2, A392 Table 3, A121 Table 4, A475

**ATTACHMENT 1 -- SECTION 05 05 13.01 – GALVANIZING
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TABLE 1 - SCHEDULE OF HOT-DIP GALVANIZING REQUIREMENTS

CLASS OF WORK	ZINC		TEST OF ZINC COATING				COATING THICKNESS
	Slab and Chemical Analysis	Coating	Thickness		Adherence	Uniformity	Oz. Per Sq. Ft.
			By Weight	By Stripping			Minimum
PIPE	B6, E536	A53	--	A90	A53	--	1.8 oz. per sq. ft
ELECTRICAL CONDUIT (Rigid Steel)	Shall comply with ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.						

Notes Applicable to Table1:

1. Prefixes A, B and E identify ASTM Specifications; prefix G identifies CSA Standard .
2. Galvanized articles shall not be subject to wiping or scraping processes which may reduce the thickness of zinc coating.
3. Small hardware items shall be centrifuged to remove excess bath metal.

**ATTACHMENT 1 -- SECTION 05 05 13.01 – GALVANIZING
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NO TEXT ON THIS PAGE

SECTION 05 05 23.01 – WELDING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall perform all structural welding as specified herein, as indicated on the Contract Drawings and as approved. The work shall include, but not limited to, the following items:
1. Procedure specifications.
 2. Procedure qualifications.
 3. Welder, welding operator and tacker qualifications.
 4. Inspection.
 5. Testing and repair of defective welds.
 6. Fabrication and welding of carbon steel, low alloy steel, extra-high-strength quenched and tempered low alloy steels, and austenitic stainless steel materials for structural steel for buildings.
- B. The following index of this Section is presented for convenience:

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SECTION 05 05 23.01 – WELDING
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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 05 12 00 - Structural Steel Framing.

1.04 REFERENCES

A. Definitions

- 1. Definitions of welding terms shall be in accordance with ANSI/AWS A3.0.

B. Reference Standards:

1. American Society for Testing and Materials (ASTM):

- a. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.
- b. ASTM E165 - Standard Practice for Liquid Penetrant Examination for General Industry.
- c. ASTM E709 - Standard Guide for Magnetic Particle Examination.

2. American Institute of Steel Construction (AISC):

- a. AISC-360 - Specification for Structural Steel Buildings.

3. American Welding Society (AWS):

- a. AWS A2.4- Standard Symbols for Welding, Brazing and Nondestructive Examination.
- b. AWS A3.0- Standard Welding Terms and Definitions.
- c. AWS A5.1- Carbon Steel Covered Arc-Welding Electrodes
- d. AWS A5.5- Low-Alloy Steel Covered Arc-Welding Electrodes
- e. AWS A5.9- Corrosion-Resisting Chromium and Chromium-Nickel Steel Bare and Composite Metal Cored and Stranded Arc Welding Electrodes and Welding Rods
- f. AWS A5.17 - Carbon Steel Electrodes and Fluxes for Submerged-Arc Welding
- g. AWS A5.18 - Filler Metals for Gas Shielded Arc Welding, Carbon Steel
- h. AWS A5.23 - Low-Alloy Steel Electrodes and Fluxes for Submerged Arc Welding

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- i. AWS D1.1- Structural Welding Code - Steel.
 - j. D1.3 - Structural Welding Code – Sheet Steel.
 - k. AWS D1.4- Structural Welding Code - Reinforcing Steel.
 - l. AWS D1.5- Bridge Welding Code.
 - m. AWS D1.6- Structural Welding Code – Stainless Steel
 - n. AWS QC1 - Qualification and Certification of Welding Inspectors
 - o. AWS Z49.1 - Safety in Welding and Cutting and Allied Processes.
- 4. ANSI/ASNT CP-189 - Standard for Qualification and Certification of Nondestructive Testing Personnel
 - 5. 2020 Building Code of New York State (NYSBC)
 - 6.

1.05 DESCRIPTION

- A. All welding shall be performed in accordance with ANSI/AWS D1.1 and ANSI/AWS D1.4. No welding shall be performed when the base metal temperature is lower than 32 degrees Fahrenheit.
- B. Welding shall not be started until welding procedures, welders, welding operators and tackers have been qualified and copies of all records and reports submitted and approved by the Engineer.
- C. The Contractor shall be responsible for the quality of welding and shall maintain records of the test results obtained from the welding procedure, welder, welding operator and tackers' performance qualifications.
- D. Each weld shown or indicated on the Contract Drawings shall be made as specified on the approved procedure specifications provided to cover each type of weld. Welding of any special steel shall conform to the written instructions of the steel manufacturer.
- E. Test specimens shall be prepared by the Contractor for each type of welded joint as designated herein under Welding Procedure Qualifications. Destructive tests of specimens for procedure and welder qualifications shall be conducted in accordance with ANSI/AWS D1.1, Section 4, Qualifications, and the requirements specified herein.
- F. Symbols
 - 1. Symbols on the Contract Drawings, shop drawings and erection drawings shall be in accordance with ANSI/AWS A2.4.
- G. Safety Precautions
 - 1. Safety precautions during welding shall conform to AWS Z49.1.

SECTION 05 05 23.01 – WELDING
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H. Welding Requirements

1. Contract Drawings will include the following information:
 - a. Size, length, type, and location of welds, where connection is indicated as “Fully Designed by Engineer”
 - b. Location of welds for which non-destructive testing is required. When location of non-destructive testing is not shown, it will be indicated by the Engineer in the field.
 - c. Where connections are not indicated on the Contract Drawings as “Fully Designed by Engineer”, the Contractor is responsible for the complete design of the welds for the required member design forces as shown on the Contract Drawings. Submit design calculations for welds, signed and sealed by a licensed Professional Engineer registered in the state of New York, with a minimum of 5 years of experience. Suggested conceptual weld details are shown on the Contract Drawings to convey the design requirements and to assist the Contractor as the basis for bid. The suggested conceptual weld details are for illustrative purposes only, and may not indicate the required size, quantity, configuration of welds, connection plate or angle profiles and thicknesses, gusset plate profiles and thicknesses, reinforcing plates, leveling plates and nuts, erection supports, shims, and other incidentals required for a complete weld design. Welds shall conform to AISC 360.
2. Workmanship and techniques for welded construction shall conform to the requirements of ANSI/AWS D1.1 and AISC-360. When ANSI/AWS D1.1 and AISC-360 are in conflict, the requirements of ANSI/AWS D1.1 shall govern.
3. Welding of reinforcing bars shall conform to the requirements of ANSI/AWS D1.4 and the Contract requirements. Welds shall develop a minimum of 85,000 psi tensile strength. Bars to be welded shall be cut by means of an oxyacetylene torch or by sawing. Ends shall be free of dirt, oxide scale, oil, grease, or other foreign matter. Sheared ends of bars shall be trimmed back at least 1/2-inch by sawing or flame cutting. Preheat and interpass temperature shall conform to ANSI/AWS D1.4. Bars having a carbon equivalent content in excess of 0.50 percent shall not be welded.
4. Where steels of dissimilar strength are welded together, the lower yield steel strength shall be used in the design calculations.
5. All groove welds shall be 100 percent complete penetration welds as defined in ANSI/AWS D1.1 or shown in ANSI/AWS D1.4 for reinforcing steel, regardless of whether a backup plate is shown or whether the supplementary backing weld or melt-through symbol is included, in each groove-weld symbol shown unless partial penetration is included in the weld symbol.

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6. Headed studs and deformed bar anchors shall be welded with an automatic process in accordance with the requirements of ANSI/AWS D1.1, Section 7.
 7. Upon completion of welding, all weld splatter, flux, slag and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance with uniform weld contours and dimensions. All sharp corners of material which is to be painted or coated shall be ground to a minimum of 1/32-inch on the flat.
 8. For welding of high restraint welds, use double bevels in lieu of single bevels where practical after approval of Engineer. Detail joints to allow for weld shrinkage. In cases of plates in more than one plane, show welding operation sequence on the shop drawings. In general, start welding at the most restrained part of the weldment and proceed to the least restrained.
 - a. Preheat shall be sufficient to prevent cracking, but in no case less than that required by AWS D1.1. The Contractor shall prepare a written welding sequence and distortion control plan to be included in the welding procedures submittal. Assembly sequence of adjoining parts shall balance applied induced heat from preheat and welding processes to minimize distortion and shrinkage. Assemblies shall include special considerations to minimize significant shrinkage stress restraint in accordance with AWS D1.1, Annex H provisions. Under conditions of severe external shrinkage restraint, preheat temperature limitations for making welds shall be in accordance with AWS D1.1, Annex H, Table H2. Under conditions of severe external restraint, reduction of induced heat and cooling rate shall be monitored under the provisions of the Hydrogen Control/HAZ Hardness Control methods of AWS D1.1, Annex H. The preheat shall be maintained throughout the thickness of the material for a distance equal to twice the material thickness on both sides of the joint at a minimum. Where different thicknesses of steel are being joined, the greater thickness shall govern. Preheat shall be measured on the face opposite the side of the heat application. Preheat shall be applied uniformly in a manner that does not harm the surface of the material nor cause surface temperatures to exceed 1100 degrees Fahrenheit. Should stress relief heat treatment be required, the Contractor shall submit a written procedure.
- I. Standard of Acceptance
1. Dimensional tolerances for welded construction, details of welds, and quality of welds shall be in accordance with the applicable requirements of ANSI/AWS D1.1, ANSI/AWS D1.4 and the Contract Drawings.
 2. The welding shall be subject to inspection and tests in the shop and at project site. Inspection and tests in the shop will not relieve the Contractor of the responsibility to furnish weldments of satisfactory quality.

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3. All welding exhibiting any cracks, either in the weld metal or the parent metal, will be rejected.
4. Incomplete fusion or lack of penetration will not be allowed, and the weld will be rejected.
5. Welds, other than stud welds, are acceptable if inspection indicates conformance within the following limitations:
 - a. Undercut shall not be more than 1/32-inch deep.
 - b. Convexity or reinforcement of a weld face shall not exceed the limits shown in ANSI/AWS D1.1, Section 3 and there shall be no overlap.
 - c. Slag inclusions, porosity and other fusion defects less than 1/16-inch in greatest dimension will be allowed if well dispersed and the sum of the greatest dimensions in any linear inch of welded joint does not exceed 3/8-inch.
 - d. Slag inclusions, porosity and other fusion defects 1/16-inch or larger in greatest dimension will be allowed providing such defects do not exceed the limits specified in ANSI/AWS D1.1.
6. When materials or workmanship do not conform to the acceptance requirements, the Engineer reserves the right to reject material or workmanship or both at any time before final acceptance of the structure containing the weldment.

J. Corrections and Repairs

1. General: In lieu of rejection of an entire piece or member containing welding which is unsatisfactory, or which indicates inferior workmanship, the corrective measures listed hereinafter may be permitted by the Engineer. The Engineer's specific approval must be obtained before making each correction. Corrective measures shall be made at the Contractor's expense and to the satisfaction of the Engineer and/or to the satisfaction of independent testing lab.
2. Defective or unsound welds or base metal shall be corrected either by removing and replacing the entire welds, or as follows:
 - a. Excessive convexity and overlap shall be reduced by removal of excess weld metal.
 - b. Any concavity of weld, crater, undersize welds or undercutting shall be corrected by cleaning and depositing additional weld metal.
 - c. Excessive weld porosity, slag, inclusions or incomplete fusion shall be repaired by removing defective portions and rewelding.
 - d. Cracks in weld or base metal shall be repaired by removing crack throughout its length, including sound weld metal 2 inches beyond each end of the crack and rewelding.

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3. The removal of defective weld metal or portions of the base metal shall be done by chipping, grinding, oxygen cutting, oxygen gouging, or air carbon-arc and in such a manner that the remaining weld metal or base metal is not nicked or undercut. Defective portions of the weld shall be removed without removal of the base metal.
4. Additional weld metal shall be deposited using an electrode smaller than that used for making the original weld, and not more than 5/32-inch diameter. The surface shall be cleaned thoroughly before welding.
5. Caulking of welds shall not be permitted.
6. Improperly fitted parts may be cut apart and rewelded. Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat.
 - a. The temperature of heated areas shall not exceed 1,200 degrees Fahrenheit (a dull red color). Temperature shall be carefully measured with temperature indicating crayons during the heating operation.
 - b. Parts to be heated for straightening shall be substantially free of stress and from external forces, except those stresses resulting from mechanical means used in conjunction with the application of heat.
7. No peening shall be done on the root or surface layers of a weld. Peening of intermediate weld layers may be used only if authorized by the Engineer and directed by him. Care shall be exercised to prevent overpeening which may cause overlapping, scaling, cracking, flaking, or excessive cold working of weld and base metal.

1.06 QUALITY ASSURANCE

A. Welding Procedure Qualifications

1. General: Except for prequalified or previously qualified procedures, the Contractor shall qualify the welding procedure specifications for any welding procedure performed in the fabrication of weldments. Qualifications of welding procedures shall conform to ANSI/AWS D1.1 and ANSI/AWS D1.4.
2. Welding procedure specification and the results of the procedure qualification test for each type of welding, which requires procedure qualifications, shall be submitted for approval. Approval of any procedure, however, will not relieve the Contractor of the sole responsibility for producing a finished structure meeting all the requirements of these Specifications. This information shall be submitted on the forms in Annex E of ANSI/AWS D1.1.
 - a. Procedures, when qualified, become the welding procedure specifications and are to be followed in making welds on the subject

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materials and provide a means of assuring reproducible results and quality control.

- b. Separate procedure specifications shall be prepared for each type of weld.
 - c. Welding procedure specifications shall be individually identified and shall be referenced on the shop drawings and erection drawings, or shall be suitably keyed to the Contract Drawings.
3. Previous Qualifications: Welding procedures previously qualified by test may be acceptable for this Contract without requalification if the following conditions are met:
- a. Testing was performed by an approved testing laboratory.
 - b. The qualified welding procedure conforms to the requirements of this Section and is applicable to welding conditions encountered under this Contract.
 - c. The welder, welding operator and tacker qualification tests conform to the requirements of this Section and are applicable to welding conditions encountered under this Contract.
4. Prequalified Procedures: Welding procedures which are considered prequalified as specified in ANSI/AWS D1.1 and ANSI/AWS D1.4, will be accepted without further qualification.
- a. The Contractor shall submit for approval a listing and an annotated drawing to indicate the joints not prequalified.
 - b. Procedure qualification shall be required for the joints not prequalified.
5. Retests: If welding procedure fails to meet the requirements of ANSI/AWS D1.1 or ANSI/AWS D1.4, the procedure specification shall be revised and requalified.
- a. At the Contractor's option, with the Engineer's approval, welding procedure may be retested in accordance with the standards.
 - b. If the welding procedure is qualified through retesting, all test results, including those of test welds that failed to meet the requirements, shall be submitted with the welding procedure.

B. Welder, Welding Operator and Tacker Qualification

1. General Information: Each welder, welding operator and tacker assigned to work on this Contract shall be certified in conformance with ANSI/AWS D1.1, Section 4. All welding shall be done in conformity with the NYSBC.
2. Certificates: Before assigning any welder, welding operator or tacker to work under this Contract, the Contractor shall submit to the Engineer the

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names of the welders, welding operators and tackers to be employed and certification that each individual is qualified as specified.

- a. The certification shall state the type of welding and positions for which the welder, welding operator or tacker is qualified, the code and procedure under which the individual is qualified, the date qualified, and the name of the firm and person certifying the qualification tests.
 - b. The certification shall be kept on file at the job site by the Contractor. The certification shall be kept current for the duration of the Contract.
3. Identification of Welds: The Contractor shall assign each welder, welding operator or tacker an identifying number, letter or symbol which shall be used to identify all welds made by that person. For identification, the welder, welding operator or tacker shall apply the assigned symbol adjacent to the weld by means of a rubber stamp, felt tipped marker with waterproof ink or other methods that do not cause an indentation in the metal. Identification with die stamps or electric etches shall not be allowed.
 4. Record of Welds: The Contractor shall maintain a record of all welders, welding operators and tackers employed on the Contract showing the date and results of tests and the identification mark assigned to each person. These records shall be certified by the Contractor and copies of the records shall be furnished to the Engineer.
 5. Charpy V-Notch Qualification of Welder for Metal Thickness exceeding 2 inches: The Welder must show acceptable Charpy V-Notch test results as per ASTM A673. Charpy V-notch tests of the Heat Affected Zone (HAZ) and weld metal shall be tested for weld metal thickness exceeding 2 inches. Energy absorbed of these two tests shall be performed on these three samples, (base metal, HAZ, Weld Metal) at the same lab session. This includes a “Welding Procedure Qualification V-Notch Test”, and a “Welder Qualification V-Notch Test”. Charpy test temperature shall be performed at 32 degrees F. and 70 degrees F with minimum energy absorption values of the base metal specified in Section 05 12 00 – Structural Steel Framing.
 6. Previous Qualifications: At the discretion of the Engineer, welders, welding operators and tackers qualified by test within the previous 6 months may be accepted for this Contract without requalification if all of the following conditions are met:
 - a. Copies of the welding procedure specifications, the procedure qualification test records, and the welder, welding operator, and tacker qualification test records are submitted and approved in accordance with the requirements shown on the Contract Drawings.
 - b. Testing was performed by an approved testing laboratory.

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- c. The previously-qualified welding procedure conforms to the requirements of this Section and is applicable to welding conditions encountered under this Contract.
 - d. The welder, welding operator and tacker qualification tests conform to the requirements of this Section and are applicable to welding conditions encountered under this Contract.
7. Renewal of Qualifications: Requalification of a welder or welding operator shall be required under any of the following conditions:
- a. It has been more than 6 months since the welder or welding operator has used the specific welding process for which he is qualified.
 - b. There is specific reason to question the welder or welding operator's ability to make welds that meet the requirements of these Specifications.
 - c. The welder or welding operator was qualified by an employer other than those firms performing work under this Contract, and a qualification test has not been taken within the past 12 months. Records showing periods of employment, name of employer where welder, or welding operator, was last employed, and the process for which qualified shall be submitted as evidence of conformance.
 - d. A tacker who passes the qualification test shall be considered eligible to perform tack welding indefinitely in the positions and with the processes for which he is qualified, unless there is some specific reason to question the tacker's ability. In such a case, the tacker shall be required to pass the prescribed tack welding test.

1.07 SUBMITTALS

- A. The Contractor shall prepare and submit Shop Drawings for approval of the Engineer. Submittals shall include, but not be limited to, the following:
 - 1. Erection drawings, and catalog data on welding equipment and materials.
 - 2. Welding procedure specifications (WPS).
 - 3. Welding procedure qualifications and test records (WPQ).
 - 4. Welder, welding operator and tacker qualifications and test records.
 - 5. Records of tests and inspections of installed welds.
 - 6. Testing or inspection agency selection.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

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1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Welding Electrodes:

1. The Lincoln Electric Company, Cleveland, OH; www.lincolnelectric.com
2. ESAB, Denton, TX; www.esabna.com
3. Hobart Brothers LLC, Troy, OH; www.hobartbrothers.com.
4. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. All welding equipment, electrodes, welding wire and fluxes shall be capable of producing satisfactory welds when used by a qualified welder or welding operator performing qualified welding procedures.
- B. All welding equipment and materials shall comply with the applicable requirements of ANSI/AWS D1.1 and ANSI/AWS D1.4.
- C. Welding materials to be in moisture resistant, undamaged package. Maintain packages effectively sealed until electrode is required for use. Storage and handling shall be per AWS D1.
- D. Electrodes shall be low hydrogen and shall be selected from table 3.2 of AWS D1.1, unless otherwise indicated on the Contract Drawings.
1. Shielded Metal-Arc Welding: Welding electrodes for manual shielded metal-arc welding shall conform to AWS D1.4.
 2. Submerged-Arc Welding: Bare electrodes and granular flux used in submerged-arc welding shall conform to AWS A5.17.
- E. Electrodes for stainless steel welds shall be selected in accordance with the requirements of AWS D1.6.
- F. Welds indicated on the Contract Drawings or the approved shop or erection drawings shall be created by electric arc welding processes. Control the heat input, weld length, weld sequence, and cooling process to prevent distortion of the completed assembly.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 APPLICATION

A. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Supervision

1. All shop and field welding shall be under the immediate supervision of a representative of a standard testing agency or an approved inspection agency reporting directly to, and under the control of, the Department of Environmental Protection.
2. Procedures and techniques for inspection shall be in accordance with the applicable requirements of ANSI/AWS D1.1.
3. Testing of welds shall be performed not less than 48 hours after the weld has been completed for the following: hot rolled steel shapes exceeding 2 inches in thickness, built-up cross sections exceeding 2 inches in thickness, and welds in which there is almost no freedom of movement for members joined due to geometry or material thickness.

B. Inspection and Tests

1. The Engineer will make periodic checks of each welder to determine that welds are being made as specified in the approved procedure specifications. Welding speed may be estimated.
2. All welds will receive 100 percent visual inspection to determine weld size and profile, surface cracks, overlap, and undercut.
3. Welds shall receive non-destructive testing as required in Section 05 12 00 - Structural Steel Framing and as follows:
 - a. Test all complete joint penetration welds for soundness by means of either radiographic or ultrasonic testing in accordance with AWS D1.1 and ASTM E164 procedures. All flaws in plate or flange material revealed during such tests shall be repaired and retested by the Contractor at no additional cost to the City.
 - b. Test all partial joint penetration welds for soundness by means of visual and magnetic particle inspection, unless other methods are specified in the Contract Documents. All flaws in plate or flange material revealed during such tests shall be repaired and retested by the Contractor at no additional cost to the City.
 - c. 10% of all fillet welds shall be tested using a non-destructive method, such as dye penetrant or magnetic particle. If this testing discloses a larger ratio (10% or more) of unacceptable welds, the

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required percentage of tested welds may be increased by the Engineer to 100%, at no additional cost to the City.

4. The Engineer reserves the right to perform any additional test on any weld, including liquid penetrant, magnetic particle, radiographic, and ultrasonic. The costs of such testing will be borne by the Contractor if unsatisfactory welds are discovered, or by the City if the welds are satisfactory.
 5. Visually inspect all headed studs and deformed bar anchors for complete fusion and full 360-degree weld flash (or fillet).
 - a. Check 10% all studs for incomplete fusion, by bending to an angle of 15 degrees from its original axis (away from any missing flash).
 - b. Contractor to replace any studs that crack or break. Contractor to only straighten studs that would foul other work or have less than 1 inch cover in bent position.
- C. Welds found deficient in dimensions but not in quality may be enlarged by additional welding. Any weld found deficient in quality shall be removed by grinding or melting and the weld shall be remade.

3.04 **STARTUP / DEMONSTRATION**

- A. Not Used

3.05 **ADJUSTING / PROTECTION / CLEANUP**

- A. Not Used

END OF SECTION

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NO TEXT ON THIS PAGE

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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all materials, labor, and equipment required to provide all metal fastening in accordance with the Contract Drawings, as specified herein and approved.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- 1. Section 05 05 13.01 - Galvanizing.
- 2. Section 05 05 23.01 - Welding.
- 3. Section 05 12 00 - Structural Steel Framing.

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1.04 REFERENCES

A. Definition:

1. No definition of additional terms is required for this Section.

B. Reference Standards:

1. ASTM International (ASTM)

- a. ASTM A 36 - Carbon Structural Steel.
- b. ASTM A 307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- c. ASTM A 489 - Carbon Steel Lifting Eyes.
- d. ASTM A 563 - Carbon and Alloy Steel Nuts.
- e. ASTM B 348 - Titanium and Titanium Alloy Bars and Billets.
- f. ASTM D 1785 - Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80 and 120.
- g. ASTM E 488 - Standard Testing Method for Strength of Anchors in Concrete Elements
- h. ASTM E 1109 - Test Method for Strength of Power-Actuated Fasteners Installed in Structural Members
- i. ASTM E 1512 - Test Method for Testing Bond Performance of Bonded Anchors
- j. ASTM F 436 - Specification for Hardened Steel Washers Inch and Metric Dimensions
- k. ASTM F 467 - Nonferrous Nuts for General Use.
- l. ASTM F 593 - Stainless Steel Bolts; Hex Cap Screws, and Studs.
- m. ASTM F 594 - Stainless Steel Nuts.
- n. ASTM F 1554 - Specification for Anchor Bolts, Steel, 36, 55 and 105 ksi Inch and Metric Dimensions
- o. ASTM F 3125 - Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated 120 ksi and 150 ksi, Minimum Tensile Strength Inch and Metric Dimensions

2. American Concrete Institute (ACI)

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- a. ACI 355.2 - Qualification of Post-Installed Mechanical Anchors in Concrete
- b. ACI 355.4 - Qualification of Post-Installed Adhesive Anchors in Concrete
3. International Code Council – Evaluation Service (ICC-ES)
 - a. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements
 - b. ICC-ES AC58 - Acceptance Criteria for Adhesive Anchors in Masonry Elements
 - c. ICC-ES AC60 - Acceptance Criteria for Anchors in Unreinforced Masonry Elements
 - d. ICC-ES AC70 - Acceptance Criteria for Fasteners Power-Driven into Concrete, Steel and Masonry Elements
 - e. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements
 - f. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements
 - g. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements
4. American Welding Society (AWS)
 - a. AWS D1.1 - Structural Welding Code - Steel
 - b. AWS D1.2 - Structural Welding Code - Aluminum
 - c. AWS D 1.6 - Structural Welding Code – Stainless Steel
5. American Society of Mechanical Engineers (ASME)
 - a. ASME B 18.2.1 - Square, Hex Bolts, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head and Lag Screws (Inch Series)
 - b. ASME B 18.2.2 - Square and Hex Nuts (Inch Series)
 - c. ASME B 18. 22.1 - Plain Washers
6. 2020 Building Code of New York State (NYSBC)
7. American Institute of Steel Construction (AISC)
 - a. AISC 325-17 - Steel Construction Manual, 15th Edition
 - b. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges

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- c. AISC 360 - Specification for Structural Steel Buildings
- 8. Research Council on Structural Steel Connections (RCSC) - Specifications for Structural Joints Using High-Strength Bolts.
- 9. Aluminum Association (AA):
 - a. Specifications for Aluminum Structures.

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Fasteners not manufactured in the United States shall be tested and certification provided with respect to specified quality and strength standards. Certifications of origin shall be submitted for all U.S. fasteners supplied on the project. Fasteners to be tested shall be randomly selected by the Engineer in the field.
- B. All welding shall be performed by welders certified in accordance with AWS. Certifications of field welders shall be submitted prior to performing any field welds as per Section 05 05 23.01 – Welding. Welding shall comply with, but not limited to the following:
 - 1. AWS D1.1 for Steel
 - 2. AWS D1.2 for Aluminum
 - 3. AWS D1.6 for Stainless Steel.
 - 4. Inadequate welds shall be corrected or redone and retested to the satisfaction of the Engineer, at no additional cost to the City.
- C. Fasteners and concrete anchors will be inspected in accordance with the Inspection Article in Part 3.
- D. Manufacturer’s load tables and certified performance tests for titanium bolts shall be provided.

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings and material specifications for approval by the Engineer. Submittals shall include, but not be limited, to the following:
 - 1. Shop Drawings providing the manufacturer, fastener type, certification of the fastener's material and capacity and product data such as:
 - a. Product information
 - b. Technical information
 - c. Manufacturer’s Installation Instructions (MPII)
 - d. ICC-ES Evaluation Report.

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2. Copy of valid AWS certification for each person who is to perform field welding.
 3. Certified weld inspection reports, when required.
 4. Adhesive Anchors
 - a. For all adhesive anchors, submit anchor sizes and location plan
 - b. Testing methods, procedures and equipment.
 - c. In the event that any adhesive anchors fail field testing, submit a detailed procedure for the removal and replacement of those anchors.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Materials stored outdoors shall be supported above ground surfaces and protected with approved effective and durable covers.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Expansion anchors shall be:
 1. Power-Stud+SD1 by DeWalt, Brewster, NY; www.dewalt.com,
 2. Kwik Bolt TZ by Hilti North America, Plano, TX; www.hilti.com,
 3. Strong-Bolt 2 Wedge Anchor by Simpson Strong-Tie, Pleasanton, CA; www.strongtie.com
 4. Or approved equal.
- B. Screw anchors shall be:
 1. HUS-HR type 316 stainless steel by Hilti North America, Plano, TX; www.hilti.com,
 2. Screw-Bolt+ type 316 stainless steel by DeWalt, Brewster, NY; www.dewalt.com,
 3. Titen-HD type 316 stainless steel by Simpson Strong-Tie, Pleasanton, CA; www.strongtie.com,

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4. Read Head Tapcon+ as manufactured by ITW Commercial Construction North America, Glenview, IL; www.itwredhead.com,
 5. Or approved equal.
- C. Sleeve or drop-in anchors shall be as manufactured by:
1. Hilti North America, Plano, TX; www.hilti.com
 2. DeWalt, Brewster, NY; www.dewalt.com
 3. Simpson Strong-Tie, Pleasanton, CA; www.strongtie.com
 4. Or approved equal.
- D. Adhesive Anchors
1. Epoxy adhesive anchor system shall be:
 - a. Pure 110+ by DeWalt, Brewster, NY; www.dewalt.com
 - b. HIT-RE 500-V3 by Hilti North America, Plano, TX; www.hilti.com
 - c. Or approved equal.
 2. Vinylester adhesive anchor system shall be:
 - a. AC200+ by DeWalt, Brewster, NY; www.dewalt.com
 - b. HIT HY-200 by Hilti North America, Plano, TX; www.hilti.com
 - c. Red Head A7+ by ITW Commercial Construction North America, Glenview, IL; www.itwredhead.com
 - d. AT-XP by Simpson Strong-Tie, Pleasanton, CA; www.strongtie.com
 - e. Or approved equal.
- E. The wedge inserts shall be as manufactured by:
- a. Hohmann & Barnard, Inc., Hauppauge, NY; www.h-b.com
 - b. Blok-Lok, Woodbridge, ON, Canada; www.blok-lok.com
 - c. Or approved equal.
- F. Anchor channels shall be as manufactured by:
- a. Halfen USA Inc., San Antonio, TX; www.halfenusa.com
 - b. Unistrut, Harvey, IL; www.unistrut.com
 - c. Or approved equal.
- G. Masonry Anchors
1. The adhesive system shall be as manufactured by:
 - a. Hit HY-70 by Hilti North America, Plano, TX; www.hilti.com

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- b. AC100+ Gold by DeWalt, Brewster, NY; www.dewalt.com
 - c. AT (acrylic) or SET (epoxy) by Simpson Strong-Tie, Pleasanton, CA; www.strongtie.com
 - d. Or approved equal.
- H. Blind Bolts in Structural Steel Connections shall be:
- 1. Hollo-Bolt by Lindapter, UCC Steelworks Connections New York, North Syracuse, NY; www.lindapter.com
 - 2. Blind Bolt by Abrasive & Fastening Solutions, Inc., Yorkville, IL; www.blindbolt.com
 - 3. Box Bolt by LNA Solutions, Buffalo, NY; www.lnasolutions.com
 - 4. Or approved equal.
- I. Headed studs and threaded welded studs shall be:
- 1. Nelson studs by Stanley Engineered Fastening, Downingtown, PA; www.stanleyengineeredfastening.com
 - 2. Delta Stud Weld, Inc., Katy, TX; www.deltastudweld.com
 - 3. Or approved equal.
- J. Countersunk expansion anchors shall be:
- 1. Hilti HSL Expansion Anchor by Hilti North America, Plano, TX; www.hilti.com
 - 2. Power-Bolt by DeWalt, Brewster, NY; www.dewalt.com
 - 3. Or approved equal.
- 2.02 MATERIALS / EQUIPMENT
- A. Anchor Bolts
- 1. Anchor bolts for miscellaneous framing and architectural elements attachments shall conform to ASTM A36 or ASTM A307 Grade A except where stainless steel or other approved anchor bolts are shown on the Contract Drawings. Anchor bolts shall be of the size and configuration shown on the Contract Drawings and shall be supplied with hexagonal nuts meeting the requirements of ASTM A563 Grade A.
 - 2. Anchor bolts for equipment attachment shall be of stainless steel Type 316 with nitronic 60 stainless steel nuts and locknuts.
 - 3. All underwater anchor bolts shall be Type 316 stainless steel with nitronic 60 stainless steel nuts.

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4. Where anchor bolts are used to anchor galvanized steel or are otherwise specified to be galvanized, they shall be hot-dip galvanized in accordance with ASTM A307 and Section 05 05 13.01 - Galvanizing.
 5. Pipe sleeves around anchor bolts shall be of the size and configuration shown on the Contract Drawings.
 6. Material for anchor bolts submerged in salt water or corrosive liquids for which stainless steel Type 316 is not suitable shall be as indicated in the Contract.
- B. Bolts
1. Bolts, nuts and washers for miscellaneous framing and for attachment of architectural elements shall conform to Section 05 12 00 - Structural Steel Framing.
 2. Where bolts are used to connect galvanized steel or are otherwise specified to be galvanized, bolts, nuts, and washers shall be hot-dip galvanized in accordance with Section 05 05 13.01 - Galvanizing.
- C. Stainless Steel Bolts
1. Stainless steel bolts shall conform to ASTM F593. All underwater fasteners shall be Type 316 stainless steel. Unless otherwise specified, fasteners for aluminum members shall be Type 304 stainless steel. Fasteners for stainless steel members shall be of matching grade.
 2. Stainless steel bolts shall have hexagonal heads with a raised letter or symbol on the bolts indicating the manufacturer, and be supplied with hexagonal nuts meeting the requirements of ASTM F594. Nuts shall be of the same alloy as the bolts and shall have a raised letter or symbol indicating the manufacturer.
 3. Nuts for stainless steel bolts for elements which are indicated on the Contract Drawings to be removable shall be made of nitronic 60 alloy.
 4. Material for bolts submerged in salt water or corrosive liquids for which stainless steel Type 316 is not suitable shall be as indicated in the Contract.
- D. Post-Installed Anchors
1. Concrete anchors shall be one of the types listed below as indicated on the Contract Drawings. Unless otherwise noted, all concrete anchors which are submerged, or which are subject to vibration from equipment such as pumps and generators, shall be injected, adhesive anchors. The determination of anchors equivalent to those listed below shall be based on test data performed by a commercial testing laboratory.
 - a. Mechanical Anchors

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- 1) Expansion anchors shall be wedge, sleeve, or drop-in mechanical anchors.
 - 2) Screw anchors shall be one-piece threaded anchor with a finished hexagonal head.
 - 3) All concrete mechanical anchors shall be acceptable for use in cracked and uncracked base concrete conditions.
- b. Adhesive anchors shall be two part injection type.
 - c. Where anchor type is not indicated on the Contract Drawings, the wedge expansion anchor shall be used.
2. Expansion anchors shall be fully threaded, medium duty, Type 316 stainless steel anchors. Shall be sized and embedded to depths as shown on the Contract Drawings. If embedment depth is not given, the standard embedment depth as recommended by the manufacturer shall be used.
 - a. Manufacturer for Expansion anchor shall be as specified in this Section.
 3. Screw anchors shall be a one piece, heavy duty anchor with a finished hexagonal head. Screw anchors shall be sized and embedded to depths as shown on the Contract Drawings. If embedment depth is not given, the standard embedment depth as recommended by the manufacturer shall be used.
 - a. Manufacturer for screw anchor shall be as specified in this Section.
 4. Adhesive anchors shall consist of Grade 60 reinforcing steel ASTM A 615, or Type 316 stainless steel ASTM F593 or Grade B7 high strength carbon ASTM A193 threaded rods or bolts anchored with a two-part injection type adhesive system into hardened concrete or grout-filled masonry. The adhesive system shall use a two-component adhesive mix and shall be injected with a static mixing nozzle following manufacturer's instructions. The anchor diameter, type, and embedment depth shall be as shown on the Contract Drawings.
 - a. The embedment depth of the rod/bolt shall provide a minimum allowable bond strength that is equal to the allowable tensile capacity of the rod/bolt (see Table 1) unless noted otherwise on the Contract Drawings.
 - b. Manufacturer for Epoxy adhesive and Vinylester adhesive anchor systems and shall be as specified in this Section.
 - c. Adhesive anchoring system shall have an ICC-ES Evaluation Service Report issued in accordance with AC308.
 - d. Adhesive for the anchors must qualify under ACI 355.4.

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Table 1 Allowable Tensile Capacity (Kips) for Standard Manufacturer Embedment		
Size	Concrete Anchors Wedge Type	CONCRETE ANCHORS WITH INJECTION ADHESIVE SYSTEM
3/8"	1.3	2.1
1/2"	2.4	3.8
5/8"	3.3	5.9
3/4"	4.8	8.4
7/8"	5.6	11.0
1"	7.1	15.0

5. Concrete anchors shall be of Stainless Steel Type 316 unless noted otherwise. Concrete anchors for stainless steel attachments shall be of matching grade.
6. All underwater concrete anchors shall be Type 316 stainless steel and shall have nitronic 60 stainless steel nuts.
7. Material for concrete anchors submerged in salt water or other corrosive liquids for which stainless steel Type 316 is not suitable shall be as indicated in the Contract.

E. Concrete Inserts

1. Wedge Type Inserts:
 - a. The concrete inserts for attachment of shelf angles or brick relieving angles to the reinforced concrete beams or concrete encased steel beams, shall be wedge type inserts. The inserts shall have an askew head bolt to produce an automatic tightening action when a load is placed on the bolt.
 - b. The wedge inserts shall be of malleable iron, hot dipped galvanized. The askew bolt and the horseshoe shim plates shall be of stainless steel Type 304 or 316. The type of insert and size of bolts shall be as shown on the Contract Drawings.
 - c. Manufacturer for wedge inserts shall be as specified in this Section.

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2. Anchor Channel Inserts: for the top attachment of the masonry wall panels to steel encased or concrete structures, the inserts shall be:
 - a. Manufacturer for anchor channel inserts shall be as specified in this Section.
 - b. The anchor channel shall be made from channel profiles with "I" anchors shop welded to the back of channels. Anchor channels shall be furnished with the head bolts, channel nuts, etc., for a complete installation. All material shall be stainless steel type 304.
 - c. The type and series of the anchor channel shall be as shown on the Contract Drawings.
 - d. Anchor channels can be used for other attachments if detailed on the Contract Drawings.

F. Masonry Anchors

1. Masonry anchors shall be injection adhesive anchors with screen tube for fastening to hollow block, clay tiles and brick with holes (see Table 2).
2. Manufacturer for adhesive system shall be as specified in this Section.
3. Masonry anchors shall be of stainless steel type 304 unless noted otherwise. Masonry anchors for stainless steel attachments shall be of the matching grade.

Table 2 Allowable Tensile Masonry (lbs) in Hollow Concrete Block	
Size	MASONRY ANCHORS WITH INJECTION ADHESIVE SYSTEM
1/4"	255
5/16"	370
3/8"	525
1/2"	525

G. Electrodes for Welding

1. Electrodes for welding carbon steel shall comply with Section 05 12 00 - Structural Steel Framing.
2. Electrodes for welding aluminum shall comply with the Aluminum Association Specifications and AWS D1.2.

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3. Electrodes for welding stainless steel and other metals shall comply with AWS A5.4.

H. Eye Bolts

1. Eyebolts shall be of the size indicated on the Contract Drawings and shall conform to ASTM A489 unless noted otherwise.
2. Carbon steel eyebolts shall be galvanized in accordance with Section 05 05 13.01 - Galvanizing.

I. Titanium Bolts and Anchors

1. Titanium bolts, washers, nuts and anchors shall be provided in, over, and adjacent to containment areas for ferric chloride and sodium hypochlorite, unless indicated otherwise on the Contract Drawings.
2. Bolts and anchors shall be of the size indicated on the Contract Drawings. Bolts, anchors washers and nuts and shall conform to ASTM B 348, Grade 2.
3. Minimum mechanical and physical properties:
 - a. Tensile Strength 50,000 psi
 - b. Yield Strength 40,000 psi
 - c. Elongation in 4" dia. 20%
 - d. Modulus of Elasticity 14.9x10⁶ psi

J. Expansion Bolts in Structural Steel Connections

1. Expansion bolts for connecting to hollow section steel or where access is restricted (blind-bolts) shall be Type 316 stainless steel with a hex head such as specified in this Section.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Contractor shall field verify all dimensions and condition of the materials to be connected, review the Drawings and report any discrepancies to the Engineer for clarification prior to starting fabrication.

3.02 INSTALLATION

- A. Anchor Bolts and Concrete Anchors:

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1. Anchor bolts shall be installed in accordance with AISC "Code of Standard Practice" by setting in concrete while it is being placed and positioned by means of a rigidly held template.
 2. The installation of concrete anchors shall be done in strict conformance with the manufacturer's field demonstration and recommendations.
 3. The holes drilled for adhesive anchors shall be cleaned by use of a fiber bristle brush and dry compressed air. The anchors shall be supported in the correct position until the adhesive sets and gains enough strength to prevent any dislocation. Adhesive anchors shall not be tightened or loaded until the adhesive has fully cured as recommended by the manufacturer.
 4. No concrete anchor shall be installed before base concrete has attained specified 28-day strength.
 5. Concrete anchors shall not be used in place of anchor bolts without Engineer's approval.
- B. Bolts:
1. All steel bolts shall be installed in conformance with Section 05 12 00 - Structural Steel Framing.
 2. Unless otherwise specified, where aluminum and steel members are connected together they shall be fastened with Type 304 stainless steel bolts and isolated with micarta, nylon, rubber, or approved equal.
- C. Concrete Inserts: Provide concrete inserts where shown on the Contract Drawings. Inserts shall be firmly held in position in the forms and sealed from intrusion of concrete mortar during concrete placement.
- D. Titanium Bolts
1. All bolts shall be installed in conformance with the manufacturer's recommendations.
 2. Titanium anchors shall be installed in accordance with AISC "Code of Standard Practice" by setting in concrete while it is being placed and positioned by means of a rigidly held plate.
- E. Adhesive Anchors
1. Concrete is to be a minimum of 21 days old at time of anchor installation
 2. Work shall be performed by certified ACI/CRSI Adhesive Anchor Installers under continuous special inspection
 3. Shall be installed in accordance with Manufacturer's Published Installation Instructions (MPII), the applicable ICC-ES ESR and in accordance with NYSBC.

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4. Adhesive anchoring installation shall be subject to special inspection requirements of NYSBC section BC 1704.32.
5. Adhesive anchor shall be identified by labels on the packaging including manufacturer's name, product designation and the requirements specified in ICC-ES AC308, Annex A.

F. Welding

1. Welding shall comply with the requirements of Sections 05 12 00 - Structural Steel Framing and 05 05 23.01 - Welding.

3.03 FIELD TESTING / QUALITY CONTROL

A. Inspection

1. Inspection for high strength bolted connections shall conform to the requirements of Section 05 12 00 - Structural Steel Framing.
2. At least 25 percent of the concrete anchors required to be installed shall be proof tested to 1.33 times the allowable load specified by the manufacturer of the system.
3. Welding inspection shall be done in accordance with the requirements of Sections 05 12 00 - Structural Steel Framing and 05 05 23.01 - Welding.
4. Inspection of titanium bolted connections shall conform to the requirements of AISC "Code of Standard Practice."
5. Adhesive Anchors: Adhesive anchoring installation shall be subject to special inspection requirements of NYSBC section BC 1704.32.

B. Testing of Adhesive Anchors

1. Field testing:
 - a. Testing to be performed by an approved special inspection agency to perform field testing of the installed anchors in accordance with NYSBC BC 1704.32 and ICC-ES ESR and the applicable sections of ASTM E488 in the presence of the Engineer.
 - b. Anchors that are to be tested are as indicated on the Contract Drawings.
2. Pull-out testing:
 - a. A total of 15% of the adhesive anchors designated for testing are to be tested and no more than one (1) bolt is to be tested per connection.
 - b. The Engineer will randomly choose the anchors to be tested.
 - c. Testing of the adhesive anchors shall not begin until all the anchors are installed.

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- d. If only one anchor fails, all the adhesive anchors will be accepted. If a second anchor fails, an additional 5% of the anchors shall be tested. If more than 20% of the total anchors tested fail, all the anchors shall be removed and replaced.
- 3. Removal and replacement of failed test anchors:
 - a. Remove all anchors that fail the field test without damage to the surrounding concrete.
 - b. Redrill holes to remove adhesive bonding material residue and clean in accordance with MPII.
 - c. Reinstall new anchors that are the same size as the removed anchors and install the new anchors in the same exact location as the removed anchor. Do not reuse the failed anchors, they shall be discarded.
 - d. Assign reinstalled anchors into batches only containing reinstalled anchors of the same diameter, embedment length and adhesive bonding material system, and field test in accordance with the above sections.
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

SECTION 05 05 23.02 - MISCELLANEOUS METAL FASTENINGS

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NO TEXT ON THIS PAGE

SECTION 05 06 00.01 - SCHEDULES FOR STAINLESS STEEL WORK
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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish, install and erect the stainless steel work as specified herein and shown on the Contract Drawings.
- B. Stainless steel work shall be furnished complete with all accessories, mountings and appurtenances of the type of stainless steel and finish as specified or required for a satisfactory installation.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 05 05 23.01 - Welding.

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1.04 REFERENCES

- A. ASTM A193 - Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
- B. ASTM A194 - Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
- C. ASTM A262 - Practice for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steel.
- D. ASTM A276 - Stainless and Heat-Resisting Steel Bars and Shapes.
- E. ASTM A314 - Stainless and Heat-Resisting Steel Billets and Bars for Forging.
- F. ASTM A380 - Practice for Cleaning and Descaling Stainless Steel Parts, Equipment and Systems.
- G. ASTM A473 - Stainless and Heat-Resisting Steel Forgings.
- H. ASTM A666 - Austenitic Stainless Steel, Sheet, Strip, Plate and Flat Bar.
- I. ASTM F593 - Stainless Steel Bolts, Hex Cap Screws and Studs.
- J. ASTM F594 - Stainless Steel Nuts.
- K. ASME B1.1 - Unified Inch Screw Thread (UN and UNR Thread Form).

1.05 DESCRIPTION

- A. Tests
 - 1. All stainless steel materials including stainless test welds, shall be checked for compliance with tests for susceptibility to intergranular attack. Such tests shall be Practices A, B and E of ASTM A262. Detailed procedures for the tests shall be submitted to the Engineer for approval prior to start of work. Practice A shall be used only for acceptance of materials but not for rejection of materials, and shall be used for screening material intended for testing in Practice B and Practice E. The maximum acceptable corrosion rate under Practice B shall be 0.004 inch per month, rounded off to the third decimal place. If the certified mill report indicates that such test has been satisfactory performed, the fabricator may not be required to repeat the test. Material passing Practice E shall be acceptable.
 - 2. Sample selection for the susceptibility to intergranular attack tests shall be as follows:
 - a. One (1) sample per each heat treatment lot for plates and forgings;

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- b. One (1) sample per each Welding Procedure Qualification regardless of the joint design;
- c. If tests indicate a reduction in corrosion resistance, welding procedure shall be adjusted or heat treatment determined as needed to restore required corrosion resistance;
- d. The samples so chosen shall have received all the post-weld heat treatments identical to the finished part.

1.06 QUALITY ASSURANCE

- A. Shop inspections may be made by the City representatives. The Contractor shall give ample notice to the Engineer prior to the beginning of any stainless steel fabrication work so that inspection may be provided. The Contractor shall furnish all facilities for the inspection of materials and workmanship in the shop, and the inspectors shall be allowed free access to the necessary parts of the works.
- B. Inspectors shall have the authority to reject any materials or work which does not meet the requirements specified herein or of the Contract Drawings.
- C. Inspection at the shop is intended as a means of facilitating the work and avoiding errors, but is expressly understood that it will in no way relieve the Contractor from his responsibility for furnishing proper materials or workmanship.

1.07 SUBMITTALS

- A. The Contractor shall prepare and submit Shop Drawings for all stainless steel fabrication for approval by the Engineer. Submittals shall include, but not be limited to, the following:
 - 1. Certified test reports for susceptibility to intergranular attack.
 - 2. Affidavit of compliance with type of stainless steel shown on the Contract Drawings or specified herein.
 - 3. Certified weld inspection reports.
 - 4. Cleaning and handling of stainless steel in accordance with Article "Cleaning and Handling" in this Section.
- B. Samples of finish, on each type of stainless steel to be furnished, shall be submitted in accordance with the Quality Assurance requirements of the Contract.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Mechanical damage (e.g., scratches and gouges) to the stainless steel material can occur during handling. Care shall be taken in the material handling since such mechanical damage will result in the passive oxide film being

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"punctured" leading to a possible lower resistance to the initiation of corrosion than the surrounding chemically-passivated surface. Corrosion in such areas can be accelerated by the galvanic corrosion effect due to the unfavorable relative area ratios which would exist.

- B. Stainless steel plates and sheets shall be stored vertically in racks and not be dragged out of the racks or over one another. Racks shall be protected to prevent iron contamination.
- C. Heavy stainless steel plates shall be carefully separated and chocked with wooden blocks so that the forks of a fork-lift could be inserted between plates without mechanically damaging the surface.
- D. Stainless steel plates and sheets laid out for use shall be off the floor and be divided by wooden planks to prevent surface damage and to facilitate subsequent handling.
- E. Plate clamps, if used, shall be used with care as the serrated faces can dig in, indent and gouge the surface.
- F. Stainless steel fabrications shall be loaded in such a manner that they may be transported and unloaded without being overstressed, deformed or otherwise damaged.
- G. Stainless steel fabrications and packaged materials shall be protected from corrosion and deterioration and shall be stored in a dry area. Materials stored outdoors shall be supported above ground surfaces on wood runners and protected with approved effective and durable covers.
- H. Stainless steel fabrications shall not be placed in or on a structure in a manner that might cause distortion or damage to the fabrication. The Contractor shall repair or replace damaged stainless steel fabrications or materials as directed by the Engineer.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Materials and Finishes

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1. Type and finish of stainless steel to be utilized for fabrication shall be the type and finish indicated on the Contract Drawings or as specified herein for the intended service and conforming to the applicable ASTM standard.
2. The basic mill forms (sheet, strip, plate and bar) are classified by size as shown on Table 1. Tables 2, 3 and 4 identify finishes and conditions in which sheet, bar and plate are available.
3. Tables 2, 3 and 4 show numbered finishes and conditions for sheet, bar and plate. While there are no specific designations for polished finishes on bar or plate, the sheet finish designations are used to describe the desired effect. This also applies to finishes on ornamental tubing.
4. There are three standard finishes for strip, which are broadly described by the finishing operations employed:
 - a. No. 1 Strip Finish is approximately the same as No. 2D Sheet Finish. It varies in appearance from dull gray matte to a fairly reflective surface, depending largely on alloy composition and amount of cold reduction.
 - b. No. 2 Strip Finish is approximately the same as a No. 2B sheet finish. It is smoother, more reflective than No. 1, and likewise varies with alloy composition.
 - c. Bright annealed finish is a highly reflective finish that is retained by final annealing in a controlled atmosphere furnace.

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Table 1
CLASSIFICATION OF STAINLESS STEEL PRODUCT FORM

Item	Description	Dimensions		
		Thickness	Width	Diameter or Size
Sheet	Coils and cut length: Mill finishes Nos. 1, 2D and 2B Polished finishes Nos. 3, 4, 6, 7 & 8	under 3/16" under 3/16"	24" and over all widths	-- --
Strip	Cold finished, coils or cut lengths Polished finishes Nos. 3, 4, 6, 7 & 8	under 3/16" under 3/16"	under 24" all widths	-- --
Plate	Flat rolled or forged	3/16" and over	over 10"	--
Bar	Hot finished rounds, squares, octagons and hexagons Hot finished flats	-- 1/8" to 8" incl.	-- 1/4" to 10" incl.	1/4" and over --
	Cold finished rounds, squares, octagons and hexagons Cold finished flats	-- 1/8" to 4-1/2"	-- 3/8" to 4-1/2"	over 1/8" --
Wire	Cold finishes only: (in coil) Round, square, octagon, hexagon and flat wire	under 3/16"	under 3/8"	--
Pipe and Tubing	Several different classifications, with differing specifications, are available.			
Extrusion	Not considered "standard" shapes. Currently limited in size to approximately 6-1/2" diameter or structurals.			

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Table 2
STANDARD MECHANICAL SHEET FINISHES

<p>Unpolished or Rolled Finishes: No. 1 A rough dull surface which results from hot rolling to the specified thickness followed by annealing and descaling.</p>	<p>No. 4 A polished surface obtained by finishing with a 120-150 mesh abrasive, following initial grinding with coarser abrasives. This is a general purpose bright finish with a visible "grain" which prevents mirror reflection.</p>
<p>No. 2D A dull finish which results from cold rolling followed by annealing and descaling, and may perhaps get a final light roll pass through unpolished rolls. A 2D finish is used where appearance is of no concern.</p>	<p>No. 6 A dull satin finish having lower reflectivity than No. 4 finish. It is produced by Tampico brushing the No. 4 finish in a medium of abrasive and oil. It is used for architectural applications and ornamentation where a high luster is undesirable, and to contrast with brighter finishes.</p>
<p>No. 2B A bright cold-rolled finish resulting in the same manner as No. 2D finish, except that the annealed and descaled sheet receives a final light roll pass through polished rolls. This is the general purpose cold-rolled finish that can be used as is, or as a preliminary step to polishing.</p>	<p>No. 7 A high reflective finish that is obtained by buffing finely ground surfaces but not to the extent of completely removing the "grit" lines. It is used chiefly for architectural and ornamental purposes.</p>
<p>Polished Finishes: No. 3 An intermediate polish surface obtained by finishing with a 100 grit abrasive. Generally used where a semi-finished polished surface is required. A No. 3 finish usually receives additional polishing during fabrication.</p>	<p>No. 8 The most reflective surface, which is obtained by polishing with successively finer abrasives and buffing extensively until all grit lines from preliminary grinding operations are removed. It is used for applications such as mirrors and reflectors.</p>

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Table 3
CONDITIONS AND FINISHES FOR BAR

Conditions	Surface Finishes¹
Hot worked only	(a) Scale not removed (excluding spot conditioning) (b) Rough turned ² (c) Pickled or blast cleaned and pickled.
Annealed or otherwise heat treated.	(a) Scale not removed (excluding spot conditioning) (b) Rough turned (c) Pickled or blast cleaned and pickled (d) Cold drawn or cold rolled (e) Centerless ground (f) Polished
Annealed and cold worked to high tensile strength ³	(d) Cold drawn or cold rolled (e) Centerless ground (f) Polished

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**Table 4
CONDITIONS AND FINISHES FOR PLATE**

Condition and Finish	Description and Remarks
Hot rolled	Scale not removed. Not heat treated. Plates not recommended for final use in this condition. ⁴
Hot rolled, annealed or heat treated	Scale not removed. Use of plates in this condition is generally confined to heat resisting applications. Scale impairs corrosion resistance. ¹
Hot rolled, annealed or heat treated, blast cleaned or pickled	Condition and finish commonly preferred for corrosion resisting and most heat resisting applications.
Hot rolled, annealed, descaled and temper passed	Smoother finish for specialized applications.
Hot rolled, annealed, descaled cold rolled, annealed, descaled, optionally temper passed	Smooth finish with greater freedom from surface imperfection than the above.
Hot rolled, annealed or heat treated, surface cleaned and polished	Polished finishes refer to Table 2.
Notes:	
1. Surface finishes (b), (e) and (f) are applicable to round bars only.	
2. Bars of the 4xx series stainless steels which are highly hardenable, such as Types 414, 420, 420F, 431, 440A, 440B and 440C, are annealed before rough turning. Other hardenable grades, such as Types 403, 410, 416 and 416Se, may also require annealing depending on their composition and size.	
3. Produced in Types 302, 303Se, 304 and 316.	
4. Surface inspection is not practicable on plates which have not been pickled or otherwise descaled.	

B. Fasteners

1. Stainless steel fasteners shall be used for joining stainless steel work.
2. Stainless steel fasteners shall be made of alloys that are equal to or more corrosion resistant than the materials they join.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Fabrication

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1. Holes for bolts and screws shall be drilled. Fastenings shall be concealed where practicable. Joints exposed to the weather shall be formed to exclude water.
2. As far as practicable, all fabricated units shall be fitted and assembled in the shop, with all cuts and bends made to precision measurements in accordance with details shown on approved shop drawings.
3. Work shall be fabricated so that it is installed in a manner that will provide for expansion and contraction, prevent the shearing of bolts, screws and other fastenings, ensure rigidity, and provide close fitting of sections.
4. All finished and/or machined faces shall be true to line and level. Stainless steel sections shall be well formed to shape and size with sharp lines and angles; curved work shall be sprung evenly to curves.
5. All work shall be fitted together at the shop as far as possible, and delivered complete and ready for erection. Proper care shall be exercised in handling all work so as not to injure the finished surfaces.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Field Measurements

1. The Contractor shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of the work.
2. The Contractor shall review the Contract Drawings and any discrepancies shall be reported to the Engineer for clarification prior to starting fabrication.

3.02 IMPLEMENTATION

- A. Installation

1. All stainless steel fabrications shall be erected square, plumb and true, accurately fitted, adequately anchored in place, set at proper elevations and positions.
2. All inserts, anchor bolts and all other miscellaneous work specified herein or shown on the Contract Drawings or required for the proper completion of the work, which are embedded in concrete, shall be properly set and securely held in position in the forms before the concrete is placed.

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3. All stainless steel fabrications shall be installed in conformance with details shown on the Contract Drawings or on the approved shop drawings.

B. Welding

1. Welding shall be done in a manner that will prevent buckling and in accordance with Section 05 05 23.01 - Welding, and as modified hereinafter.
2. All welds exposed in the work shall be ground smooth and finished to match the finish of the adjacent stainless steel surfaces.
3. Select weld rods that provide weld filler metal having corrosion resistant properties as nearly identical or better than the base metal to insure preservation of the corrosion-resistant properties. Provide heat treatment at welds where testing of weld procedure indicates it is required to restore the corrosion resistance.
4. Thermal conductivity of stainless steel is about half that of other steels; and the following methods may be used to accommodate this situation:
 - a. Use lower weld current setting.
 - b. Use skip-weld techniques to minimize heat concentration.
 - c. Use back-up chill bars or other cooling techniques to dissipate heat.
5. Edges of the stainless steel to be welded shall be cleaned of contaminants.

C. Cleaning and Handling

1. All stainless steel surfaces shall be precleaned, descaled, passivated and inspected before, during and after fabrication in accordance with the applicable sections of ASTM A380 and as detailed in the procedures to be submitted to the Engineer for approval prior to start of work. Degreasing and passivation of stainless steel articles shall be conducted as the last step after fabrication.
2. Measures to protect cleaned surfaces shall be taken as soon as final cleaning is completed and shall be maintained during all subsequent handling, storage and shipping.
 - a. The Contractor shall submit for approval specific procedures listing all the steps to be followed in detecting contamination and in descaling, cleaning, passivation and protecting of all stainless steel.
 - b. Area showing clear indications of contamination shall be recleaned, repassivated and reinspected.

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3. At approved stages in the shop operations, contaminants such as scale, embedded iron, rust, dirt, oil, grease and any other foreign matter shall be removed from the metal, as directed or approved by the Engineer. The adequacy of these operations shall be checked by the Engineer. Operations in the shop shall be conducted so as to avoid contamination of the stainless steel and to keep the metal surfaces free from dirt and foreign matter.
4. In order to prevent incipient corrosion during fabrication, special efforts shall be made at all times to keep all stainless steel surfaces from coming in contact with other metals.
 - a. Stainless steel and stainless steel welds shall be cleaned with clean sand, stainless steel wool, stainless steel brushes, or other approved means and shall be protected at all times from contamination by any materials, including carbon steel, that shall impair its resistance to corrosion.
 - b. Approved methods of cutting grinding and handling shall be used to prevent contamination. If air-arc, or carbon-arc cutting is used, additional metal shall be removed by approved mechanical means so as to provide clean, weldable edges. All grinding of stainless steel shall be performed with aluminum oxide or silicon carbide grinding wheels bonded with resin or rubber. Grinding wheels used on carbon steel shall not be used on stainless steel.
 - c. Sand, grinding wheels, brushes and other materials used for cleaning stainless steel shall be checked periodically by the Engineer for contaminants. Cleaning aids found to contain contaminants shall not be used on the work.

D. Not Used

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 05 12 00 - STRUCTURAL STEEL FRAMING
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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all labor, materials, equipment, services, and perform all operations required for complete furnishing, fabrication, delivery, unloading, handling, storing, installation, and erection of all structural steel Work as shown on the Contract Drawings, called for herein and as approved. Include all supplementary parts, members, connections, engineering, and incidental work necessary to complete the structural steel Work, regardless of whether all such items are specifically shown or specified on the Contract Drawings.
- B. Extent of structural steel Work is shown on the Contract Drawings, including schedules, notes, and details that show size and location of members, typical connections, and type of steel required.
- C. Unless otherwise shown, specified, or required, design, workmanship and erection shall conform to or exceed the applicable requirements of the documents listed hereinafter in Article "References" included in this Section to the extent that the provisions of such documents are not in conflict with the requirements of this Section.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Requirements from the following sections also apply to this Section:

1. Section 05 05 13.01 - Galvanizing
2. Section 05 05 23.01 - Welding
3. Section 05 05 23.02 - Miscellaneous Metal Fastenings.
4. Section 05 50 00 - Metal Fabrications.
5. Section 05 51 00 - Metal Stairs.
6. Section 05 31 23 - Steel Roof Decking.
7. Section 07 21 60 - Structural Thermal Breaks.

1.04 REFERENCES

- A. Definition:

1. No definition of additional terms is required for this Section.

- B. Reference Standards:

1. American Society for Testing and Materials (ASTM):
 - a. ASTM A6 - General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling
 - b. ASTM A29 - General Requirements for Steel Bars, Carbon and Alloy, Hot Wrought.
 - c. ASTM A36 - Carbon Structural Steel
 - d. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
 - e. ASTM A108 - Steel Bar, Carbon and Alloy, Cold-Finished
 - f. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - g. ASTM A193 - Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service

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- h. ASTM A194 - Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
 - i. ASTM A240 - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 - j. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
 - k. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
 - l. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
 - m. ASTM A563 - Carbon and Alloy Steel Nuts
 - n. ASTM A572 - High-Strength Low-Alloy Columbium-Vanadium Structural Steel
 - o. ASTM A588 - High-Strength Low-Alloy Structural Steel with 50 ksi Minimum Yield Point to 4-Inches Thick
 - p. ASTM A673 - Sampling Procedure for Impact Testing of Structural Steel
 - q. ASTM A992 - Standard Specification for Steel for Structural Shapes for Use in Building Framing
 - r. ASTM F436 - Hardened Steel Washers, Inch and Metric Dimensions
 - s. ASTM B695 - Coatings of Zinc Mechanically Deposited on Iron and Steel
 - t. ASTM F594 - Stainless Steel Nuts
 - u. ASTM F959 - Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners
 - v. ASTM F3125 - High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi & 150 ksi Minimum Tensile Strength, Inch and Metric Dimensions
 - w. ASTM F1554 - Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength.
 - x. ASTM F2329 - Zinc coating, hot-dip requirements for application to carbon and alloy steel bolts, screws, washers, nuts, and special threaded fasteners.
- 2. ANSI B18.2.1 - Square and Hex Bolts and Screws-Inch Series.
 - 3. ANSI B18.22.1 - Plain Washers

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4. ANSI/ASME B18.2.2 - Square and Hex Nuts (Inch Series)
5. ANSI/ASNT CP-189 - Standard for Qualification and Certification of Nondestructive Testing Personnel
6. American Welding Society (AWS):
 - a. AWS A2.4- Standard Symbols for Welding, Brazing, and Nondestructive Examination
 - b. AWS A5.1- Carbon Steel Covered Arc-Welding Electrodes
 - c. AWS A5.5- Low-Alloy Steel Covered Arc-Welding Electrodes
 - d. AWS A5.9- Corrosion-Resisting Chromium and Chromium-Nickel Steel Bare and Composite Metal Cored and Stranded Arc Welding Electrodes and Welding Rods
 - e. AWS A5.17 - Carbon Steel Electrodes and Fluxes for Submerged-Arc Welding
 - f. AWS A5.18 - Filler Metals for Gas Shielded Arc Welding, Carbon Steel
 - g. AWS A5.23 - Low-Alloy Steel Electrodes and Fluxes for Submerged Arc Welding
 - h. AWS D1.1- Structural Welding Code – Steel
 - i. AWS D1.4- Structural Welding Code – Reinforcing Steel.
 - j. AWS D1.5- Bridge Welding Code.
 - k. AWS D1.6- Structural Welding Code – Stainless Steel.
 - l. AWS QC1 - Qualification and Certification of Welding Inspectors
7. 2020 Building Code of New York State (NYSBC)
8. American Institute of Steel Construction (AISC):
 - a. AISC 325 - Steel Construction Manual, 15th Edition
 - b. AISC 207 - Certification Standard for Steel Fabrication and Erection, and Manufacturing of Metal Components
 - c. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges
 - d. AISC 360 - Specification for Structural Steel Buildings
 - e. AISC 326 - Detailing for Steel Construction
 - f. Design Guide 24 - Hollow Structural Sections

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9. Research Council on Structural Steel Connections (RCSC) - Specifications for Structural Joints Using High-Strength Bolts.
10. Steel Structures Painting Council (SSPC) .
11. SP 6/NACE No. 3– Commercial Blast Cleaning.
12. Occupational Safety and Health Administration, OSHA 29 CFR 1926, Part R, “Safety Standard for Steel Erection”.

1.05 DESCRIPTION

- A. Structural Steel: The term structural steel shall be as defined in Section 2.1 from AISC Code of Standard Practice for Steel Buildings and Bridges. The Work shall include but not be limited to the following:
- a. Beams, girders, lateral braced frames, girts.
 - b. Columns, posts, struts, and hangers.
 - c. Base plates, bearing plates, leveling plates, and shims.
 - d. Anchor rods and plates to be embedded in concrete.
 - e. Templates for items to be embedded in or attached to concrete.
 - f. Structural steel support angles, channels, etc. for metal deck.
 - g. Shop painting, lacquering, and galvanizing and field touch-up.
 - h. Bracing, guying, surveying, and plumbing of erected steel.
 - i. Shoring and temporary bracing.
 - j. Connections.
 - k. Shop applied stud shear connectors.
 - l. Concrete reinforcing bar coupling devices which are to be welded to structural steel.
 - m. Drilled-in anchors into concrete or masonry to fasten structural steel.
 - n. Deformed anchor bars stud welded to structural steel.
 - o. TFE slide bearings.
 - p. Erection drawings, shop drawings and samples.
 - q. Protection of work of this Section.
 - r. Protection of other work from activities under this Section.
 - s. Submittals.
 - t. Provisions for other work.
 - u. All other work shown in the Contract Drawings, specified in this Section, or required to make the structural steel Work complete.

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1.06 QUALITY ASSURANCE

A. Contractor Qualifications:

1. Qualification Data: Submit for record qualification data (personnel and firm resumes, and project lists with references) for the following:
 - a. Structural Steel Fabricator (“Fabricator”).
 - b. Structural Steel Detailer (“Detailer”).
 - c. Structural Steel Erector (“Erector”).
 - d. Erector’s Professional Engineer for temporary erection bracing.
 - e. Contractor’s Professional Engineer for connection design.
2. The Fabricator shall have a minimum of 10 years of comparable experience in installations of this type and shall employ labor and supervisory personnel familiar with the type of installation, experienced in fabrication and erection of structural steel for projects of similar size and complexity. The Fabricator’s qualifications shall be subject to review by the Engineer.
3. The Detailer shall have a minimum of 10 years of experience preparing detailed shop drawings and Computerized Numerical Control “CNC” downloads for structures of this type and complexity. The detailer’s qualifications shall be subject to review by the Engineer. All detailing shall be performed with 3D modeling software, such as TEKLA STRUCTURES, SDS/2, or approved equivalent.
4. The Professional Engineer employed by the Contractor for connection design shall be experienced in this specific area of structural steel connection design with demonstrated experience of not less than 10 years of similar scope and complexity. The Contractor’s connection engineer(s) shall be a licensed Professional Engineer registered in the state of New York.
5. The Erector shall have a minimum of 10 years of successful experience erecting structural steel for structures of this type and complexity in the region of the project.
6. The Professional Engineer employed by the Erector for preparation of Temporary Erection Bracing Drawings shall be experienced in the specific area of structural frame bracing during erection design with demonstrated experience of not less than 10 years of similar scope and complexity.

- B. Shop inspections may be made by the City representatives. The Contractor shall give ample notice to the Engineer prior to the beginning of any fabrication Work so that inspection may be provided. The Contractor shall furnish all facilities for the inspection of materials and workmanship in the shop, and the inspectors shall be allowed free access to the necessary parts of the works.

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1. Inspectors shall have the authority to reject any materials or work which does not meet the requirements of these Specifications.
 2. Inspection at the shop is intended as a means of facilitating the work and avoiding errors, but is expressly understood that it will in no way relieve the Contractor from his responsibility for furnishing proper materials or workmanship under this Specification.
- C. All welding shall be performed by certified welders under the immediate supervision of a representative of a standard testing agency or a special inspection agency reporting directly to and under the control of the City and meeting the requirements of Section 05 05 23.01 – Welding.
- D. The Contractor shall coordinate with the testing and inspection agency before starting Work.
1. All shop and field welds in structural steel shall be visually inspected by an AWS qualified welding inspector. The testing agency shall furnish a letter of certification for each welded connection stating that these requirements have been met.
 2. The costs of all welding supervision shall be borne by the Contractor. The Contractor shall coordinate with the testing agency to inspect welded connections and to perform tests and prepare test reports.
 3. Ten (10) percent of all butt and bevel groove welds which extend continuously for 24 inches or less will be completely tested using Radiographic Testing or Ultrasonic Testing in accordance with AWS D1.1. All butt and bevel groove welds which extend continuously for more than 24 inches will be spot tested at intervals not exceeding 36 inches.
 4. Welds that are required by the Engineer and/or inspectors to be corrected shall be corrected or redone and retested as directed, at the Contractor's expense and to the satisfaction of the Engineer and/or to the satisfaction of independent testing lab.
- E. The Contractor shall coordinate with the testing and inspection agency to inspect high-strength bolted connections. The agency shall report directly and be under the control of the City.
1. Rejected bolts shall be either replaced or retightened as required. In cases of disputed bolt installation, the bolts in question shall be checked by a calibrated wrench certified by an independent testing laboratory. The certification shall be at the Contractor's expense.
- F. The Contractor shall be solely responsible for the correctness of all shop and field fabrication and fit.
- G. Where connections are not indicated on the Contract Drawings as “Fully Designed by Engineer”, the Contractor is responsible for the complete design of the connections for the required member design forces as shown on the Contract

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Drawings. Submit design calculations for steel connections, signed and sealed by a licensed Professional Engineer registered in the state of New York. Suggested conceptual connection details are shown on the Contract Drawings to convey the design requirements and to assist the Contractor as the basis for bid. The suggested conceptual connection details may not fully represent the complexity of the final connection design to resist the forces shown on the Contract Drawings. The suggested conceptual details are for illustrative purposes only, and may not indicate the required size, quantity, configuration of bolts, welds, connection plate or angle profiles and thicknesses, gusset plate profiles and thicknesses, reinforcing plates, washers, leveling plates and nuts, erection supports, shims, and other incidentals required for a complete connection design.

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings and material specifications for the approval of the Engineer. Submittals shall include, but not be limited to:
1. Submittal schedule, including a list, in order of date to be submitted, of all calculations, drawings, and other required submittal items scheduled to be submitted in this Section. Submittal schedule shall be submitted prior to commencing submission of connection design calculations and shop drawings. See Division 1 specifications for additional information.
 2. Layout piece shop drawings and details for each member produced in the fabrication shop, indicating all material type and grade, structural shapes, sizes, complete dimensional and geometric information, camber, connections, cuts, copes, holes, slots, openings, bolts, welds, surface treatments (cleaning, shop paint, etc.) and provisions for the connection of other work, prepared in accordance with AISC 303, 325, and 326. Steel type, grade, and size for all attached elements shall also be shown on each layout piece shop drawing. Layout piece shop drawings shall clearly distinguish between shop and field welds and bolts, identify pretensioned high-strength bolts and identify surface preparation requirements at slip-critical connections. Details for bolt assemblies shall indicate bolt size, length, type and the presence, type, and location of washers where required as part of the assembly; distinguish between N and X bolts, distinguish between slip-critical and bearing bolts; specify approved slip-critical coatings; and indicate bolt orientation. Layout piece shop drawings and erection drawings shall show the size, length, and type of each weld, including the electrode type to be used. Submit in complete package sequences so that individual parts and the assembled unit may be reviewed together.
 3. Anchor rods and setting plans, including templates, and directions for installation of anchor rods, and other anchorages to be installed by other Contractors.

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4. Erection Drawings, indicating complete member-placement showing the location and attachment of the individual shipping pieces, based on established dimensions shown on the Contract Drawings. Erection drawings shall include plans showing exact locations of base and bearing plates, and/or anchor rods and other embedded items. All field connections not specifically shown on the layout piece shop drawings shall be shown on erection drawings, including field bolt size, type, number, location and any special installation requirements, and field weld size, type, length, and location.
5. Erection sequence and procedure, including but not limited to temporary shoring and bracing drawings. Erection sequence and procedure submittal drawings shall be signed & sealed by a registered Professional Engineer in the State of New York. The review by the Engineer shall only be for the effects of the steel erection procedures on the final in-place structure. This erection procedure shall, at a minimum, meet the requirements outlined on the Contract Drawings. No deviation from the approved procedure shall be permitted without prior written approval by the Erector's Engineer and review by the Engineer. Temporary shoring and erection bracing drawings shall include the requirements for raising, bolting, and/or welding. Erection bracing drawings are in addition to and separate from the Erection Drawings.
6. Calculations for elements designed by the Contractor, including but not limited to connections, temporary shoring, bracing, etc. Calculations shall be signed and sealed by a registered Professional Engineer in the State of New York.
7. Pre-construction surveys. Where interfacing with existing construction occurs, before related shop drawings are prepared, survey the existing construction and submit the survey prepared by a professional surveyor employed by the Contractor. For all steel construction, before steel erection commences, perform, and submit to the Engineer a complete survey for position and alignment at all points where construction by other trades will support steel elements, including but not limited to pockets, embedded plates, anchor rods, and base plates. Include plan location positions relative to the building gridlines and elevations of bearing surfaces and tops of bolts relative to the building datum elevation. Immediately notify the Engineer of elements that are not within tolerance.
8. As-built surveys. Perform and submit for record a comprehensive survey of steel structure at the completion of each sequence to assess if the structure has been built within the tolerances specified in the Contract Documents. Each certified survey, performed by a professional surveyor employed by the Contractor, shall be submitted to the Contractor's Engineer for their approval before proceeding to the next sequence of erection. If deviations from the tolerances are discovered, the Contractor shall present corrective

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measures to the Engineer within 48 hours of completion of that sequence of erection. Upon completion of steel erection, submit the complete package of steel surveys for record to the Engineer.

9. Quality Control Program. Submit for record complete details of the Contractor's quality control program, including the names of the personnel responsible for this work.
 10. Product Data. Submit for review and approval the manufacturer's specifications, test reports, and applicable standards for all products listed in Part 2.
 11. High-Strength Bolting Procedures. Submit for review and approval, written high-strength bolting procedures that are in accordance with RCSC.
 12. Welding Procedures Specification (WPS). Submit for record, written procedures for all AWS D1.1 prequalified joints, and qualification procedures for all joints not prequalified by Section 3 of AWS D1.1 For stainless steel welds or bimetallic welds between stainless and carbon steels, submit for review welding procedures and processes per AWS D1.6 requirements.
 13. Submit written welding design, component assembly procedures, and welding methodology for hot rolled steel shapes exceeding 2 inches in thickness, built-up cross sections exceeding 2 inches in thickness, and welds in which there is almost no freedom of movement for members joined due to geometry or material thickness. Use the forms in AWS D1.1, Annex M.
 14. Welder Certifications. Submit for record certification that the welders have passed qualification tests using AWS procedures.
 - a. A certification shall be submitted in standard AWS format.
 - b. Each certification shall state that the welder has been performing satisfactory welding of the required type within the six-month period prior to the subject work.
 15. Dissimilar metals isolation details. Submit locations for review and approval. Submit manufacturer's isolation kits between dissimilar metals, including product data, technical information, and specifications.
 - a. For fastened connections, isolation kits shall at a minimum contain the following: isolation pads, isolation washers, and isolation bushings. Minimum thickness of the isolation pads, washers, and bushings shall follow manufacturer's recommendations unless otherwise directed by the Engineer.
- B. Reproduction of Contract Drawings prepared by Engineer for shop drawings shall not be permitted.

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- C. All modifications or revisions to submittals, shop drawings, connection design calculations and erection drawings shall be clouded, with an appropriate revision number clearly indicated.
- D. No fabrication shall be started until Shop Drawings have been approved in writing by the Engineer.
- E. The Contractor shall also submit the following:
 - 1. Certified mill reports for structural steel (each type). Reports shall include chemical and physical properties. For ASTM A6 hot-rolled shapes with flange thickness exceeding 2 inches, submit test reports for Charpy V-Notch testing in accordance with ASTM A6 Supplementary Requirement S30. See AISC specification section A3.1c.
 - 2. Affidavit of compliance with grade specified
 - 3. Certified weld inspection reports.
 - 4. Certification mill reports for high-strength bolts (each type, and every lot), including nuts and washers. Reports shall include chemical and physical properties.
 - 5. Certification mill reports for shop-applied stud shear connectors (each type, and every lot). Reports shall include chemical and physical properties.
 - 6. Laboratory test reports and other data for reinforcing bar coupling devices which are to be shop welded to structural steel, to show compliance with the Specifications.
 - 7. Laboratory test reports and other data for deformed anchor bars to be stud welded to structural steel, to show compliance with the Specifications.
 - 8. Paint certification
 - 9. Quality certifications for fabricators and erectors.
- F. Mill reports shall be obtained from the steel mills producing the steel and shall certify in a cover letter submitted with the report, that the steel meets the minimum requirements as to the physical and chemical properties, inspection, marking and tests for structural steel as defined by the relevant ASTM Standard Specifications. Any steel that does not meet the ASTM requirements shall be clearly identified in a cover letter submitted with the reports.
- G. The Contractor shall furnish samples for testing as requested by the Engineer.
- H. The Contractor shall submit for review and approval connection design calculations for Engineer's review in advance of the start of preparation of detailed shop drawings. Proposed variations from the connection details shown on the Contract Drawings will be considered and such variations shall have approval from the Engineer prior to the preparation of detailed shop drawings. All connection details designed by the Contractor shall be signed & sealed by a licensed Professional

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Engineer registered in the state of New York, and their calculations shall be submitted for review and approval.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Structural members shall be loaded in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
- B. Structural steel members and packaged materials shall be protected from corrosion and deterioration. Material shall be stored in a dry area.
- C. Materials stored outdoors shall be supported above ground surfaces on wood runners and protected with approved effective and durable covers.
- D. Materials shall not be placed on the structure in a manner that might cause distortion or damage to the members or the supporting structures. The Contractor shall repair or replace damaged materials or structures as directed by the Engineer.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hot-rolled structural steel shapes (W-shapes, channels, angles, WT-shapes) as shown on the Contract Drawings:
 - 1. Nucor Corporation, Charlotte, NC; www.nucor.com
 - 2. ArcelorMittal, Chicago, IL; www.usa.arcelormittal.com
 - 3. Gerdau Ameristeel, Tampa, FL; www.gerdau.com
 - 4. Steel Dynamics, Columbia City, Indiana; www.stld-cci.com
 - 5. Or approved equal.
- B. Hollow structural sections (HSS shapes) as shown on the Contract Drawings:
 - 1. Atlas Tube Inc., Chicago, IL; www.atlastube.com.
 - 2. Nucor Corporation, Charlotte, NC; www.nucor.com.
 - 3. Bull Moose Tube Company, Chesterfield, MO; www.bullmoosetube.com
 - 4. Exltube, North Kansas City, MO; www.exltube.com.
 - 5. Hanna Steel, Hoover, AL; www.hannasteel.com.
 - 6. Longhorn Tube, Dallas, TX; www.longhorntube.com

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7. Maruichi American Corporation, Santa Fe Springs, CA; www.macsfs.com.
8. Welded Tube of Canada, Concord, ON, Canada; www.weldedtube.com.
9. Valmont Industries Structural Tubing, Omaha, NE; www.valmont.com.
10. Or approved equal.

C. Carbon structural steel plates as shown on the Contract Drawings:

1. Nucor Corporation, Charlotte, NC; www.nucor.com.
2. ArcelorMittal, Chicago, IL; www.usa.arcelormittal.com
3. Cleveland Cliffs Inc., Cleveland, OH; www.clevelandcliffs.com.
4. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Structural Steel

1. The fabricator shall provide an affidavit stating that the structural steel furnished meets the requirements of the grade specified. All unidentified steel will be rejected and shall be removed from the site and replaced by the Contractor, at no additional cost to the City.
2. Structural steel for W, MC, C, WT, and L shapes shall conform to ASTM A992 unless otherwise indicated on the Contract Drawings.
3. Structural steel for base, anchor, bearing, and framing plates shall conform to ASTM A572 Grade 50 unless otherwise indicated on the Contract Drawings.
4. Structural steel for connection and splice plates shall conform to ASTM A36 or A572 Grade 50 unless otherwise indicated on the Contract Drawings.
5. Certified mill test reports or certified reports of tests made by the fabricator or a testing laboratory for structural steel in accordance with ASTM A6 and the governing specification shall constitute evidence of conformity with the ASTM Specification.
6. Steel pipe shall be ASTM A53, Type S, Grade B, unless otherwise indicated on the Contract Drawings. All members shall be furnished full length without splices unless otherwise noted or accepted by the Engineer.
7. Structural tubing shall be ASTM A500, Grade C, unless otherwise indicated on the Contract Drawings. All members shall be furnished full length without splices unless otherwise noted or accepted by the Engineer.
8. All structural steel shapes shall be new, and not re-used.

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9. For metal thickness exceeding 2 inches, Charpy V-Notch tests shall be performed in accordance with ASTM A673, and shall meet a minimum value of 25 ft-lbs absorbed at 32 degrees F, and 55 ft-lbs absorbed at 70 degrees F.

B. Bolts

1. High strength bolts shall conform to ASTM F3125, unless otherwise indicated on the Contract Drawings.
2. Galvanized high strength bolts shall conform to ASTM F3125, grade A325 Type 1, nuts shall conform to ASTM A563. Galvanizing shall be by the hot-dip process and in accordance with Section 05 05 13.01 - Galvanizing.
 - a. Nuts shall meet the requirements of either ASTM A563 for Grade DH, or ASTM A194 for Grade 2H.
 - b. Flat circular washers and square or rectangular beveled washers shall conform to the requirements of ASTM F436.
 - c. Beveled washers shall be square, smooth, and sloped so that contact surfaces of the bolt head and nut are parallel.
 - d. The diameter of the hole of square beveled washers shall be 1/16 inch greater than the bolt size for bolts smaller than 1 inch, and shall be 1/8 inch greater than the bolt size for bolts larger than 1 inch.
 - e. Bolt dimensions shall conform to the requirements for regular semi-finished hexagon bolts, ANSI B18.2.1., unless otherwise specified.
 - f. Nut dimensions shall conform to requirements for heavy hexagon semi-finished nuts ANSI/ASME B18.2.2. Washers shall be flat and smooth and their dimensions shall conform to the requirements for heavy plain washers, ANSI B18.22.1.
3. Bolts used to connect dissimilar metals or located in a corrosive atmosphere, as indicated on the Contract Drawings or specified herein, shall be Type 316 stainless steel conforming to ASTM A193 and A194.
4. Bolts not manufactured in the United States shall be tested and certification provided with respect to specified and required quality and strength standards. Certification of origin shall be provided for all United States fasteners. Bolts to be tested will be randomly selected in the field by the Engineer.
5. Galvanized twist off type bolts (Tension Control bolts) shall conform to ASTM F3125, grade F1852 (A325 TC), type 1, mechanically galvanized in accordance with ASTM B695.
6. All bolts shall be new, and not re-used.

C. Anchor Rods

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1. Anchor rods for structural steel shall be of the size and configuration shown on the Contract Drawings and shall conform to ASTM F1554 unless shown or noted otherwise on the Contract Drawings.
 2. All anchor rods shall be new, and not re-used.
- D. Welding Electrodes
1. Welding electrodes for manual shielded metal arc welding shall conform to ANSI/AWS A5.1. Carbon steel electrodes and granular flux for the submerged-arc welding process shall conform to ANSI/AWS A5.17 and low-alloy steel electrodes and fluxes for submerged arc-welding shall conform to ANSI/AWS A5.23 as required for the conditions of actual use.
 2. Welding electrodes for ASTM A36 steel shall comply with ANSI/AWS A5.1 (minimum tensile strength of 72,000 psi) and shall be E70XX.
 3. Welding electrodes for ASTM A588, ASTM A572, and ASTM A992 steel shall comply with ANSI/AWS A5.17 (tensile strength range of 70,000 psi to 95,000 psi) or ANSI/AWS A5.23 wire and flux, and shall be F7XX-EXXX or F7XX-EXX-XX.
 4. Gas-welding electrodes for steel shall comply with ANSI/AWS A5.18 (minimum yield strength of 60,000 psi).
- E. Dissimilar metals.
1. Where dissimilar metals are in contact with each other as shown on the Contract Drawing, the Contractor shall protect against galvanic corrosion by providing isolation materials between each other.
 2. Acceptable means of isolation consist of materials having high dielectric strength and low water absorption capacity.
 3. Acceptable isolation kits include the following materials:
 - a. Neoprene isolation pads.
 - b. Mylar film or tape.
 - c. PTFE (Teflon) film or tape.
 - d. Glass Reinforced Epoxy (GRE) gaskets.
 - e. Or approved equal.
 4. For bolted connections, an isolation kit includes plastic washers, bolt sleeves, and shims to isolate the dissimilar materials.
 5. Slip-critical bolts shall not be used to connect dissimilar metals. Slip-critical bolts between galvanized steel connected to carbon steel that is coated with a zinc-rich primer is permissible.
 6. Compressible materials used as isolation between dissimilar metals is strictly prohibited, unless shown on the Contract Drawings.

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- 2.03 FABRICATION / ASSEMBLING / FINISHES
- A. Material shall not be fabricated or delivered before the shop and erection drawings have been approved.
 - B. Fabrication shall be in accordance with the AISC Code of Standard Practice for Steel Buildings and Bridges.
 - C. Fabricate and assemble structural steel in the shop as approved .
 - D. Anchor Rods:
 - 1. All anchor rods for structural steel erection and other incidental items of the structural steel required to be built into concrete shall be properly set and securely held in position in the forms before the concrete is placed.
 - 2. Anchor rods and setting plans for steel columns shall be provided at the site, marked, or tagged for ready identification.
 - 3. Anchor rods shall be accurately set to template and at elevation to provide suitable projection above concrete and/or grout as specified in AISC Code of Practice. Anchor rods shall be set perpendicular to the theoretical bearing surface.
 - 4. All holes in structural steel members required for anchors, anchor rods, bolt holes, connection angles, supports and braces for stair stringers, equipment apparatus, sag rods, or other members noted on the Contract Drawings shall be provided by the fabricator and detailed on the shop drawings.
 - 5. Where misalignment between anchor rods and bolt holes in steel members is encountered, the Engineer shall be immediately notified. The Contractor shall submit a method to remedy the misalignment for review by the Engineer.
 - E. All materials shall be properly worked and match-marked for field assembly. Where finishing is required, assembly shall be completed including bolting and welding of units before start of finishing operations.
 - F. Connections:
 - 1. Unless noted otherwise on the Contract Drawings, all beam connections shall be designed for reaction values indicated on the Contract Drawings.
 - 2. Except where otherwise noted on the Contract Drawings or in this Specification, all welds shall be shop welded.
 - G. Where shop assembly of field connections is shown, specified or required, the unmatched holes shall be reamed and the pieces matchmarked before disassembly. The interchange of matching parts will not be permitted.
 - H. Holes shall be provided in members to permit connections to the work of other trades or contracts, and for passage through the member of work of other trades. All holes shall be accurately drilled or punched at right angles to the surface of the

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metal in accordance with AISC Specifications. Holes shall not be made or enlarged by burning. Burning or drifting unfair holes will not be permitted. Holes that must be enlarged shall be reamed. Drift pins will be allowed only to bring together the several parts for connection. Holes in base plates shall be drilled. Holes shall be clean-cut without torn or ragged edges. Outside burrs resulting from drilling operations shall be removed with a suitable tool.

- I. At hot rolled steel shapes exceeding 2 inches in thickness, built-up cross sections exceeding 2 inches in thickness, and welds in which there is almost no freedom of movement for members joined due to geometry or material thickness, provide pre-production sample testing of heat treatment, observe fabrication, welding, and heat treatment of the samples for conformance with submitted welding procedures. Establish locations of testing coupons following AWS procedures. Test coupons following AWS procedures to verify satisfactory results using the welding procedure and heat treatment.
 - J. Fitted stiffeners shall be ground to fit closely against flanges.
 - K. The Contractor shall be solely responsible for errors of detailing, fabrication, and erection of structural steel and structural steel deck. The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Field Measurement
 - 1. The Contractor shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of the work.
 - 2. The Contractor shall review the Contract Drawings and any discrepancies shall be reported to the Engineer for clarification prior to starting fabrication.
 - 3. The Contractor shall examine all work prepared by other Contractors to receive work of this Section and report any defects affecting installation to the Engineer. Commencement of work will be construed as complete acceptance of preparatory work by other Contractors. The Contractor is solely responsible for checking the dimensions and coordination of the structural steel work with other trades.

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3.02 IMPLEMENTATION

A. Erection

1. The erection of all structural steel shall conform to the applicable requirements of the Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings of the AISC.
 - a. All temporary bracing, guys and bolts as may be necessary to ensure the safety of the structure until the permanent connections have been made shall be provided by the Contractor. Provide temporary bracing during erection in accordance with the Contractor's approved erection procedure and sequence submittals.
 - b. High strength steel bolts shall conform to the AISC Specifications for Structural Joints Using High-Strength Bolts.
 - c. The structure as shown on the Contract Drawings is designed to withstand the design loads only when all structural elements are installed and fully connected. The Contractor shall be responsible for the analysis of all components and assemblies for stress and displacements that may be imposed by fabrication, shipping, handling, erection, temporary conditions, construction loads, etc. The analysis of such shall be performed by the Contractor's licensed Professional Engineer registered in the state of New York.
 - d. Immediately notify the Engineer of any errors in shop fabrication, deformations resulting from handling and transportation, and improper erection that affects the assembly and fitting of parts. Prepare details for corrective work and obtain approval of the method of correction. Approved corrections shall be made expeditiously at the sole expense of the Contractor, at no additional cost to the City.
2. All field connections shall be accurately fitted up before being bolted. Drifting shall be only such as will bring the parts into position and shall not be sufficient to enlarge the holes or to distort the metal. All unfair holes shall be drilled or reamed.
3. High Strength Steel Bolts
 - a. The furnishing and installation of high-strength bolts, washers and nuts shall be in conformity with:
 - 1) Relevant sections of the NYSBC.
 - b. All bolted connections shall use high strength bolts in bearing-type or slip-critical connections, as noted on the Contract Drawings, in accordance to the AISC Specification for Structural Joints Using High-Strength Bolts.

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- c. For slip-critical connections, the Engineer shall approve the procedure for calibration of wrenches and installation of bolts and, in general, the Contractor shall demonstrate to the Engineer that all requirements of the RSCS-Specifications for Structural Joints Using High-Strength Bolts are met.
 - d. Bolts shall be driven accurately into the holes without damaging the threads or steel member. Bolt heads shall be protected from damage during driving. Bolt heads and nuts shall rest squarely against the metal. Where bolts are to be used on beveled surfaces having slopes greater than 1 in 20 with a plane normal to the bolt axis, beveled washers shall be provided to give full bearing under the head or nut.
 - e. Except where “hand tightened” is shown on the Contract Drawings, all high strength bolts shall be installed with full pretension using the following methods, in accordance with RCSC, Section 8.2:
 - 1) Turn-of-Nut.
 - 2) Calibrated wrench.
 - 3) Use of twist off type tension control bolts, ASTM F3125, grade F1852.
 - 4) Direct-Tension-Indicator (DTI), in accordance with ASTM F959.
 - f. Comply with special washer requirements of the RCSC, such as those related to slotted and oversize holes, and tapered flanges. DTI “washers” shall not be substituted for such required washers.
 - g. All high strength bolt assemblies (including tension control bolts and DTI’s) used in pretensioned connections shall be verified in accordance with the Pre-Installation Verification section of the RCSC.
 - h. Clean and re-lubricate bolts and nuts that become dry or rusty before use, except tension control bolts must be re-lubricated by the manufacturer.
 - i. Bolts indicated as “hand tightened” to allow movement in the direction of the slots shall be prevented from backing off by using lock nuts, thread compound or deformed threads.
4. Cutting and Burning: The use of a gas cutting torch in the field for correcting fabrication errors will not be permitted on any major member in the structural framing. Its use may be permitted on minor members if the member is not under stress, and only after the written approval of the Engineer has been obtained.
- a. No cutting of structural steel members in the field will be allowed except by written approval of the Engineer.

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- b. All cutting shall be done with an oxyacetylene torch in conformity with the NYSBC and AWS.
 - c. Automatic or semi-automatic cutting methods shall be used. If manual shop cutting is required, it shall be done only with a mechanically guided torch, except that an unguided torch may be used where the cut is more than ½ inch from the finished dimension and final removal is completed by means such as chipping or grinding to produce a gouge-free surface of quality equal to that of the base metal. At restrained joints and as indicated elsewhere, weld access holes shall be ground smooth.
 - d. Where hot rolled steel shapes exceeding 2 inches in thickness are to be joined by partial or complete joint penetration welds, preheating shall be required for all thermal cutting operations. Preheat shall be sufficient to prevent cracking but in no case less than 150 degrees Fahrenheit . Weld access holes and copes shall be ground to a smooth radius after cutting and tested for cracks by the magnetic particle method. All cut edges shall be free of sharp notches and gouges.
5. Hammering which may damage or distort the members will not be permitted.
6. Bearing:
- a. Bearing ends of columns shall be milled or sawn square perpendicular to axis of column.
 - b. Finish bearing areas of base plates per AISC Specification for Structural Steel Buildings Section M2.8.
 - c. Clean bearing surfaces and surfaces that will be in permanent contact before the members are assembled.
7. Grouting of Base Plates and Bearing Plates: All loose column base plates and billets shall be accurately set to the designated levels on steel wedges or angle screeds in preparation for grouting under this Section. Support and align column base plates, with attached columns, on steel shims or setting bolts. After the supported members have been plumbed and properly positioned, tighten anchor rods nuts in preparation for grouting. Cut off wedges and shims flush with edges of plates and leave in place. The use of leveling plates shall not be permitted.
- a. Prior to the placement of non-shrink grout beneath base and bearing plates, the bottom surface of the plates shall be cleaned of all foreign materials, and concrete and masonry bearing surface shall also be cleaned of all foreign materials and roughened to improve bonding.

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- b. Anchor rods shall be tightened after the supported members have been positioned and plumbed and the non-shrink grout has attained its specified strength.
 - c. Baseplates shall be grouted with non-shrink grout to assure full uniform bearing. Grouting shall be done prior to placing loads on the structure.
8. Welding:
- a. Welding, where required, shall be performed in accordance with the requirements of:
 - 1) Section 05 05 23.01 – Welding.
 - 2) AWS D1.1 Structural Welding Code.
 - 3) Relevant sections of the NYSBC when applicable.
 - b. In assembly and during welding the component parts of built-up Work shall be held in place by sufficient clamps, temporary bolts or other adequate means to keep parts in proper position. Where temporary bolts are used, to hold the parts together in steel plates or similar work, the temporary bolts shall be removed and the holes shall be filled with welding material where practical. Otherwise, the nuts shall be tightened and the bolt threads outside the unit shall be burned and the bolt peened to prevent the nut from loosening.
9. Misfits at Bolted Connections:
- a. Where misfits in erection bolting are encountered, the Engineer shall be immediately notified. The Contractor shall submit a method to remedy the misfit for review by the Engineer. The Engineer will determine whether the remedy is acceptable or if the member must be refabricated.
 - b. Incorrectly sized or misaligned holes in members shall not be enlarged by burning or by the use of drift pins. The Contractor shall notify the Engineer immediately and shall submit a proposed method of remedy for review by the Engineer.
- B. Frame Assembly
- 1. Structural frames shall be set accurately to the lines and elevations indicated on the Contract Drawings. The various members shall be aligned and adjusted to form a part of a complete frame or structure before being permanently fastened. Bearing surfaces and other surfaces which will be in permanent contact shall be cleaned before assembly. Necessary adjustments to compensate for discrepancies in elevations and alignments shall be performed.

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2. Individual members of the structure shall be leveled, plumbed, squared, and true to lines and levels in strict accordance with the tolerances of the AISC Code of Standard Practice. The Contractor shall provide and install all temporary bracing required until structure is complete. The Contractor shall provide corrective measures to meet the tolerances, as required, at no additional cost to the City.
3. Contractor shall compensate for the difference between the temperature at time of fabrication and the mean temperature in service.

C. Painting

1. General Requirements:
 - a. Structural steel work shall be painted in accordance with Section 09 91 00 - Painting. All painting performed at the fabricator's shop shall be subject to inspection by the Engineer, and all parts of the work shall be made accessible to the Engineer.
 - 1) All structural steel shall be given one prime coat before shipment to the field.
 - 2) Structural steel encased in concrete shall not be painted.
 - 3) Structural steel encased in masonry or which will be otherwise inaccessible in the finished work, shall receive two shop coats. After erection and before the steel is enclosed, all damaged surfaces shall be prepared and touched-up.
 - 4) No paint shall be permitted on faying surfaces of slip critical joints unless it is qualified by test in accordance with AISC "Test Methods to Determine the Slip Coefficient for Coatings used in Bolted Joints" as adopted by the Research Council on Structural connections. Manufacturer's certification shall include a certified copy of the test report.
 - 5) Prime coat shall be compatible with fireproofing system.
 - b. All structural steel work specified to be painted shall be sand blasted or wheel abraded by the fabricator, of loose mill scale, loose rust, weld slag or flux deposit, dirt and other foreign matter to satisfy the following specifications of the SSPC:
 - 1) SSPC SP-6, Commercial Blast Cleaning, for all steel except steel subject to immersion.
 - 2) SSPC SP-10, Near-White Blast Cleaning, for steels subject to immersion.
 - c. Cleaned steels shall be primed within 6 hours after cleaning to prevent formation of new rust.

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2. Finished Surfaces: Machine finished surfaces with zero clearance metal to metal contact shall be protected against corrosion by rust-inhibiting coating that can be easily removed prior to erection or which has characteristics that make removal unnecessary prior to erection.
 3. Field Welds: Surfaces within 2 inches of any field weld location shall be free of materials that would prevent proper welding or produce objectionable fumes while welding is being done.
 4. Defective Work: The Contractor shall correct such work as found to be defective under this Article of the Sections.
- D. Splices will be permitted only where indicated on the Contract Drawings or the approved shop drawings. Fasten splices of compression members only after surfaces are cleaned and abutting surfaces have been brought completely into contact. Fill any remaining gaps with steel shims driven into place and cut flush. Tack weld shims to each other and to members. Use runoff tabs at bevel weld splices. Cut off runoff tabs and ground smooth after weld completion.
- E. Driftpins may be used only to bring together the several parts, and shall not be used in such a manner as to distort or damage the metal. Correct poor matching of holes by drilling to the next larger size and using a larger size bolt. Plug welding and redrilling will not be permitted, unless a specific instance arises and is approved by the Engineer.
- F. On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces. On non-exposed welded construction, remove erection bolts.
- G. If the Contractor furnishes additional material and labor for the purpose of erection or if the erection method requires that material be added to certain members, the required modifications shall be at the sole expense of the Contractor, at no additional cost to the City.
- H. Following erection, accurately align, level, and adjust all members prior to final fastening. Conform to AISC standard tolerances, unless otherwise noted in the Contract Documents.
- I. After erection, clean all damaged areas in the shop coat, exposed surfaces of bolts, bolt heads, nuts and washers, and all field welds and unpainted areas adjacent to field welds according to manufacturer's recommendations and paint with the same paint used for the shop coat. Match the touch up and field applied paint color to the as-built paint color.
- J. Clean all steel members of mud, debris, and construction residue prior to erection.
- K. Galvanizing
1. All steel noted to be galvanized on the Contract Drawings or specified herein shall be galvanized in accordance with Section 05 05 13.01 - Galvanizing.

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2. All bolts and anchor rods connecting galvanized steel members shall be galvanized.
3. Shop paint primer shall be omitted from steel to be galvanized.
4. After erection, clean all damaged galvanized areas, welds, and areas adjacent to welds and paint with the specified galvanizing repair paint.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

SECTION 05 31 23 - STEEL ROOF DECKING
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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all labor, materials, equipment, services, and perform all operations required for complete furnishing, fabrication, delivery, unloading, handling, storing, installation, and erection of all structural steel roof decking systems, and appurtenant items, with all attachments, flashings, metal closures, accessories and fittings as required for a complete installation. The work shall be completed in place as shown on the Contract Drawings, as specified herein and as approved.
- B. The Work shall include all incidental and miscellaneous items not specified under another Section but required for completing the work of this Section, whether or not specifically required herein.
- C. Unless otherwise shown, specified, or required, design, workmanship and erection shall conform to or exceed the applicable reference standards listed hereinafter in this Section to the extent that the provisions of such documents are not in conflict with the requirements of this Section.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Requirements from the following sections also apply to this Section:

1. Section 05 05 13.01 - Galvanizing.
2. Section 05 05 23.01 - Welding.
3. Section 05 05 23.02 - Miscellaneous Metal Fastenings.
4. Section 05 12 00 - Structural Steel Framing.

1.04 REFERENCES

- A. Acronyms:

1. American Galvanizers Association (AGA)
2. Steel Deck Institute (SDI)

- B. Definitions:

1. No definition of additional terms is required for this Section.

- C. Reference Standards

1. American Society for Testing and Materials (ASTM):
 - a. ASTM A36 - Carbon Structural Steel
 - b. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - c. ASTM A385 - Practice for Providing High Quality Zinc Coatings (Hot Dip)
 - d. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - e. ASTM A780 - Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
 - f. ASTM A792 - Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - g. ASTM A924 - General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
 - h. ASTM A1008 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

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- i. ASTM B6 - Standard Specification for Zinc
- j. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
2. American Iron and Steel Institute (AISI):
 - a. S100-16 - North American Specification for the Design of Cold-Formed Steel Structural Members
 - b. D100-17 - Cold-Formed Steel Design Manual
3. American Institute of Steel Construction (AISC)
4. Factory Mutual Global (FM), DS 1-28R, 1-29R, Roof Systems.
5. Steel Deck Institute (SDI):
 - a. COSP17 - Code of Standard Practice 2017.
 - b. MOC3 - Manual of Construction with Steel Deck.
 - c. SPD2 - Standard Practice Details
 - d. RDDM2 - Roof Deck Design Manual.
 - e. SDCFSFDM - Steel Deck on Cold-Formed Steel Framing Design Manual.
 - f. QA/QC-2017 - Standard for Quality Control and Quality Assurance for Installation of Steel Deck.
 - g. RD-2017 - Standard for Steel Roof Deck
6. American Welding Society (AWS):
 - a. AWS D1.1- Structural welding Code - Steel
 - b. AWS D1.3- Structural Welding Code - Sheet Steel
7. 2020 Building Code of New York State (NYSBC).
8. Occupational Safety and Health Administration, OSHA 29 CFR 1926
9. Steel Structures Painting Council (SSPC).
 - a. SSPC-VIS-1 - Visual Standard for Abrasive Blast Cleaned Steel (SSPC)
 - b. Paint 20 - Zinc-Rich Primers (Type I, Inorganic, and Type II, Organic)
10. Underwriters Laboratories (UL):
 - a. UL 580 - Safety Tests for Uplift Resistance of Roof Assemblies.

1.05 DESCRIPTION

A. Design

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1. The structural steel roof deck shall be designed in accordance with AISI Specification for the Design of Cold-Formed Steel Structural Members, except as specified otherwise herein. Deck units shall have ribbed sections and adequate thickness providing a satisfactory surface for the reception of design loads. The depth and gage of deck shall be as specified on the Contract Drawings.
2. Allowable Deflection:
 - a. Structural steel roof deck, shall be designed to support the superimposed gravity, snow, and wind loads as indicated on the Contract Drawings, with maximum deflection not to exceed 1/240 of the span or 1 inch, whichever is less. Structural steel roof deck shall be designed to support a 200-pound concentrated load at midspan on a 1 foot wide section of deck during construction.
 - b. Structural steel roof deck, in the vertical position, shall be designed to support the gravity and wind loads as indicated on the Contract Drawings, with a maximum deflection not to exceed 1/180 of the span under a uniform design wind load.
3. Attachments: Roof deck units shall be installed and anchored to supporting members to provide lateral stability and resist design horizontal and uplift loadings indicated on the Contract Drawings. Fastening requirements to resist horizontal loads shall be in accordance with SDI "Diaphragm Design Manual."
4. Section properties shall be determined in accordance with AISI "Specification for the Design of Cold-Formed Steel Structural Members." The properties of steel deck section shall be computed on the basis of the effective design width as limited by the provisions of the AISI Specifications. The Contractor shall determine section properties to resist the loads shown on the Contract Drawings.

1.06 QUALITY ASSURANCE

A. Contractor's Qualifications:

1. The Manufacturer shall have a minimum of 10 years of comparable experience in installations of this type and shall employ labor and supervisory personal familiar with the type of installation, experienced in fabrication of structural roof deck for projects of similar size and complexity.
2. The Steel Deck Erector shall have a minimum of 10 years of successful experience installing structural roof metal deck for structures of this type and complexity in the region of the project.
3. The Contractor's engineer shall have a minimum of 10 years of successful experience in responsible charge of work of this nature, on steel deck installations for projects of similar size and complexity, in material,

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design, and extent. The Contractor's Engineer shall be a Professional Engineer registered in the state of New York.

- B. Except as otherwise specified, the SDI "Design Manual" cited herein shall govern the work.
- C. Steel roof deck units and accessories shall be provided where indicated on the Contract Drawings and shall be the products of a manufacturer who is regularly engaged in the manufacture of structural steel roof decking.
- D. Qualification of Welders: Each welder shall use prequalified welding processes in accordance with AWS and shall provide certification that each welder to be employed in the Work are currently qualified for those processes and have satisfactorily passed the applicable AWS qualification tests. A welder shall be retested and recertified when the work of the welder creates a reasonable doubt as to his or her proficiency. Such tests when required, shall be conducted at no additional expense to the City. Recertification of the welder shall be submitted only after the welder has taken and passed the required retest.
- E. Testing and Inspection: Material and fabrication procedures are subject to inspection and tests in the mill, shop, and field. These tests shall be conducted by the Testing Laboratory in accordance with the Contract requirements. Such inspection and tests shall not relieve the Contractor of responsibility of providing materials and fabrication procedures in compliance with specified requirements.
- F. Factory Inspection: Except as specified otherwise in this paragraph, factory tests and inspections of materials will not be required provided that certified copies of factory test reports are submitted to the Engineer for approval. These shall include manufacturer's certificates of compliance with all requirements of these specifications. When the test reports are on materials previously manufactured they shall be accompanied by notarized statements from the manufacturer certifying that the materials being furnished are identical with previously manufactured materials on which the factory test reports are based.
- G. Shop Drawings Reviews: Such reviews shall be obtained before custom fabrication is started and before delivery of materials to the project site.
- H. Coordination: Work of this Section shall be coordinated with the work of other trades so that construction is not delayed.
- I. Safety: Steel roof deck erection procedures and health and safety of the work force shall be the responsibility of the Contractor. The requirements of authorities having jurisdiction shall be complied with.
- J. Responsibility for Errors: Errors of detailing and fabrication and for the correct fit of the steel deck units shall be the responsibility of the Contractor.
- K. Remedial Action: Materials, fabrications and workmanship found defective shall be promptly removed and replaced and new acceptable work shall be provided in accordance with Contract requirements at no additional expense to the City.

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- L. Design of roof deck layout, spans, fastenings, joints, and framed openings shall be under the direct supervision of a Professional Engineer experienced in structural design of decking and licensed in the State of New York.

1.07 SUBMITTALS

- A. Contractor shall submit Shop Drawings and material specifications for the approval of the Engineer. Submittals shall include, but not be limited to:

- 1. Shop and Erection Drawings. Detailed Shop Drawings which clearly indicate the following:
 - a. Deck types (dimensional cross-sectional profiles), material, thickness, designation, deck finishes, and computed structural properties to verify compliance with the project requirements.
 - b. Deck layout, including panel locations, number of deck spans per panel, placement directions, structural support locations and joint locations.
 - c. Deck dimensions and sections keyed to layout plans, including side and end details, and bearing requirements.
 - d. Deck fastener types (welds, screws, pins, proprietary systems) and layout patterns at panel sides, ends, and interior supports. Sequence of welded connections.
 - e. Deck manufacturer load capacity for all detailed conditions.
 - f. Details and locations of accessories including hardware, various connections, framing reinforcement anchorage, anchorage details, attachment of accessories, sump pans, cant strips, ridge plates, valley plates, and closure plates and panels.
 - g. Fabrication necessary to incorporate steel deck into the Work.
 - h. Supplementary framing and correlation with other requirements, openings, special jointing, and flashings. Size and location of holes and openings to be cut.
 - i. Contractor-coordinated openings for mechanical, electrical, plumbing, fire protection and other trades.
- 2. Shop and Erection Drawings shall be reviewed and approved for Specification compliance. However irrespective of Shop Drawing review determination, final Specification compliance with requirements for materials, fabrication and erection shall be the exclusive responsibility of the Contractor.

- B. Certifications:

- 1. General: Test requirements for materials as stated herein or incorporated in reference documents may be waived, provided that certified copies of

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test reports from approved laboratories performed on previously manufactured material are submitted.

2. **Manufacturer's Certifications:** Manufacturer's certifications as required to show compliance with these specifications shall be submitted. Copies of mill test reports, including names and locations of mills and shops, covering the chemical and physical properties of the steel sheet to show compliance with these specifications shall be submitted. Test reports shall be accompanied by notarized certificates of compliance from the manufacturer certifying that the previously tested material is of the same type, quality and manufacture as that proposed for this project.
3. **Certification for Welders:** Certification that each welder has been qualified within the previous 12 month period shall be provided in accordance with AWS D1.1.

- C. **Manufacturer's Data:** Manufacturer's specifications and installation instructions for each type of required decking and accessory shall be submitted. These include sheet steel, steel deck units, galvanized mill finish, finished repair paint, welding electrodes, welding washers, fasteners, depressed steel roof deck pans, closure strips, cover plates, and similar items.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. **Delivery:** Materials shall be delivered to the site in an undamaged condition and at such intervals as will avoid delay in the work.
- B. **Storage:** Material shall be stored and protected in a clean, properly drained location. Material shall be kept off the ground under a weather-tight covering permitting good air circulation. Decking shall be stored on dry wood sleepers, pallets, platforms or other appropriate supports which have slope for positive drainage. Decking shall be protected from distortion, excessive stresses, corrosion and other damage.
 1. **Caution:** Materials shall not be stored on the structure in a manner that might cause distortion or damage to the supporting structure. The maximum uniform distributed storage load shall not exceed 20 pounds per square foot.
- C. **Handling:** Material shall be handled safely in a manner that will prevent distortion or other damage. Care shall be exercised at all times to avoid damage through careless handling during unloading, storing and erecting.
- D. Do not store deck bundles on framing unless material is securely tied down and the framing has been analyzed to ensure that such storage will not cause an overload.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel roof deck units shall be as manufactured by:
1. Canam, South Plainfield, NJ; www.canam-construction.com
 2. Vulcraft Corporation, Florence, SC; www.vulcraft.com
 3. New Millennium Building Systems, Fort Wayne, IN; www.newmill.com
 4. ASC Steel Deck, West Sacramento, CA; www.ascsd.com
 5. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Galvanized Steel Roof Deck: ASTM A653, Grade 33, Coating Designation G90, type and thickness as shown on Contract Drawings but not less than 20 gage.
1. Galvanizing: ASTM A924, Commercial quality.
 2. Galvanizing Repair Paint: ASTM A780, high zinc-dust/zinc oxide content paint for repair of damaged galvanized surfaces and field touch-up of welds.
 3. Steel Closure Strips, Finishing Strips, or Plates: ASTM A653, minimum 20 gage, galvanized (except as otherwise indicated).
 4. Steel Cover Plates: ASTM A653, minimum 20 gage but not less than the steel deck thickness, galvanized to G90 coating class.
 5. Sheet Steel Accessories: ASTM A653, commercial quality, galvanized to G90 coating class, thickness indicated or as suitable for use intended.
 6. Ridge and Valley Plates: ASTM A653, galvanized to G90 coating class, thickness not less than that of steel deck units.
 7. Recessed Steel Roof Deck Pans: ASTM A653, galvanized, minimum 14 gage (0.071 inch).
 8. Reinforcing channels: ASTM A653, galvanized to G90 coating class, thickness not less than that of steel deck units.
 9. Recessed Sump Pans: Manufacturer's standard size, single piece steel sheet 0.071-inch thick minimum, of same material as steel deck units, with 1½ inch minimum deep level recessed pans and 3-inch wide flanges. Cut holes for drains in the field.
 10. Flat Receiver Pan: Manufacturer's standard size, single piece steel sheet, 0.071-inch thick minimum units, of same material as steel deck units.
- B. Welding Washers: Standard type compatible with decking furnished.

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- C. Flexible Rib Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.
- D. Side Lap Fasteners: Manufacturer's standard, corrosion-resistant, hexagonal washer head; self-drilling, carbon steel screws, No. 10 minimum diameter. Where Factory Mutual is indicated in the Contract Documents, fasteners must be approved by Factory Mutual as a method for securing steel roof deck for Class indicated.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. General: Deck units shall be manufactured in lengths to span three or more supports, where possible, with flush, telescoped or nested 2-inch end laps and nested side laps, unless otherwise indicated. End laps shall occur over supports. Deck configurations shall comply with SDI requirements and as specified herein.
- B. Metal Roof Deck:
 - 1. Galvanized Steel Roof Deck Units shall be manufactured from mill coated, extra heavy duty galvanized sheet steel conforming to ASTM A653. Configuration of roof deck units shall conform to standard SDI wide-rib fluted profile, of the depth, steel thickness or gage and section properties as indicated on the Contract Drawings.
- C. All steel decking shall be roll formed for uniformity in dimension and strength.
- D. Manufacturers for steel roof deck shall be as specified in this Section.
- E. Steel Closure Strips: Steel closure strips of not less than 20 gage sheet steel of the same quality and material as the deck units shall be provided and shall form to the configuration required to provide tight-fitting closures at open ends and sides of decking.
- F. Painting of Deck: On the steel deck surface to be painted in the field, the galvanized surface shall be primed in accordance with the requirements of Section 09 91 00 - Painting.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Field Measurements
 - 1. Prior to commencement of the work, existing dimensions, elevations, locations and conditions applicable to the work shall be field verified. Variances and discrepancies from the Contract Drawings and potential interferences shall be reported promptly to the Engineer.
 - 2. Sufficient field measurements shall be taken prior to preparation of Shop Drawings and fabrication of construction materials, where possible, to

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ensure proper fitting of the work. However, job progress shall not be delayed. Allow for adjustments and fittings wherever the taking of field measurements before fabrication may not be possible or might delay the work.

3. Actual field-verified conditions may require modifications to the fabrication and/or erection details indicated on the Contract Drawings. The work shall be performed to meet actual field conditions encountered.

B. Inspection

1. The areas and conditions under which work of this Section is to be performed shall be examined. Conditions detrimental to the proper and timely completion of the work shall be corrected. Work shall not be proceeded until satisfactory conditions have been corrected.

3.02 IMPLEMENTATION

A. Installation

1. General: Deck units and accessories shall be installed in accordance with manufacturer's recommendations, approved Shop Drawings and as specified herein.
 - a. Deck bundles shall be coordinated with structural steel erector in locating decking bundles to prevent overloading of structural members.
 - b. Deck Storage: Deck units shall not be used for storage or working platform until permanently secured.
2. Placing of Deck Units: Deck units shall be placed on supporting framework with edges up and flutes at right angles to supports. Decking shall be adjusted to final position with ends bearing at least 1.5 inches on supporting members, unless otherwise shown on the Contract Drawings or manufacturer's literature. Also the decking ends shall be accurately aligned before being permanently fastened. Lap end shall not be less than 2 inches for welded construction of all roof decks. Side laps shall be one-half corrugation. The side lap interlock shall not be stretched or contracted. Deck units shall be placed flat and square, and shall be secured to adjacent framing without warp or excessive deflection and with close alignment between cells at ends of abutting deck units.
3. Cutting and Framing: Roof deck units and accessories shall be cut and fitted around other work projecting through or adjacent to the roof decking, as shown on the Contract Drawings. Neat, square and trim cuts shall be provided.
4. Welding: Steel roof deck units shall be permanently fastened to steel supporting members by not less than 5/8-inch-diameter fusion (puddle) welds or elongated welds of equal strength. Welding washer shall be used where recommended by the deck manufacturer. AWS requirements and

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procedures for manual shielded metal-arc welding appearance, quality and methods used in correcting welding work shall be complied with. The ambient temperature when welding is performed shall be 35 degree Fahrenheit or higher. Welds shall be free of cracks, craters and other defects. Units with burned holes or any other damage shall be replaced promptly with satisfactory units at no additional cost to the City. Steel accessories shall be securely welded in place.

5. Attachments: Steel roof deck units shall be fastened to the supporting members to resist horizontal and uplift loadings as indicated on the Contract Drawings in accordance with SDI "Diaphragm Design Manual." In no case shall the fastening requirements be less than the following:
 - a. End Laps and Edge Supports: End laps and all edge supports shall be fastened at 6 inches on center.
 - b. Intermediate Supports: Each sheet shall be anchored by welding at each intermediate support not less than 12 inches on center and at closer spacing where required for lateral force resistance, unless otherwise shown on the Contract Drawings.
 - c. Side Laps: Side laps between adjacent deck units shall be locked at intervals not exceeding 18 inches on center by welding, unless otherwise shown on the Contract Drawings.
6. Steel Closure Strips: Steel closure strips shall be provided at all open uncovered ends, at edges of roof decking and at voids between decking and other construction and shall be welded into position to provide a complete decking installation.
7. Steel Cover Plates: Steel joint covers shall be provided at abutting ends of deck units, except where taped joints are required or permitted.
8. Reinforcement at Openings:
 - a. Additional steel reinforcement and closure pieces required for strength, continuity of decking, and support of other work shall be provided, unless otherwise shown or specified.
 - b. Roof decking around openings less than 6 inches in any dimension shall be provided by means of a steel sheet of the same profile as the deck placed over the opening and fusion welded to the top surface of the deck. Steel sheet of the same quality and material as the deck units, not less than 18 gage and at least 14 inches wider and longer than the opening shall be provided. Welds at each corner shall be provided and spaced not more than 6 inches on centers along each side.
 - c. Openings larger than 6 inches in steel roof deck, where framing around the opening is not shown on the Contract Drawings, shall be reinforced by steel angles on each side of the opening. The design of the framing angles shall be based on the design live load of that

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floor area and in no case shall the angles be less than 3-1/2 x 3-1/2 x 3/8 inches. The angles parallel to the deck span shall be connected to the structural steel framing and to the angles on the other two sides of the opening by welding. The angles shall also be anchored to the deck by welding as required for supports.

9. Roof Insulation Support: Steel closure strips shall be provided for the support of roof insulation where the rib opening in the top surface of roof decking occur adjacent to edges and opening. These strips shall be welded into position.

B. Galvanizing Repair

1. Decking and accessories shall be cleaned and touched-up where field cut, welded, burned or otherwise damaged. Spot repairs to galvanized or painting finish shall be made in accordance with ASTM A780 where required at no cost to the City.

C. Finish Painting

1. Exposed to view surfaces of steel roof deck units shall be field painted in accordance with the requirements of Section 09 91 00 - Painting.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Before placement of roof insulation and standing seam metal roofing, the structural roof deck shall be inspected for tears, dents, or other damage that may prevent the deck from acting as a structural roof base. The need for repair of damaged deck shall be determined by the Engineer of Record based on structural performance.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Protection

1. During installation, the steel decking shall not be used as a storage platform nor as a working platform until the deck have units been permanently fastened in position.
2. The surface of installed steel decking shall not be overloaded during the entire construction period. Construction loads must not exceed load carrying capacity of the deck.
3. Mechanical equipment or other loads, either temporarily or permanently, shall not be hung from steel roof decking unless otherwise detailed or permitted.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS
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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all labor, materials, equipment, services, and perform all operations required to fabricate and install all Metal Fabrications not specifically included in other Sections and required for the completion of the work as shown on the Contract Drawings, as specified herein and as approved. Metal Fabrications shall include, but not limited to, fall prevention systems, roof davit systems, self-closing safety swing gates, platforms, vertical fixed ladders, stair nosings, and bollards.
- B. Metal fabrications shall be provided complete with all accessories, base attachments, fastenings and other appurtenances as specified and as may be required for a satisfactory installation.
- C. Unless otherwise shown, specified or required, design, workmanship and erection shall conform to or exceed the applicable requirements of the documents listed hereinafter in Article 1.04 to the extent that the provisions of such documents are not in conflict with the requirements of this Section.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 05 06 00.01 - Schedules for Stainless Steel Work
- B. Section 05 05 13.01 - Galvanizing
- C. Section 05 05 23.01 - Welding
- D. Section 05 05 23.02 - Miscellaneous Metal Fastenings
- E. Section 05 12 00 - Structural Steel Framing
- F. Section 05 51 00 - Metal Stairs
- G. Section 05 52 13.05 - Welded Pipe Railings (Stainless Steel)
- H. Section 05 53 01.02 - Stainless Steel Floor Grating
- I. Section 09 91 00 - Painting.

1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A36 - Structural Steel.
 - 2. ASTM A48 - Gray Iron Castings.
 - 3. ASTM A276 - Stainless and Heat-Resisting Steel Bars and Shapes.
 - 4. ASTM A480 - General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plates, Sheet and Strips.
 - 5. ASTM A666 - Austenitic Stainless Steel, Sheet, Strip Plate and Flat Bar.
 - 6. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - 7. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
 - 8. ASTM B308 - Aluminum-Alloy 6061-T6 Standard Structural Profiles.
- B. ANSI:
 - 1. ANSI/ASSP Z359.16-2016 – Safety Requirements for Climbing Ladder Fall Arrest Systems
- C. American Welding Society (AWS):
 - 1. ANSI/AWS D1.1- Structural Welding Code.

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- 2. ANSI/AWS D1.2- Structural Welding Code - Aluminum.
- D. 2020 Building Code of New York State (NYSBC)
- E. American Institute of Steel Construction (AISC):
 - 3. AISC 325- Steel Construction Manual, 15th Edition
 - 4. AISC 360- Specification for Structural Steel Buildings.
 - 5. AISC 303- Code of Standard Practice for Steel Buildings and Bridges.
- F. Aluminum Association (AA):
 - 6. ADM 2020 - Aluminum Design Manual.
 - 7. DAF45 - Designation System for Aluminum Finishes.
- G. Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Shop inspections may be made by the City's representatives. The Contractor shall give ample notice to the Engineer prior to the beginning of any fabrication work so that inspection may be provided. The Contractor shall furnish all facilities for the inspection of materials and workmanship in the shop, and the inspectors shall be allowed free access to the necessary parts of the works.
- B. Inspectors shall have the authority to reject any materials or work which does not meet the requirements of these Specifications.
- C. Inspection at the shop is intended as a means of facilitating the work and avoiding errors, but is expressly understood that it will in no way relieve the Contractor from his responsibility for furnishing proper materials or workmanship under this Section.
- D. Design of Members and Connections:
 - 1. All details shown are typical; similar details shall apply to similar conditions, unless otherwise shown or specified. Dimensions shall be verified at the site without causing delay in the work.
 - 2. Each fabricator shall be responsible for the structural design of miscellaneous metal work within the requirements established by these Specifications.
- E. Complete design calculation and Shop Drawings shall be prepared, signed and stamped with the seal of a Licensed Professional Engineer, licensed to practice in the State of New York with minimum of 10 years of experience and recognized as an expert in the required work unless the design and details have been shown on the Contract Drawings.

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- F. "Pencil-line" thin butt joints shall be provided.
- G. Shop Assembly: Items in the shop shall be preassembled to the greatest extent possible, so as to minimize field splicing and assembly of units at the site. Units shall be disassembled only to the extent necessary for shipping and handling limitations. Units shall be clearly marked for reassembly and coordinated installation.

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings and other materials for the approval by the Engineer. Shop drawings shall include, but not be limited to, the following:
 - 1. Complete layout and installation drawings, drawn to scale, indicating all structural shapes, sizes, and dimensions.
 - 2. Certifications, schedules, design calculations, detailed drawings, plans, elevations, and details of sections and connections
 - 3. Detail drawings shall indicate jointing and anchoring details.
 - 4. Anchor bolts and setting plans
 - 5. Erection drawings
- B. No fabrication shall be started until Shop Drawings have been approved by the Engineer.
- C. The following shall also be submitted:
 - 6. Manufacturer's specifications, load table, installation instructions, setting drawings and templates for location and installation of miscellaneous metal items, appurtenances and anchorage devices.
 - 7. Certified weld inspection reports.
 - 8. Certifications for welders employed on the project, verifying AWS qualification within the previous 12 months shall be submitted.
- D. Representative samples of bolts, anchors and inserts shall be submitted as requested by the Engineer. The Engineer's review shall be for type and finish only. Compliance with all other requirements shall be the exclusive responsibility of the Contractor.
- E. Record Drawings: During progress of the work, an up to date set of drawings showing field and Shop Drawing modifications shall be kept. Immediately upon completion of work, Record Drawings showing the actual in-place installation of all work constructed and/or installed under this Section shall be provided to the Engineer. Drawings shall include all necessary plans, sections and details, with all reference dimensions and elevations required for complete Record Drawings of the work.
- F. Submit procedures to be followed in cleaning and protecting stainless steel plates and other stainless steel parts to the Engineer for approval.

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1.08 DELIVERY, STORAGE, AND HANDLING

- A. Metal fabrications shall be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
- B. Metal fabrications and packaged materials shall be protected from corrosion and deterioration and shall be stored in a dry area. Materials stored outdoors shall be supported above ground surfaces on wood runners and protected with effective and durable covers approved by the Engineer.
- C. Metal fabrications shall not be placed in or on a structure in a manner that might cause distortion or damage to the fabrication. The Contractor shall repair or replace damaged metal fabrications or materials as directed by the Engineer.
- D. Materials shall be delivered to the site at such intervals to insure uninterrupted progress of the work. Anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry shall be delivered, in ample time not to delay that work.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers shall have a minimum of five (5) years experience in the design and manufacture of substantially similar equipment and shall show evidence of satisfactory service in at least five (5) installations.
- B. Fall Prevention System
 - 1. Ladder safety system shall be:
 - a. PeakWorks 2000 Series Climb-Rite Fixed Rail Ladder Safety System as manufactured by SureWerx, Mississauga, Ontario, Canada; www.surewerx.com
 - b. Miller Saf-T-Climb System as manufactured by Honeywell, Franklin, PA; www.millerfallprotection.com
 - c. Or approved equal.
 - 2. Full body Harness shall be:
 - a. PeakPro Harness as manufactured by SureWerx, Mississauga, Ontario, Canada; www.surewerx.com
 - b. Miller Saf-T-Climb Harness as manufactured by Honeywell, Franklin, PA; www.millerfallprotection.com

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- c. Or approved equal.
- 3. Shuttle/Trolley shall be:
 - a. PeakWorks 2000 Climb-Rite Trolley as manufactured by SureWerx, Mississauga, Ontario, Canada; www.surewerx.com
 - b. Miller Saf-T-Grip Shuttle as manufactured by Honeywell, Franklin, PA; www.millerfallprotection.com
 - c. Or approved equal.
- C. Roof davit systems
 - 1. Summit Anchor Company, Inc., Frederick, MD; www.summitanchor.com
 - 2. Peak Fall Protection LLC, Holly Springs, NC; www.peak-fp.com
 - 3. Rooftop Anchor Inc., Heber City, UT; www.rooftopanchor.com
 - 4. Thern Winches & Cranes, Winona, MN; www.thern.com
 - 5. Or Approved Equal.
- D. Self-closing safety swing gates
 - 1. Kee Safety, Inc., Buffalo, NY; www.keesafety.com
 - 2. Michigan Safety Products, Harbor Springs, MI; www.fallprotectionusa.com
 - 3. Cotterman Co., Croswell, MI; www.cotterman.com
 - 4. Fabenco, Inc., Houston, TX; www.tractel.com
 - 5. PS Industries Incorporated, Grand Forks, ND; www.psindustries.com
 - 6. SafeRack, Andrews, SC; www.saferack.com
 - 7. Or Approved Equal.

2.02 MATERIALS / EQUIPMENT

A. Materials

- 1. Structural steel shapes shall be fabricated in accordance with the details shown on the Contract Drawings and shall conform to the requirements of Section 05 12 00 - Structural Steel Framing unless otherwise indicated. All steel shall be galvanized in accordance with the requirements of Section 05 05 13.01 - Galvanizing, and shop painted in accordance with Section 09 91 00 - Painting.
- 2. Aluminum shapes and plate shall be 6061-T6 aluminum alloy with mill finishes, and shall be fabricated into finished products with welded or bolted connections as detailed on the Contract Drawings. Extruded shapes shall conform to the requirements of ASTM B221 and ASTM B308; plate and sheets shall conform to ASTM B209.

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3. Stainless steel shall comply with the requirements of ASTM A276, Type 316L, hot rolled, heat treated to meet the required mechanical properties and be capable of meeting the tests for intergranular corrosion. Stainless steel for bolted and welded construction shall be as detailed on the Contract Drawings and conforming to the applicable requirements of Section 05 06 00.01 - Schedules for Stainless Steel Work. Stainless steel plates shall conform to ASTM A480 and ASTM A666.
4. Bolting hardware shall be as specified in Section 05 05 23.02 - Miscellaneous Metal Fastenings.
5. Concrete anchors shall be as specified in Section 05 05 23.02 - Miscellaneous Metal Fastenings.
6. All materials shall be of the very best quality and be entirely suited for the service to which they will be subjected.
7. Materials shall be subjected to chemical and mechanical tests as provided in the applicable specifications, and duplicate samples of the materials tested shall be provided to the Engineer.
8. All analyses and tests shall be made in accordance with the appropriate specifications. The Engineer shall be permitted to witness any and all operations pertaining to the manufacture, sampling and testing of the materials to be furnished under this item.
9. Any work or materials not in compliance with the specifications shall be rejected or made good by approved methods of repair by the Engineer or replaced as ordered by the Engineer.

B. Access Stairs and Platforms

1. Platforms, associated access stairs and ship ladders shall be stainless steel structural members and stainless steel platform gratings as specified herein unless shown otherwise on the Contract Drawings.
2. Structural steel W, C, MC, and L sections shall conform to ASTM A36 or A992. Structural steel HSS shall conform to ASTM A500. Structural steel pipe shall conform to ASTM A53. All work shall conform to the AISC Specification for Structural Steel Buildings.
3. Stainless steel platform gratings shall be as specified in Section 05 53 01.02 – Stainless Steel Floor Gratings. Stair treads shall be designed to support a uniform live load of 175 pounds per square foot with a maximum deflection of 1/240 of the span. The stair treads shall have an abrasive nosing as shown on the Contract Drawings.
4. Aluminum platform grating shall be designed for the loads as specified herein or as shown on the Contract Drawings.
5. Stainless steel handrails shall be as specified under Section 05 52 13.05 - Welded Pipe Railings (Stainless Steel) and shall be coordinated with stair, ship ladder and platform fabrication. Handrail attachment to stairs,

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ship ladders and platform shall be in accordance with the details shown on the Contract Drawings.

C. Galvanized Accessories

1. Galvanized lintel and shelf angles, angle door guards, floor curb, sill angles and guard posts (bollards), and brackets shall be fabricated from structural steel. Work shall conform to the details on the Contract Drawings and approved shop drawings. Where the material for lintels and shelf angles is not shown on the Contract Drawings, they shall conform to “Stainless Steel Lintels and Shelf Angles” described in Paragraph H below.
2. Materials and fabrication shall conform to Section 05 12 00 - Structural Steel Framing . All galvanizing shall be done after fabrication and shall conform to the requirements of Section 05 05 13.01 - Galvanizing.

D. Stainless Steel Lintels and Shelf Angles

1. Lintels and shelf angles shall be bent or rolled angles, fabricated of stainless steel Type 316. All angles shall conform to the sizes, shapes, dimensions and details as noted on the Contract Drawings. The lintels assembled by welding shall be fabricated of stainless steel Type 316L.
2. All mounting and assembly hardware shall be Type 316 stainless steel.

E. Anchor Bolts

1. Anchor bolts shall be as specified in Section 05 05 23.02 - Miscellaneous Metal Fastenings.

F. Cast Iron Manhole Steps

1. Manhole steps shall be made of gray cast iron conforming to ASTM A48, Class 35B. Manhole steps shall comply with OSHA 1910.24.
2. The steps shall be designed to be cast in place hooking behind the reinforcing steel.

G. Vertical Ladders

1. Stainless steel ladders shall be fabricated from Type 316L stainless steel as detailed on the Contract Drawings
2. Wall mounted ladders shall have welded brackets attached to the wall with concrete or masonry anchors.
3. Ladders shall comply with OSHA 1910.23.
4. A personal fall arrest system or ladder safety system shall be required on all fixed ladders.
5. The third rail required for the fall prevention system shall be of the same material as the ladder.
6. Design live load of the fixed ladders shall be that required by OSHA.

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7. All ladder rungs shall have non-slip top surfaces.
8. Ladders shall have side members, climbing rungs, and stand-off brackets constructed to conform to the sizes and arrangements as shown on the Contract Drawings.

H. Fall Prevention System

1. All fixed ladders shall be provided with a fall prevention system.
2. Fall prevention systems shall comply with OSHA 1910.28, OSHA 1910.29, and ANSI Z359.16.
3. All necessary components of the fall prevention system shall be furnished, including two trolley/shuttle and two full-body harnesses for each fall prevention installation, to provide a complete and fully operational fall prevention system. Full-body harnesses shall be size medium where not universally sized.

I. Stair Nosings

1. Provide non-slip nosings on all treads of interior stairs that are not scheduled for resilient flooring or rubber tile finishes.
2. Non-slip nosings shall be as manufactured by one of the following manufacturers:
 - a. Wooster Products, Inc., Wooster, OH.
 - b. Safe-T-Metal Co., Syracuse NY.
 - c. Or approved equal.
3. Nosings shall be four inches wide and six inches less in length than the length of the tread.
4. Nosings shall be installed at the edge of each tread, landing, and platform. Top of surface shall be flush with concrete finish.
5. Each nosing shall utilize a minimum of three anchors into the concrete.
6. Nosings shall be stainless steel type 316.

J. Permanent Steel Bollards

1. Galvanized steel pipe bollards shall be fabricated to dimensions and details indicated in the Contract Drawings. Bollards shall be fabricated from 8-inch nominal outside diameter pipe, extra strong, unless otherwise shown on the Contract Drawings.

K. Roof Davit Systems.

1. Roof davit system geometry and loading criteria shall be indicated on the Contract Drawings. Davit system shall have the same load capacity at all boom positions.

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2. Manufacturer shall provide a visual stainless steel plate on the roof davit system for the maximum rated service load capacity, manufacturer's contact information, serial number, date of fabrication, and other pertinent information.
 3. Roof Davit System shall be stainless steel, type 316.
 4. Manufacturer shall proof load Roof Davit system after installation to 125% of rated load.
 5. Roof Davit system shall have an overload limit warning or switch prohibiting lifting of loads in excess of rated capacity.
 6. Manufacturer shall provide engineer's calculations and test report to verify that davit will support load requirements.
 7. Manufacturer shall design davit system to prevent accumulation of rainwater and snow.
 8. Manufacturer shall provide locking pins and hardware to prevent unintentional disengagement.
 9. Roof Davit system shall be manually operated and unpowered.
 10. Roof Davit system shall be able to rotate, to clear all obstructions, and easily repositioned and stored out of view.
 11. Wire rope shall be stainless steel.
 12. Roof Davit system shall be designed with an ultimate design factor exceeding 3:1 for all components, in all boom positions.
 13. Davit boom shall have a minimum of four points of height adjustment, the first at horizontal, followed by +15, +30, and +45 degrees from horizontal.
 14. Load capacity of the winch shall be appropriately sized to match that of the davit system.
 15. Winch shall facilitate cable attachment via either a standard cable anchor clamp, or a ball swaged cable end fitting.
 16. Manual winch shall be of the brake winch type, a quick disconnect removable handle, and available drill driven option.
- L. Self-closing safety swing gates.
1. Self-closing safety swing gates are intended as a visible and physical continuation of adjacent railing systems at elevated openings where required by OSHA 29 CFR 1910.23. Product shall be designed to meet or exceed all OSHA requirements of dimensions and loading requirements at the time of manufacturing.
 2. Self-closing safety swing gates shall consist of the following:
 - a. Hinges.

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- b. Ladder Safety gating including gate arm.
 - c. Pivot clamp bracket.
 - d. Hinge plate
 - e. Hinge springs
 - f. Hardware associated with a complete self-closing swing gate.
3. Self-closing swing gates and all components shall be stainless steel type 316, consisting of structural or formed shapes, tubing, bars, and plates of appropriate size and strength with welded construction.
4. Placard shall be factory mounted, caution labels with graphic fall hazard symbol and the statement "Safety First". Placard shall be safety yellow background color with black graphics.
5. Finish:
- a. Stainless steel products shall be mill finish, welds are ground smooth, not polished, and are factory acid washed, neutralized and rinsed
6. Self-closing swing gate shall be fully assembled with mounting hardware at locations shown on the Contract Drawings.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Fabrication of steel and stainless steel shall be in accordance with AISC Specification for Structural Steel Buildings. Fabrication of aluminum shall be in accordance with the Aluminum Association Specifications for Aluminum Structures.
- B. Holes for bolts and screws shall be drilled. Fastenings shall be concealed where practicable. Joints exposed to the weather shall be formed to exclude water.
- C. As far as practicable, all fabricated units shall be fitted and assembled in the shop, with all cuts and bends made to precision measurements in accordance with details shown on approved shop drawings.
- D. Work shall be fabricated so that it is installed in a manner that will provide for expansion and contraction, prevent the shearing of bolts, screws and other fastenings, ensure rigidity, and provide close fitting of sections.
- E. Welding of carbon and low alloy steel shall conform to the applicable requirements of ANSI/AWS D1.1, and Section 05 05 23.01 - Welding. Welding of aluminum shall conform to the applicable recommendations of the Aluminum Company of America publication, "Welding and Brazing Aluminum"; ANSI/AWS D1.2 and Aluminum Association Specification for Aluminum Constructions. Welding shall be done in a manner that will prevent permanent warping and all welds exposed in the finished work shall be ground smooth.
- F. All finished and/or machined faces shall be true to line and level. Steel and aluminum shall be standard, and well finished. Sections shall be well formed to

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shape and size with sharp lines and angles; curved work shall be sprung evenly to curves.

- G. All work shall be fitted together at the shop as far as possible, and delivered complete and ready for erection. Proper care shall be exercised in handling all work so as not to damage the finished surfaces.
- H. Welding shall be used for joining pieces together unless otherwise shown or specified. All joints shall be true and tight. Continuous welds shall be provided and ground smooth where exposed.
- I. In order to prevent corrosion during fabrication, special efforts shall be made at all times to keep the stainless steel surfaces from coming in contact with other metals. Stainless steel and stainless steel welds shall be cleaned with clean sand, stainless wool, stainless steel brushes, or other approved means, and shall be protected at all times from contamination by any materials, including carbon steel, that will impair its resistance to corrosion. Approved methods of grinding, cutting and handling shall be used to prevent contamination. If air-arc, inert-arc, or carbon-arc is used, additional metal shall be removed by approved mechanical means so as to provide clean, weldable edges. All grinding of stainless steel shall be performed with aluminum oxide or silicon carbide grinding wheels bonded with resin or rubber. Grinding wheels used on carbon steel shall not be used on stainless steel.
- J. After fabrication and heat treatment, all stainless steel shall be checked for compliance by testing for susceptibility to intergranular attack. Such tests shall be practices A and B of ASTM A262. Detailed procedures and acceptance criteria for both tests shall be submitted for approval prior to start of work. Deviation from normally good practices in fabrication, transfer and storage of stainless steel materials, as judged by the Engineer, may cause for the Engineer to re-examine the metal surfaces using Ferroxy Test for Free Iron in accordance with the applicable section of ASTM A380.
- K. At approved stages in the shop operations, all mill scale, rust, dirt, oil, grease and other foreign matter shall be removed from the metalwork. After fabrication, including post-weld heat treatment and machining, all stainless steel surfaces shall given light sand blasting with new clean sand or approved sizes. Sand used for carbon steel shall not be used on stainless steel. Stainless steel surfaces shall be clean after fabrication and protected in accordance with the appropriate sections of ASTM A380. The procedure to be followed in cleaning and protecting stainless steel plates and other stainless steel parts shall be submitted for approval. Subsequent operations in the shop and in the field shall be so conducted as to avoid corrosion of the stainless steel surfaces and to keep these metal surfaces free from dirt and foreign matter.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Field Measurements

1. The Contractor shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of the work.
2. The Contractor shall review the Contract Drawings and any discrepancies shall be reported to the Engineer for clarification prior to starting fabrication.

B. Inspection

3. The Contractor shall examine the alignment of the substrate and conditions under which metal fabrications work is to be performed and notify the Engineer in writing of unsatisfactory conditions. Do not proceed with the metal fabrication and installation work until unsatisfactory conditions have been corrected in a manner acceptable to the Engineer.

3.02 IMPLEMENTATION

A. Installation

1. All metal fabrications shall be erected square, plumb and true, accurately fitted, adequately anchored in place, set at proper elevations and positions.
2. All inserts, anchor bolts and all other miscellaneous metal work specified herein or shown on the Contract Drawings or required for the proper completion of the work shall be properly set and securely held in position before placement of stairs and ladder commences. Contractor shall provide temporary erection supports as required to complete the Work. The Contractor's Professional Engineer shall be completely responsible for the design of all temporary erection support and bracing. Submit temporary erection support and bracing shop drawings and calculations, signed and sealed by the Contractor's Professional Engineer, licensed in the State of New York.
3. All miscellaneous metal fabrications shall be installed in conformance with details shown on the Contract Drawings or on the approved shop drawings.
4. Stainless steel surfaces in contact with dissimilar metals shall be properly insulated. Dissimilar metals shall be prevented from being in contact with each other by the use of dielectric insulating materials in accordance with the applicable requirements of Section 05 12 00 – Structural Steel Framing.

B. Galvanizing

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1. All miscellaneous steel fabrications shall be galvanized after fabrication in accordance with Section 05 05 13.01 - Galvanizing.
2. Galvanized surfaces damaged during installation shall be touched up with a galvanizing repair paint applied in accordance with the manufacturer's instructions.

C. Painting

1. All miscellaneous metal fabrications other than aluminum or stainless steel, shall be painted in accordance with the requirements of Section 09 91 00 - Painting.
2. All galvanized metal fabrications shall have the surfaces exposed in the finish work painted in accordance with Section 09 91 00 - Painting.
3. Aluminum surfaces in contact with concrete or dissimilar metals shall be thoroughly protected with two coats of an epoxy paint with a total thickness of 16 mils or other approved isolating material.
4. Surface preparation shall be done in accordance with Section 09 91 00 - Painting.

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

**SECTION 05 50 19 – WELDED STEEL GRILLEWORK
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PART 1 GENERAL

1.01 SUMMARY

A. This Section describes the general requirements for welded steel grillework. Welded steel grillework shall conform to the requirements specified herein and as shown on the Contract Drawings. Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all welded steel grillework Work.

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Specification 05 05 23.02 - Miscellaneous Metal Fastenings
- B. Specification 05 12 00 - Structural Steel

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- C. Specification 08 71 01 - Finish Door Hardware

1.04 REFERENCES

- A. NYSBC - New York State Building Code
- B. ASTM A36 - Carbon Structural Steel, Standard Specification for
- C. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, Standard Specification for
- D. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes, Standard Specification for
- E. ASTM A1011 - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength, Standard Specification for
- F. ASTM B117 - Operating Salt Spray (Fog) Apparatus, Standard Specification for
- G. ASTM B183 - Preparation of Low-Carbon Steel for Electroplating, Standard Specification for
- H. ASTM B633 - Electrodeposited Coatings of Zinc on Iron and Steel, Standard Specification for
- I. ASTM D1186 - Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base, Standard Specification for
- J. ASTM D2794 - for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact), Standard Test Method for
- K. ASTM D3363 - Film Hardness by Pencil Test, Standard Test Method of

1.05 DESCRIPTION

- A. Fixed louver modular grillework panels fabricated with extruded aluminum louvers and flat aluminum bars including extruded aluminum fence posts.
- B. Design Requirements:
 - 1. Maintain the visual design concept shown, and the technical requirements specified, including modules, profiles, alignment of components and requirements for finish.
 - 2. Thermal Control: Provide adequate expansion joints within the fabricated system which allows for all thermal expansion and contraction caused by a material temperature range of 140 degrees F to -20 degrees F without warp or bow of system components. Distance between expansion joints shall be

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based on providing a 1/4 inch wide joint at 70° F which accommodates a movement of 150 percent of the calculated amount of movement for the specified temperature range.

3. Provide expansion joints in ornamental fencing Work where systems cross expansion joints in structure.
4. Configuration of all welded steel grillework shall be as shown on the Contract Drawings. All details shown on the Contract Drawings are typical; similar details apply to similar conditions, unless specifically noted otherwise on the Contract Drawings. Verify dimensions at the site without causing delay in the work.
5. Fasteners and Supports:
 - a. When the size, length or load carrying capacity of an anchor bolt, concrete anchor or concrete insert is not shown on the Contract Drawings, provide the size, length and capacity required to carry the design load times a minimum safety factor of four.
 - b. Sizes shown on the Contract Drawings shall be considered minimum. Increase size to comply with design loadings and minimum safety factor specified.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Engage a single fabricator, with undivided responsibility for detailing and performance of the welded steel grillework.
2. Engage a firm which can show five years previous successful experience in detailing and fabrication of welded steel grillework of scope and type similar to the required work.
3. Materials and fabrication procedures shall be subject to inspection and tests in the mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests shall not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

B. Installer Qualifications:

1. Engage a single installer skilled, trained and with documented successful experience in the installation of welded steel grillework and with specific skill and successful experience in the erection of the types of materials required; and who agrees to employ only tradesmen with specific skill and successful experience in this type of Work. Submit names and qualification to Engineer along with the following information on a minimum of three successful projects:

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- a. Names and telephone numbers of owner, architects or engineers responsible for projects.
 - b. Approximate contract cost of the welded steel grillework.
 - c. Amount of area installed.
- C. Source Quality Control:
1. Obtain all welded steel grillework components and accessories from the same manufacturer.
 2. Provide qualified welding processes and welding operators in accordance with AWS “Structural Welding Code” D1.1, Section 5, Qualification.
 3. Provide certification that all welders employed on, or to be employed for, the fabrication of the welded steel grillework have satisfactorily passed AWS qualification tests within the previous twelve months. Contractor shall ensure that all certifications are kept current.
- D. Inspections:
1. Shop inspections may be made by the City’s representatives. The Contractor shall give ample notice to the Engineer prior to the beginning of welding, before applying any coating, and before installation on site, so that inspections may be provided.
 2. The Contractor shall furnish all facilities for the inspection of materials and workmanship in the shop, and the inspectors shall be allowed free access to the necessary parts of the works.
 3. Inspectors shall have the authority to reject any materials or work which does not meet the requirements of these Specifications. Inspection at the shop is intended as a means of facilitating the work and avoiding errors, but is expressly understood that it will in no way relieve the Contractor from his responsibility for furnishing proper materials or workmanship under this Section.
 4. The Contractor shall submit the name of such inspection agency to the Commissioner for approval before starting work.
 5. The Inspector shall:
 - a. Review all CMTRs of all components of materials and approved shop drawings and procedures for coatings.
 - b. Witness fabrication of the fence and gates at shop and test samples will be selected at random.
 - c. Check the certification of the qualified welding operators as per AWS D1.1 Section 5, Qualification.
 - d. Witness thermal spray metal coating as per Specification 05 05 15.

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- e. Witness cleaning, pre-treatment and powder coating of all panels and fittings.
- f. Witness installation at field.

1.07 SUBMITTALS

A. Samples:

1. It shall be the Contractors responsibility to submit all required submittal for review and approval prior to installation. This includes but is not limited to:
 - a. Cut sheets of proposed grillework (with all relevant information) to be used for review and approval by the Engineer.
 - b. Cut sheets of all hardware to be installed, including but not limited to: Rails (top and bottom); Door stops; Wheels (top and bottom); Door handle; and locking mechanisms (mechanical and electrical).
 - c. Samples of powder coating finishes and related cut sheets to be approved by Engineer.
 - d. A 12" x 12" samples of the grillework with approved powder coating finish for approval by Engineer.
 - e. Full size grillework section mockup with all associated connections, and mounting brackets all with specified controlled uniform finish.
2. All Mockup will be reviewed by Engineer for color, finish, joinery appearance and workmanship only. Compliance with all other requirements is the responsibility of Contractor.

B. Shop Drawings:

1. Drawings for the fabrication and erection of welded steel grillework with sizes of members, components and anchorage devices, all based on specified requirements. Include copies of manufacturer's specifications, standard and custom detail drawings and installation instructions for ornamental fences and gates. Include all plans and elevations identifying the location of all ornamental fences and gates, and all expansion joints.
 - a. Drawings shall also include all details pertaining to the sliding door and hardware.
 - b. Drawings shall also include the required power needed to maintain functionality of all electronic devises to be installed.
2. Profiles of welded steel grillework components, and the details of forming, jointing, sections, connection, internal supports, trim, and accessories. Show details drawn at 1-1/2-inch scale.

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3. All calculations for complete structural analysis of the systems including calculations showing compliance with the performance criteria specified.
4. Manufacturer's catalogs showing complete selection of standard and custom components and miscellaneous accessories for selection by Engineer.

C. Certification: Submit for approval the following:

1. Copies of material purchase receipts, for this job, signed by a certified and licensed Notary Public, verifying that material purchased for the Work complies with material designations specified as confirmed by approved Working Drawings.
2. Certification of welders and welding procedures shall be submitted as specified.
3. Installer qualifications.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver welded steel grillework and all accessories dry and undamaged, with manufacturer's protective coating intact, bearing original intact factory labels.
2. Welded steel grillework which are damaged during delivery or while being unloaded shall not be stored on site. Remove such units from site and replace panels with new, undamaged material.

B. Storage of Materials:

1. Store ornamental fences and gates and accessory materials under tarpaulin covers and in an area protected from dirt, damage, weather and from the construction activities of all Contractors. Do not store outside or allow items to become wet or soiled in any way while on site.
2. Do not store in contact with concrete, earth or other materials that might cause corrosion, staining, scratching or damage to finish. Do not install system components which become dented, scratched or damaged in any way. Remove such components from site and replace with new, undamaged material.

C. Handling of Materials:

1. Do not subject welded steel grillework and accessory materials to bending or stress. Do not carry or transport panels in the horizontal (flat) position. Hold panels upright on edge when handling.
2. Do not damage edges or handle material in a manner that will cause scratches, warps or dents.

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- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
 - A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
 - A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Grillework
 - 1. Shadow 80 by:
Ametco Manufacturing Corporation
4326 Hamann Parkway
P.O. Box 1210
Willoughby, OH 44096
(800) 321-7042
 - 2. Opus 80 by:
Southern California
3651 Sausalito Street
Los Alamitos, CA 90720
(800) 321-4314
(562) 598-4314
 - 3. Talia® Screen Ventus Louvered Panels by:
Marco Specialty Steel, Inc.
9140 Tavenor Ln,
Houston, Texas 77075
(713) 489-5416 or (866) 722-2026
 - 4. Or approved equal
- B. Powder Coat Finish
 - 1. Protech Group

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7600 Henri Bourassa West
Montreal, Quebec, H4S 1W3
(514) 745-0200 or Toll Free: 1 (800) 361-9364
Color: RAL 7005 Mouse Grey (DS211A110)

2. PPG Industries
19699 Progress Drive Strongsville,
OH 44149
800-708-9678
Color: RAL 7005 Mouse Grey UD (PCTA79106)
3. IFS Coatings
866-437-2864
Color: SRSL71610 (SUPER SATIN RAL 7005)
4. Or approved equal

2.02 MATERIALS / EQUIPMENT

A. Welded Steel Grillework:

1. Infill Panel Material: Steel, ASTM A 1011, powder coated
2. Banding Material: Steel, powder coated:
 - a. Flat Bars: ASTM A 36 or A 1011
 - b. Angles and Channels: ASTM A 36
 - c. Tubing: ASTM A 500
3. Type: Rigid louvered panels
4. Visual Concealment: 80 percent
5. Free Airflow: 45 percent
6. Blades: 2 inches by 1/16 inch
7. Cross Bars: Round, 3/16-inch
8. Spacing, Center-to-Center:
 - a. Blades: 1-3/4 inches
 - b. Cross Bars: 5-3/16 inches

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9. Weight: 3.0 pounds per square foot
10. Recycled Content: 20 percent min.

B. Welded Steel Grillework for Sliding Door section:

1. Top Rail: Steel, ASTM A 1011
2. Top and bottom wheel assembly: Steel, shall be powder coated with Gillework and frame.
3. Bottom “V” rail: Steel, fastened to concrete slab
4. Handles: Steel, powder coated with Gillework and frame
5. Locking mechanisms: mechanical and electrical (with power supply)

C. Accessories:

1. All accessories shall be per manufactures requirements to securely fasten grillework to all substructures as shown in the Contract Drawing.
2. All accessories for the sliding door shall also be per manufacturer’s requirements and provided as shown in the Contract Drawing.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Finish:

1. Galvanized and Powder Coat Finish:
 - a. Hot-dip galvanize welded steel grillework to provide 3 to 5-mil coating of zinc in accordance with ASTM A 123.
 - b. Mechanical Surface Preparation: Lightly abrasive-blast galvanized metal surface to remove surface oxidation and contamination in accordance with NACE No. 3/SSPC-SP 6 to 0.001 to 0.002-inch surface profile.
 - c. Chemical Surface Preparation: Treat galvanized and abrasive-blasted surface with multi-metal phosphate-chemical-conversion coating process.
 - d. Primer:
 - 1) Apply epoxy powder primer at 0.004 to 0.005-inch thickness in accordance with ASTM D 1186.
 - 2) Heat cure in accordance with powder manufacture’s cure instructions.
 - e. Powder Coat Finish:

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- 1) All powder coating shall be of a medium to dark grey, color and manufacture shall be as indicated above.
- 2) The Contractor shall apply the powder coating material per manufactures recommendations and specifications.
- 3) The Contractor shall be responsible for maintaining a uniformed finish throughout all panels. Any and all blemishes, intentional or unintentional shall be treated with an approved touchup application and shall also maintain a consistent color and texture at the locations to which it was applied to.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Contractor shall examine the alignment of the substrate and conditions under which the welded steel grillework work is to be performed and notify the Engineer in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.

3.02 INSTALLATION

- A. Perform cutting, drilling and fitting required for installation. Set the work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.
- B. Fit exposed connections accurately together to form tight hairline joints. Do not cut or abrade the surface of units which have not been finished after fabrication, and are intended for field connections.

3.03 FIELD TESTING / QUALITY CONTROL

- A. The Contractor shall field test all security and sliding door hardware.
- B. The Contractor shall replace or reprogram any malfunctioning piece of equipment at no expense to the City.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Adjusting:
1. Adjust fencing and gates prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Plumb posts in each direction.

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- B. Protection:
 - 1. Protect installed products until completion of project.
- C. Clean and Repair:
 - 1. Cleaning: Clean exposed surfaces of welded steel grillework before leaving the site after completion of installation. Do not use abrasives or non-approved solvent cleaners. Test cleaning techniques on an un-used section of ornamental fence or gate before employing cleaning technique in the work.
 - a. Remove all stains, dirt, grease and other substances by washing the welded steel grillework thoroughly using clean water and soap. Rinse with clean water.
 - b. Do not use acid cleaning solutions, steel wool or other harsh abrasives.
 - c. If stains remain after washing, remove section of fence or gates and replace with a new section in accordance with recommendations of the manufacturer.
 - 2. Leave welded steel grillework, free from dents, burrs, scratches, holes and other blemishes. Refinish minor scratches to be indistinguishable from adjacent un-scarred areas. If, after refinishing, damage remains visible when viewed from five feet away, or if finish of work has been altered to the point where it appears different from adjacent work, Contractor shall replace damaged work with new undamaged material at no additional expense to the City.
 - 3. At the completion of the work, clean or replace adjacent work, marred by the work of this Section.
 - 4. Remove all materials and debris and leave the site in clean condition.

END OF SECTION

SECTION 05 50 19 – WELDED STEEL GRILLEWORK
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NO TEXT ON THIS PAGE

SECTION 05 51 00 – METAL STAIRS
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all labor, materials, equipment, services, and perform all operations required for complete furnishing, fabrication, delivery, unloading, handling, storing, assembly, erection, and installation all metal stairs for the Work as required in the Contract Drawings and Specifications. The Work shall include the following, but is not limited to:
 - 1. Metal grating for stairs and platforms.
 - 2. Stair handrails and railings.
 - 3. Stair ornamental railings.
 - 4. Miscellaneous metal stairs parts, members, anchors, and connections necessary to complete the Work, regardless of whether all such items are specifically shown or specified on the Contract Drawings.
 - 5. Spiral stairs and platforms.
- B. Metal stairs shall be furnished complete with all accessories, connections, base attachments, fastening, other appurtenances, and engineering as specified or as may be required for a satisfactory and complete installation.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Requirements from the following sections also apply to this Section.

1. Section 05 05 13.01 - Galvanizing.
2. Section 05 05 23.01 - Welding.
3. Section 05 05 23.02 - Miscellaneous Metal Fastenings.
4. Section 05 12 00 - Structural Steel Framing.
5. Section 05 52 13.05 - Welded Pipe Railings – Stainless Steel.
6. Section 05 53 01.02 - Stainless Steel Floor Gratings.
7. Section 09 91 00 - Painting.

1.04 REFERENCES

- A. No definition of additional term is required for this Section.

- B. Reference Standards:

1. American Institute of Steel Construction (AISC):
 - a. AISC 325 - Steel Construction Manual, 15th Edition.
 - b. AISC 360 - Specification for Structural Steel Buildings.
 - c. AISC 326 - Detailing for Steel Construction.
 - d. AISC/AISI - Standard Definitions for use in the Design of Steel Structures.
 - e. Design Guide 34 - Steel-Framed Stairway Design.
2. American Welding Society (AWS):
 - a. D1.1 - Structural Welding Code – Steel.
3. National Association of Architectural Metal Manufacturers (NAAMM):
 - a. AMP-510 - Metal Stairs Manual.
 - b. MBG-531 - Metal Bar Grating Manual.
4. ASTM International:
 - a. A276 - Standard Specification for Stainless Steel Bars and Shapes

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- b. A262 - Standard Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels.
- c. A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- d. A380 - Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
- e. A240 - Standard Specification for Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Shop inspections may be made by the City or its representatives.
- B. The Contractor shall give ample notice to the Engineer prior to the beginning of any fabrication work so that inspection may be scheduled.
- C. Inspectors shall have the authority to reject any materials or Work which does not meet the requirements of these Specifications.
- D. Inspection at the shop is intended as a means of facilitating the Work and avoiding errors, but is expressly understood that it will in no way relieve the Contractor from his responsibility for furnishing proper materials or workmanship under this Specification.
- E. Design of Members and Connections:
 - 1. All details shown are typical; similar details shall apply to similar conditions, unless otherwise shown or specified. Dimensions shall be verified at the site without causing delay in the work.
 - 2. Each fabricator shall be responsible for the structural design of miscellaneous metal work within the requirements established by these Specifications.
- F. Complete design calculation and Shop Drawings shall be prepared, signed and stamped with the seal of a licensed professional engineer, licensed and registered to practice in the State of New York with a minimum of 10 years of experience and recognized as an expert in the required work unless the design and details have been shown on the Contract Drawings.
- G. Shop Assembly: Items in the shop shall be preassembled to the greatest extent possible, so as to minimize field splicing and assembly of units at the site. Units shall be disassembled only to the extent necessary for shipping and handling limitations. Units shall be clearly marked for reassembly and coordinated installation.

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1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings and material specifications of the metal stairs for the approval of the Engineer. Submittals shall include, but not be limited to:
 - 1. Complete layout and installation drawings, drawn to scale, and schedules with clearly indicated dimensions for metal stairs.
 - 2. All grating shop drawings shall clearly indicate the orientation of the bearing bars.
- B. Samples shall include:
 - 1. Stair nosings.
 - 2. Metal stair treads.
 - 3. Spiral stair treads.
 - 4. Stair toe guards.
- C. Submit certification for welders employed on the project, verifying AWS qualifications within the previous twelve months.
- D. Submit procedures to be followed in cleaning and protecting stainless steel plates and other stainless steel parts to the Engineer for approval.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. All materials shall be boxed or crated and suitably protected against damage from handling and the elements prior to shipment from the place of fabrication.
- B. All materials shall be protected on the site and/or incorporated in the work free from damage or marring of any kind.
- C. Contractor shall handle materials so that no parts are bent, broken or otherwise damaged and avoid causing damage to other materials and work.
- D. Protect materials from exposure to conditions that may damage the materials.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Spiral Stairs:
 - 1. Spiral Stairs of America, Erie, PA; www.spiralstairsfamerica.com

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2. Trex Spiral Stairs – The Iron Shop, Broomall, PA; www.trexspiralstairs.com
3. Stairways Inc., Houston, TX; www.stairwaysinc.com
4. Paragon Stairs, Collegeville, PA; www.paragonstairs.com
5. Or approved equal.

B. Manufacturers shall have a minimum of five (5) years experience in the design and manufacture of metal stairs of the kind indicated on the Contract drawings and shall show evidence of satisfactory service in a least five (5) installations.

2.02 MATERIALS / EQUIPMENT

A. General:

1. Stainless steel shall comply with the requirements of ASTM A276, Type 316L, hot rolled, heat treated to meet the required mechanical properties and be capable of meeting the tests for intergranular corrosion.
2. All materials shall be of the very best quality and be entirely suited for the service to which they will be subjected.
3. Materials shall be subjected to chemical and mechanical tests as provided in the applicable specifications, and duplicate samples of the materials tested shall be provided to the Engineer.
4. All analyses and tests shall be made in accordance with the appropriate specifications. The Engineer shall be permitted to witness any and all operations pertaining to the manufacture, sampling and testing of the materials furnished for metal stairs.
5. Welding shall conform to the applicable requirements of Section 05 05 23.01 - Welding.
6. Fastening: Bolts, nuts and inserts shall be of the best quality conforming to the applicable requirements of Section 05 05 23.02 - Miscellaneous Metal Fastenings. Bolts shall have hexagonal nuts. All threads shall be clean cut of the American Standard size.
 - a. Expansion anchors shall be used only where shown on the Contract Drawings. Power driven "pin" or "stud" type fasteners shall not be permitted. Anchors shall be sized and installed to the proper depths as required by the loads in accordance with manufacturer's recommendations.
 - b. Carbon steel fasteners shall be galvanized in accordance with Section 0508 - Galvanizing and painted in accordance with Section 09 91 00 - Painting.
 - c. Stainless steel fasteners shall conform to the applicable requirements of 05 05 23.02 – Miscellaneous Metal Fastenings.

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7. Structural steel shapes shall be installed as shown on the Contract Drawings and shall conform to the requirements of Sections 05 12 00 - Structural Steel Framing . All steel furnished under this Section shall be stainless steel or hot dipped galvanized in accordance with the requirements of Section 05 05 13.01 – Galvanizing, as indicated on the Contract Drawings.
8. Railings, stair treads and platforms shall be fabricated into finished products as detailed on the Contract Drawings.
9. Any work or materials not in compliance with the specifications shall be rejected or made good by approved methods of repair by the Engineer or replaced as ordered by the Engineer.

B. Steel Stairs

1. The metal stairs and platforms shall be of stainless steel or galvanized steel construction, as indicated on the Contract Drawings, with stainless steel treads, landings and railings constructed to conform to the sizes and arrangements as shown on the Contract Drawings, and specified herein.
2. Entire stair assembly shall be constructed to support a minimum live load as indicated on the Contract Drawings, but shall not be less than 100 pounds per square foot or 300 lbs concentrated load per tread, whichever produces the greater stress. Steel framing, hangers, columns, struts, clips, brackets, bearing plates and other components shall be provided as required for the support of stairs and platforms.
3. Steel brackets and bearing surfaces shall be provided as detailed on the Contract Drawings and as required to anchor and contain the stairs on the supporting structure.
4. Steel framing stringers shall be fabricated of structural steel shapes as shown on the Contract Drawings. Closure pieces shall be provided for exposed ends of stringers. All carbon structural steel elements shall be galvanized.
5. Platforms shall be constructed of structural steel and/or stainless steel channel headers and miscellaneous steel framing members as shown on the Contract Drawings. Headers shall be bolted to stringers and framing members shall be bolted to stringers and headers. .
6. Stair treads shall have a 1-1/4 inch wide abrasive nosing. Stair construction shall be coordinated with the railing fabricator for location of post supports.

C. Spiral Stairs:

1. Spiral steel stairs, treads, handrails, balusters, posts, base plates, platforms, fasteners, anchor bolts, shall be stainless steel, ASTM A240, type 316, as shown on the Contract Drawings. Steel elements shall conform to the sizes and arrangements as shown on the Contract Drawings.
2. Entire spiral stair assembly shall be constructed to support a minimum live load as indicated on the Contract Drawings, but shall not be less than 100

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pounds per square foot, or 300 lbs concentrated load per tread, whichever produces the greater stress.

3. Stair treads shall have a 1-1/4 inch wide abrasive nosing. Stair construction shall be coordinated with the railing fabricator.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Steel shall be standard, well finished, structural or bar steel. Sections shall be well formed to shape and size with sharp lines and angles; curved work shall be sprung evenly to curves.
- B. Welding shall be used for joining pieces together unless otherwise shown or specified. Units shall be fabricated so that bolts and other fastenings do not appear on finished surfaces. All joints shall be true and tight, and connections between parts light-proof tight. Continuous welds shall be provided and ground smooth where exposed.
- C. Welding shall be done in a manner that will prevent permanent warping and all welds exposed in the finished and/or machined faces shall be true to line and level.
- D. Holes for bolts and screws shall be drilled. Fastenings shall be concealed where practicable. Joints exposed to the weather shall be formed to exclude water. Work shall be fabricated and installed in a manner that will provide for expansion and contraction, prevent the shearing of bolts, screws and other fastenings, ensure rigidity, and provide close fitting of sections.
- E. All work shall be fitted together at the shop as far as possible, and delivered complete and ready for erection. Proper care shall be exercised in handling all work so as not to injure the finished surfaces.
- F. Assembly of system components shall be performed in strict accordance with the fabricator's recommendations for installation.
- G. All carbon steel work shall be galvanized in accordance with Section 05 05 13.01 - Galvanizing and painted in accordance with Section 09 91 00 - Painting.
- H. The Contractor shall make all field measurements required to verify field conditions prior to submitting shop drawings for approval.
- I. All required welding shall be performed in the shop. Welding in the field shall not be permitted unless indicated on the Contract Drawings or approved.
- J. In order to prevent corrosion during fabrication, special efforts shall be made at all times to keep the stainless steel surfaces from coming in contact with other metals. Stainless steel and stainless steel welds shall be cleaned with clean sand, stainless wool, stainless steel brushes, or other approved means, and shall be protected at all times from contamination by any materials, including carbon steel, that will impair its resistance to corrosion. Approved methods of grinding, cutting and handling shall be used to prevent contamination. If air-arc, inert-arc, or carbon-arc is used, additional metal shall be removed by approved mechanical means so as to provide clean, weldable edges. All grinding of stainless steel shall be performed with

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aluminum oxide or silicon carbide grinding wheels bonded with resin or rubber. Grinding wheels used on carbon steel shall not be used on stainless steel.

- K. After fabrication and heat treatment, all stainless steel shall be checked for compliance by testing for susceptibility to intergranular attack. Such tests shall be practices A and B of ASTM A262. Detailed procedures and acceptance criteria for both tests shall be submitted for approval prior to start of work. Deviation from normally good practices in fabrication, transfer and storage of stainless steel materials, as judged by the Engineer, may cause for the Engineer to re-examine the metal surfaces using Ferroxy Test for Free Iron in accordance with the applicable section of ASTM A380.
- L. Contractor shall mill all scale, rust, dirt, oil, grease and other foreign matter from the metalwork at approved stages in the shop operations. After fabrication, including post-weld heat treatment and machining, all stainless steel surfaces shall given light sand blasting with new clean sand of approved sizes. Sand used for carbon steel shall not be used on stainless steel. Stainless steel surfaces shall be clean after fabrication and protected in accordance with the appropriate sections of ASTM A380. The procedure to be followed in cleaning and protecting stainless steel plates and other stainless steel parts shall be submitted for approval. Subsequent operations in the shop and in the field shall be so conducted as to avoid corrosion of the stainless steel surfaces and to keep these metal surfaces free from dirt and foreign matter.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Verify that field conditions and verify all pertinent dimensions are acceptable and ready to receive the work prior to fabrication.

3.02 INSTALLATION

- A. All inserts, anchor bolts, and all other miscellaneous metal work specified and shown on the Contract Drawings or required for the proper completion of the work, which are embedded in concrete, shall be properly set and securely held in position in the forms before the concrete is placed.
- B. All metal stair work shall be erected square, plumb and true, accurately fitted, adequately anchored in place, and set at proper elevations and positions.
- C. All aluminum surfaces in contact with concrete shall be given a heavy coat of bituminous paint. Aluminum surfaces in contact with other metals shall be properly isolated.
- D. All galvanized and painted surfaces shall be touched up as required in accordance with the fabricator's instructions.

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- E. Properly insulate stainless steel surfaces in contact with dissimilar metals. Prevent contact between dissimilar metals by the use of dielectric insulating materials in accordance with the applicable requirements of Section 05 12 00 – Structural Steel Framing.
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Not Used

END OF SECTION

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NO TEXT ON THIS PAGE

SECTION 05 52 13.05 – WELDED PIPE RAILINGS - STAINLESS STEEL

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PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the requirements for stainless steel welded pipe railing. Stainless steel welded pipe railing and auxiliary system components shall be provided as specified herein and in the Contract; and as shown on the Contract Drawings. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install all stainless steel welded pipe railing.
- B. Unless otherwise shown or specified, stainless steel welded pipe railing shall consist of a system of two rails welded to posts spaced not more than 5 feet 0 inches on center and a system of handrails supported from adjacent construction by mounting brackets spaced at not more than 5 feet 0 inches on center.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

A. Requirements from the following sections also apply to this Section:

1. Section 05 06 00.01 - Schedules for Stainless Steel Work
2. Section 05 05 23.02 - Miscellaneous Metal Fastenings

1.04 REFERENCES

A. Reference Standards:

1. 1. American Society for Testing and Materials (ASTM):
 - a. ASTM A 276 - Stainless Steel Bars and Shapes, Standard Specification for
 - b. ASTM A312 - Seamless and Welded Austenitic Stainless Steel Pipes, Standard Specification for
 - c. ASTM A 554 - Welded Stainless Steel Mechanical Tubing, Standard Specification for
 - d. ASTM A 666 - Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar, Standard Specification for
 - e. ASTM C 1107 - Packaged Dry, Hydraulic-Cement Grout (Non-shrink), Standard Specification for
 - f. ASTM E 329 - Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction, Standard Specification for
 - g. ASTM E 488 - Strength of Anchors in Concrete and Masonry Elements, Standard Test Method for
 - h. ASTM E 548 - General Criteria Used for Evaluating Laboratory Competence, Standard Guide for
 - i. ASTM E 894 - Anchorage of Permanent Metal Railing Systems and Rails for Buildings, Standard Test Method for
 - j. ASTM E 935 - Performance of Permanent Metal Railing Systems and Rails for Buildings, Standard Test Methods for
 - k. ASTM E 985 - Permanent Metal Railing Systems and Rails for Buildings, Standard Specification for

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- l. ASTM F 593 - Stainless Steel Bolts, Hex Cap Screws and Studs, Standard Specification for
- m. ASTM F 594 - Stainless Steel Nuts, Standard Specification for
2. American Welding Society (AWS):
 - a. ANSI/AWSD1.1 - Structural Welding Code - Steel
 - b. AWS D1.6- Structural Welding Code – Stainless Steel.
 - c. AWS A5.12 - Tungsten and Tungsten Alloy Electrodes for Arc Welding and Cutting
3. ANSI A 1264.1 - Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems
4. AMP 521-01 (R2012) - Architectural Metal Products Division of The National Association of Architectural Metal Manufacturers. Pipe Railing Systems Manual
5. OSHA 29 CFR 1910.23 - Guarding Floor and Wall Openings And Holes
6. 2020 Building Code of New York State (NYSBC).
7. American Institute of Steel Construction (AISC).
 - a. AISC 370 - Specification for Structural Stainless Steel Buildings
 - b. AISC 13- Code of Standard Practice for Structural Stainless Steel Buildings.

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications:

1. Engage a single fabricator, with undivided responsibility for detailing and performance of the stainless steel welded railing systems.
2. Engage a firm which can show minimum of five years previous successful experience in detailing and fabrication of stainless steel welded pipe railing systems of scope and type similar to the required work.
3. Materials and fabrication procedures shall be subject to inspection and tests in the mill, shop, and field, conducted by a qualified inspection agency in compliance with ASTM E329 and ASTM E548. Such inspections and tests shall not relieve the Contractor of responsibility for

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providing materials and fabrication procedures in compliance with specified requirements.

B. Installer Qualifications:

1. Engage a single installer skilled, trained and with successful and documented experience in the installation of stainless steel welded pipe railing systems and with specific skill and successful experience in the erection of the types of materials required; and who agrees to employ only tradesmen with specific skill and successful experience in this type of work. Submit names and qualification to Engineer along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owner, architects or engineers responsible for projects.
 - b. Approximate contract cost of the stainless steel welded pipe railing.
 - c. Amount of area installed.

C. Professional Engineer:

1. Engage a Professional Engineer registered in the State of New York with minimum of 10 years of experience providing engineering services of the kind indicated.
2. Responsibilities include, but are not necessarily limited to, the following:
 - a. Carefully reviewing system performance and design criteria stated in the Contract Documents.
 - b. Preparing written requests for clarification or interpretation of performance or design criteria for submittal to Engineer by Contractor.
 - c. Preparing, or supervising the preparation of design calculations, and reviewing and approving related Shop Drawings prepared by the welded pipe railing system manufacturer prior to submission to Engineer; testing plan development, and test-result interpretations; and providing comprehensive engineering analyses verifying compliance of the system with the requirements of the Contract Documents.
 - d. Signing and sealing all calculations and engineering analyses.
 - e. Certifying that:

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- 1) It has performed the design of the welded pipe railing system in accordance with the performance and design criteria stated in the Contract Documents, and
 - 2) The said design conforms to all applicable local, state and federal codes, rules and regulations and to the prevailing standards of practice.
- D. Testing Agency Qualifications: To qualify for approval, an independent testing agency shall demonstrate to Engineer's satisfaction, based on evaluation of criteria submitted by testing agency, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the work in accordance with ASTM E329 and ASTM E548.
- E. Performance Criteria:
1. Maintain the visual design concept shown, and the technical requirements specified, including modules, profiles, alignment of components and requirements for finish.
 2. Contractor shall provide stainless steel welded pipe handrail and railing system that conforms to the New York State Building Code (NYSBC), ASTM E985 and CFR 29, Part 1910.23, including the 200 pound loading requirement, and including the requirement that specific types of occupancies and sizes of contributing protected areas shall incorporate greater design load resistance into welded pipe railing system, in compliance with ASTM E985, than that specified herein.
 - a. Completed handrail and railing shall withstand a uniform lateral force of 50 pounds per linear foot and a vertical uniform downward force of 50 pounds per linear foot, both applied simultaneously at the top of the handrail and railing, performance tested in accordance with Test Method A and B of ASTM E935.
 - b. Intermediate and bottom rails shall withstand simultaneously applied lateral uniform forces of 40 pounds per linear foot and a vertical load of 50 pounds per linear foot, however, lateral and vertical loads on intermediate and bottom railings need not be considered in the detailing and fabrication of posts and anchorages.
 - c. For railings having solid panels or picket balusters, the panels or picket balusters shall be detailed and fabricated to withstand a uniform lateral load of 50 pounds distributed over any round or square area of one square foot located anywhere within the infill area or a 50 pound per foot penetration cone, performance tested in accordance with Test Method C and D of ASTM E 935.

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- d. Concentrated 200 pound load and uniform force conditions shall not be applied simultaneously.
 - e. Other pertinent requirements ceded to ANSI A1264.1 by governing authorities having jurisdiction at the Site.
 - f. Bending stresses shall not exceed 75 percent of the yield stress of the material. Applied loads shall not produce permanent residual deformation in the completed work when loads are removed. Load-deformation data shall be determined in accordance with ASTM E935.
 - g. Maximum allowable deflections shall be in accordance with ASTM E985.
 - h. Where no computations provide the needed information, testing, in compliance with ASTM E935, shall be performed for verification that stainless steel welded pipe railing system and auxiliary system components comply with specified performance requirements and the requirements of governing authorities having jurisdiction.
3. Thermal Control: Provide adequate expansion within the fabricated system that allows for a thermal expansion and contraction caused by a material temperature range of 140 degrees F to -20 degrees F without warp or bow of system components. Distance between expansion joints shall be based on providing a 1/4 inch wide joint at 70 degrees F which accommodates a movement of 150 percent of the calculated amount of movement for the specified temperature range.
4. Provide expansion joints in handrail and railing system Work where systems cross expansion joints in structure.
5. Configuration of all stainless steel welded pipe handrail and railing systems shall be as shown on the Contract Drawings. All details shown on the Contract Drawings are typical; similar details apply to similar conditions, unless specifically noted otherwise on the Contract Drawings. Verify dimensions at the site without causing delay in the work.
6. Manufacturer is responsible for structural analysis and detailing of stainless steel welded pipe handrail and railing system. Provide complete structural performance calculations and Shop Drawings for all stainless steel welded pipe handrail and railing members, anchors and all other support system components prepared, signed and stamped with the seal of a Professional Engineer registered in the State of New York and recognized as an expert in the specialty involved.

F. Anchors and Supports:

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1. Anchorage system shall be structurally analyzed based on results of tests in compliance with ASTM E488 and ASTM E894. Anchors shall be tested for static, seismic, fatigue and shock loadings in series. Static tests shall include tension, shear, flexure, and torsion load resistance.
2. When the size, length or load carrying capacity of an anchor bolt, concrete anchor or concrete insert is not shown on the Contract Drawings, provide the size, length and capacity required to carry the design load times a minimum safety factor of four when installed in cast-in-place concrete and a minimum safety factor of six when installed in unit masonry construction.
3. Sizes shown on the Contract Drawings shall be considered minimum. Increase size to comply with design loadings and minimum safety factors specified.

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings for approval of the Engineer. Submittals shall include, but not be limited, to the following:
 - B. Samples:
 1. Full size sample, 2 foot - 0 inches long, of assembled stainless steel welded pipe railing system at post and rail intersections with all associated components including typical welded connections, mounted toe-board and sleeve, and handrail complete with mounting brackets all with specified controlled uniform finish.
 2. Samples will be reviewed by Engineer for color, finish, joinery appearance and workmanship only. Compliance with all other requirements is the responsibility of Contractor.
 - C. Shop Drawings:
 1. Drawings for the fabrication and erection of stainless steel welded pipe railing and handrail systems with sizes of members, components and anchorage devices, all based on specified requirements. Indicate that Shop Drawings have been reviewed by the Professional Engineer preparing, signing and stamping its seal on design calculations and engineering analyses, verifying that the manufacturer's proposed fabrication, installation methods and details adequately translate the results of the design calculations and engineering analyses into the work, before submitting Shop Drawings to Engineer for review.
 2. Include copies of manufacturer's specifications, standard and custom detail drawings and installation instructions and manufacturer's catalog showing complete selection of standard and custom components, auxiliary system

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components and miscellaneous accessories for selection by Engineer. Include all plans and elevations identifying the location of all railing and handrails, and all expansion joints. Show all anchorage items.

3. Profiles of stainless steel welded pipe railing and handrail system components, and the details of forming, jointing, sections, connection, internal supports, trim, and accessories. Show details of the stainless steel welded pipe railing and handrail drawn at 1-1/2 inch scale.
 4. Calculations for the complete design and engineering analysis of the stainless steel welded pipe railing and handrail system, auxiliary system components and anchorages. Calculations to show compliance with the performance criteria specified in the Contract Drawings. Calculations are to be prepared, signed, and stamped with the seal of a registered professional engineer licensed to practice in the State of New York and recognized as an expert in the required work.
- D. Maintenance Manuals (O&M Manuals): Upon completion of the installation of the stainless steel welded pipe railing and handrail system submit the following:
1. Product name and manufacturer.
 2. Name, address and telephone number of manufacturer and local distributor.
 3. Detailed procedures for routine maintenance and cleaning, including recommended cleaning materials, application methods and precautions as to use of materials that may be detrimental to finish when improperly applied.
- E. Certificates: Submit for approval the following:
1. Copies of material purchase receipts, for this project, signed by a certified and licensed Notary Public, verifying that material purchased for the Work complies with material designations specified as confirmed by approved Shop Drawings.
 2. Furnish certification that laboratory loading tests have been performed on the handrail, railing and anchorage systems verifying compliance with performance criteria specified, and that it conforms to all applicable CFR, ANSI and ASTM requirements for loads and deflections and that the data derived from such tests has been used by the registered professional engineer in the design calculations and engineering analyses of the welded pipe railing and auxiliary system components.
 3. Registered professional engineer who prepares, signs and stamps its seal shall provide a written statement confirming responsibility for the design and attesting that the design prepared meets the performance criteria

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required by the Contract Documents, the requirements of governing authorities having jurisdiction, and conforms to prevailing standards of practice.

4. Certification of welders and welding procedures shall be submitted as specified.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver stainless steel welded pipe railing and handrail and all accessories dry and undamaged, with manufacturer's protective coating intact, bearing original intact factory labels.
2. Stainless steel welded pipe railing systems which are damaged during delivery or while being unloaded shall not be stored on Site. Remove such units from Site and replace panels with new, undamaged material.

B. Storage of Materials:

1. Store stainless steel welded pipe railing and accessory materials in a dry location and in a manner that will protect strippable coating from exposure to sun and condensation; with good air circulation around each piece and with protection from windblown rain.
2. Store stainless steel welded pipe railing and accessory materials under tarpaulin covers and in an area protected from dirt, damage, weather and from the construction activities of all Contractors. Do not store outside or allow items to become wet or soiled in any way while on Site.
3. Do not store in contact with concrete, earth or other materials that might cause corrosion, staining, scratching or damage to finish. Do not install system components which become dented, scratched or damaged in any way. Remove such components from site and replace with new, undamaged material.

C. Handling of Materials:

1. Do not subject stainless steel welded pipe railing and accessory materials to bending or stress. Do not carry or transport panels in the horizontal (flat) position. Hold panels upright on edge when handling.
2. Do not damage edges or handle material in a manner that will cause scratches, warps or dents.
3. Keep on-Site handling to a minimum.

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4. Maintain protective covering on railings and handrails. System components which are damaged during installation shall be removed from Site and replaced with new, undamaged material.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Stainless Steel Mechanical Tubing, unless otherwise indicated on the Contract Drawings:
 1. Stainless Steel Mechanical Tubing: ASTM A554, Type 316L, annealed. Provide posts and rails with 1.90-inch outside diameter, 0.109-inch wall thickness.
 2. Stainless Steel Fittings: Same material as rails except where otherwise shown on Contract Drawings.
- B. Post Reinforcing Insert, unless otherwise indicated on the Contract Drawings: ASTM A312, Grade TP316L, welded stainless steel pipe, 1.66-inch outside diameter, 0.140 wall thickness (Schedule 40S).
- C. Toe-boards, unless otherwise indicated on the Contract Drawings: ASTM A666, Type 316L stainless steel. Provide Toe-boards to the dimensions and details shown on the Contract Drawings and as follows:
 1. Provide same finish as rails and handrails, securely fastened in place with not more than 1/4 inch clearance above floor level.
 2. Provide for thermal expansion and contraction in Toe-boards over the entire range of temperatures specified. Thermal movement shall not cause warping or buckling of Toe-boards.
 3. Toe-boards shall meet the requirements of 29 CFR, Part 1910.23, Section (e). Minimum thickness of stainless steel plate shall be 3/16-inch.
 4. Toe-boards shall follow curvature of stainless steel welded pipe railing. Where stainless steel welded pipe railing is shown to have curved contours

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at corners, or other locations, the toe-board shall likewise be curved to follow line of stainless steel welded pipe railing system.

- D. Brackets, Flanges, and Plates, unless otherwise indicated on the Contract Drawings: Provide ASTM A666, Type 316L stainless steel brackets, flanges and plates. Components shall be selected by Engineer from manufacturer's standard and custom components. Components shall be in accordance with manufacturer's recommendations and as acceptable to Engineer as shown on approved Shop Drawings.
- E. Chain, Snaps and Eyebolts, unless otherwise indicated on the Contract Drawings: Provide oblong 0.250-inch welded link, Type 316L stainless steel chain weighing 57 pounds per cubic foot, each link 1-1/8-inch by 7/16-inch. Provide 1/4-inch threaded quick link stainless steel eye bolts with heavy-duty swivel snaps and spring loaded latches.
- F. Post Sleeves, unless otherwise indicated on the Contract Drawings: Provide the following ASTM A312, Grade TP316L stainless steel sleeves:
 - 1. Post Sleeves for Fixed Railing: 3.50-inch outside diameter, 0.216-inch wall thickness (Schedule 40S), 6-inch long post sleeves, as required for anchorage to concrete and masonry. Components shall be in accordance with manufacturer's recommendations and as acceptable to Engineer as shown on approved Shop Drawings.
 - 2. Removable Railing Post Sleeves: 6-inch long, Schedule 40S post sleeves for removable railing sections. Size post sleeves for snug fit to avoid removable railing lateral movement. Provide continuous cylindrical Teflon inserts to fill annular space between sleeve and post with top cover flange flush with top of mounting surface.
- G. Railing Gates, unless otherwise indicated on the Contract Drawings: Provide the following:
 - 1. Hinges: Provide railing gates with two self-closing hinges.
 - 2. Latches and Stops: Provide one latch and stop with rubber bumper and 1-inch diameter plastic knob for each railing system gate shown on the Contract Drawings.
- H. Accessory and Miscellaneous Materials: Provide all accessory items and system components of ASTM A666, Type 316 stainless steel, finished to match posts and rails.
- I. Concealed Connector Sleeves (Rail Splice Inserts): Provide ASTM A312, Grade TP316L stainless steel, 1.66-inch outside diameter, 0.140-inch wall thickness (Schedule 40S), minimum 5-inches long.

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- J. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrode as recommended by manufacturer of metal to be welded and as required for strength and compatibility of finished items.
- K. Concrete and Masonry Anchors: Concrete and masonry anchors shall be as specified in Section 05 05 23.02 - Miscellaneous Metal Fastenings.
 - 1. Anchors shall be of stainless steel Type 316 and a minimum size of 1/2 inch diameter.
- L. Non-Shrink, Non-Metallic Grout:
 - 1. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and is recommended by the manufacturer for exterior use.
 - 2. Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous, cementitious grout, complying with ASTM C1107, requiring only the addition of water at the Site.
 - 3. See Contract Drawings for minimum compressive strength for non-shrink grout. Strength shall not be less than $f'c=5000$ psi.
- M. Bolting Materials: As specified in Section 05 05 23.02 - Miscellaneous Metal Fastenings.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Provide stainless steel welded pipe railing and handrail systems completely factory fabricated using fabrication techniques recommended for stainless steel. Use tools and fabrication equipment dedicated only to the fabrication of Type 300 series stainless steels to completely eliminate ferrous contamination.
- B. Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the Site. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
 - 1. Railing shall be assembled in sections as long as practicable. Posts shall be connected to flanges and fittings by welding. Surfaces of butt joints shall be ground smooth and square to obtain flush and tight joints undetectable from surrounding finish on all surfaces of the pipe.
 - 2. On-Site welding shall not be permitted.
- C. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Fabricate all corners without the use of fittings. Form bent metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work. Provide not less than 4 inch outside radius.

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1. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail or railing components.
- D. Cope intersections of rails and posts and weld joints. Butt weld end-to-end joints of railings or use welding connectors. Lower rails shall be coped and welded to the posts.
 1. Components shall be coped at perpendicular and skew connections to provide close fit.
- E. Provide for expansion and contraction in the railing system as required by performance criteria. At each side of expansion joints located in the structure to which the railing system is attached, provide an end post and railing return located 16 inches from the joint. Separation between returns shall match the width of the structure expansion joint.
- F. Cut, reinforce and tap components to receive finish hardware, screws, and similar items.
- G. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges and ease exposed edges to a radius of approximately 1/32 inch.
- H. Provide wall returns at ends of wall-mounted handrails. Close end returns, unless clearance between end of handrail and wall is 1/4 inch or less.
 1. Close ends of handrail and railing members with prefabricated end fittings.
- I. Chains
 1. Chains shall be provided across openings in stainless steel welded pipe railing where shown on the Contract Drawings. One end of each chain shall be attached to a 1/4-inch eye bolt in the post and the other end shall be attached by means of an approved heavy stainless steel swivel eye snap hook to a similar eye bolt in the opposite post.
- J. Weep Holes
 1. Provide 15/64 inch diameter weep holes at the lowest point on all railing system posts and along the bottom side of railing system rails.
 2. Provide pressure relief holes at closed ends of handrails and railings.
- K. Welding
 1. Welding shall comply with the requirements of AWS and NYSBC.

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2. Provide uniform, tight and dense welds, uniformly ground smooth and blended so no roughness shows after finishing, and without visible transition to metal surfaces so that welded surface matches contours of adjoining surfaces.
 - a. Welded joints shall be continuous, and made watertight.
 - b. Field welding shall not be permitted.
3. All welding shall be performed with Inert Gas Tungsten Arc Welding using Direct Current, Straight Polarity. The non-consumable electrode shall be 1/16-inch diameter, 2 percent threaded tungsten electrode and have a point ground on the end similar to a pencil point. The welding current shall be between 70 and 100 amperes. The shielding gas shall be argon, helium or a combination of both with a minimum flow of 15 cubic feet per hour. Filler metal shall be Type 316L, stainless steel.

L. Finishes

1. All handrail, railing, exposed supports and Toe-boards, except for Pond Outlet Structure Fall Protection Railing, shall be provided with a uniform, bright, mill-polished surface obtained by finishing with a 150 - 220 mesh abrasive, following initial grinding with coarser abrasives. The finish shall be characterized by very fine parallel “grit lines” and be within a uniform range established as either an AISI No. 4 or 5 finish, with final finish established by Sample submission as approved by Engineer in compliance with Section 05 06 00.01 - Schedules for Stainless Steel Work and AISI/NIDI 9012 or AMP/NAAMM AMP 503.
2. Pond Outlet Structure Fall protection railing (stainless steel) shall be vinyl coated or shop fabricated with black vinyl coating.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Obtain all stainless steel welded pipe handrail and railing system components and accessories from the same manufacturer.
- B. Provide qualified welding processes and welding operators in accordance with ANSI/AWS “Structural Welding Code” D1.1, Section 5, Qualification.
- C. Provide certification that all welders employed on, or to be employed for, the fabrication of the stainless steel welded pipe rail system have satisfactorily passed AWS qualification tests within the previous twelve months. Contractor shall ensure that all certification are kept current.
- D. Allowable Tolerances:

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1. Limit variation of cast-in-place inserts, sleeves and field-drilled holes to the following:
 - a. Spacing: $\pm 3/8$ inch.
 - b. Alignment: $\pm 1/4$ inch.
 - c. Plumb: $\pm 1/8$ inch.
 2. Limit variation of completed handrail and railing system alignment to $1/4$ inch in 12 feet and $1/16$ inch in 3 feet.
- E. Set rails horizontal and parallel to rake of steps or ramps to within $1/4$ inch in 12 feet.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Contractor shall examine the alignment of the substrate and conditions under which the stainless steel welded pipe railing system work is to be performed and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the stainless steel welded pipe railing system work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.
- B. Protection: Protect cast-in-place sleeves and field-drilled holes from debris and water intrusion by use of temporary covers or removable foam inserts that completely fill the cast-in-place sleeve.
- C. Coordinate installation of anchorages for handrails and railings. Furnish setting drawings, templates, and installation instructions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in cast-in-place concrete or masonry. Deliver to Site in time for installation.
- D. Verify dimensions by taking measurements at the Site without causing delay in the work. Where measurements cannot be taken at the Site without delaying the work, establish dimensions and proceed with fabrication of handrails and railings without Site measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.
- E. Verify to Engineer gage of stainless steel welded pipe railing posts and rails brought to the site by actual measurement of on-site material in the presence of Engineer

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3.02 ERECTION

A. Fastening to In-Place Construction

1. General: Do not erect components which have become scarred, dented, chipped, discolored or otherwise damaged or defaced. Railing and handrail system components which have holes, cuts, gouges, deep scratches or dents of any kind shall be removed from the Site before installation. Repairs to correct such work shall not be approved by Engineer. Remove and replace with new material.
2. Posts and rail sections shall be brought into final alignment by stainless steel welded pipe railing installer.
3. Provide anchorage devices and fasteners where necessary for securing railing and handrail items to in-place construction, including threaded fasteners for concrete and masonry inserts, through-bolts and other connectors as required. Use only Type 316 stainless steel devices and fasteners.
4. Flanged fittings shall be secured to steel with nuts, bolts and washers; to hollow glazed structural tile and masonry with masonry anchors; and to solid grouted masonry and concrete with concrete anchors. Flanges not bearing on metal shall be set in non-shrink grout.
5. Provide end posts and railing returns at 16-inches on each side of structural expansion joints. Separation between returns shall match the width of the structural expansion joint.
6. Field-dowel connections shall be located at posts.

B. Cutting, Fitting and Placement

1. Perform cutting, drilling and fitting required for installation. Set the work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.
2. Fit exposed connections accurately together to form tight hairline joints. Do not cut or abrade the surface of units which have not been finished after fabrication, and are intended for field connections by mechanical or other means without further cutting or fitting.
3. Handrails supported from walls, partitions and similar construction shall be supported by brackets located within 18 inches of handrail terminations and at intermediate points spaced not more than 5 feet on center. Drill wall plate portion of the mounting bracket to receive one bolt, unless otherwise shown on the Contract Drawings as concealed anchorage. Provide flush-type wall-return fittings with the same projection as that

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shown for mounting brackets. Secure mounting brackets and wall-return fittings to building construction as follows:

- a. For anchorage to concrete and solid masonry units, use concrete anchors.
 - b. For anchorage to hollow masonry units, use toggle bolts having square heads.
4. Make all splices as near as possible to posts but not exceeding 12 inches from the nearest post. Permanent field splice connections shall be made using manufacturer's recommended minimum 5-inch long Type 316 stainless steel connector sleeves. Tight press-fit all field splice connectors and install in accordance with manufacturer's written instructions as provided on approved Shop Drawings.
 5. Space posts 5 feet - 0 inches on center and connect sections as shown on Shop Drawings approved by Engineer.
 6. Expansion Joints: Provide slip joints with internal sleeve extending 2 inches minimum beyond joint on each side. Construct expansion joints as for field splices except fasten internal sleeve securely to one side of rail assembly. Locate joints within 6 inches of posts. Submit proposed locations of expansion joints to Engineer.

3.03 FIELD TESTING / QUALITY CONTROL

- A. An anchor testing program shall be established based on ASTM E488 and ASTM E894. Perform tension, shear, flexure, and shock loading resistance tests.
 1. Test a minimum of one anchor for every three posts and one anchor for every three railing supports.
 2. Based on initial results of testing, test additional anchors in order to verify that design safety factors have been provided by anchor installation.
- B. Anchors: Suitable equipment shall be used to perform tests required to verify correct installation of anchors and provide proof loads on anchors installed at the Site in accordance with ASTM E488 and ASTM E894.
- C. The Contractor shall provide a field report on anchor testing results to Engineer, in compliance with ASTM E488 and ASTM E894, for final approval of welded pipe railing system along with recommendations for remedial work required to bring anchors up to load resistance requirements specified and required by governing authorities having jurisdiction.
- D. Final payment and final approval will not be provided to Contractor until report has been approved by Engineer and remedial work is tested and shown to be in compliance with specified performance requirements.

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3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Adjusting

1. Adjust railings and handrails prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Plumb posts in each direction.
2. Anchor posts in concrete by means of sleeves set and anchored into concrete substrate and by side-mounting, in areas shown on the Contract Drawings. Provide closure secured to the bottom of the sleeves. Unless otherwise shown on the Contract Drawings, after the posts have been inserted into the sleeves, fill the annular space between posts and sleeves solid with non-shrink, non-metallic grout as specified. Crown grout away from posts.
3. Anchor posts to steel with stringer or support flanges, angle-type or floor-type as required by conditions, shop-connected to posts and bolted to the steel supporting members.
4. Side-mount posts by fastening them securely in brackets attached to steel or concrete and in accordance with Shop Drawings approved by Engineer.
5. Provide hinged railing sections where shown on the Contract Drawings. Provide hinges and latch for connection to adjacent railing.
6. At walkways and other locations where railing is provided on each side, locate railing system posts opposite each other.

B. Protection

1. Protect railing system from damage by the work of all contractors.
2. Remove defective railing system components immediately upon discovery of damage, and replace with material that meets specification requirements, so that all stainless steel welded pipe railing system components will be without damage or surface blemish at the time of Substantial Completion.

C. Cleanup

1. Clean exposed surfaces of stainless steel welded pipe railing work of every substance before leaving the site after completion of installation. Comply with recommendations of both the stainless steel welded pipe railing and finish manufacturer. Do not use abrasives or non-approved

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solvent cleaners. Test cleaning techniques on an un-used section of railing before employing cleaning technique in the work.

- a. Remove protective plastic as recommended by manufacturer.
 - b. Remove all stains, dirt, grease and other substances by washing railings and handrails thoroughly using clean water and soap. Rinse with clean water.
 - c. Do not use acid cleaning solutions, steel wool or other harsh abrasives.
 - d. If stains remain after washing, remove finish and restore in accordance with recommendations of the manufacturer.
2. Leave stainless steel welded pipe railing and handrails, free from dents, burrs, scratches, holes and other blemishes. Refinish minor scratches to be indistinguishable from adjacent un-scarred areas. If, after refinishing, damage remains visible when viewed from five feet away, or if finish of work has been altered to the point where it appears different from adjacent work, Contractor shall replace damaged work with new undamaged material at no additional expense to the City.

END OF SECTION

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NO TEXT ON THIS PAGE

**SECTION 05 53.01.02– STAINLESS STEEL FLOOR GRATINGS
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish and install all stainless steel floor gratings and stair grating treads as indicated on the Contract Drawings, specified herein and as approved.
- B. Gratings shall be complete with frames, anchors, fastening devices, toe guards, and miscellaneous appurtenances. Stair grating treads shall be complete with frames, anchors, fastening devices, nosing, and miscellaneous appurtenances.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 05 05 23.01 - Welding.
- B. Section 05 12 00 - Structural Steel Framing

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C. Section 05 05 23.02 - Miscellaneous Metal Fastenings

D. Section 05 51 00 - Metal Stairs

1.04 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
2. ASTM A240 - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
3. ASTM A276 - Stainless and Heat-Resisting Steel Bars and Shapes.
4. ASTM A480 - General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plates, Sheet and Strips.
5. ASTM A666 - Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar.
6. ASTM A992 - Steel Plates, Shapes and Bars; Carbon, Structural.
7. ASTM F593 - Stainless Steel Bolts, Hex Cap Screws and Studs.
8. ASTM F594 - Stainless Steel Nuts.

B. American Association of State Highway and Transportation Officials (AASHTO):

1. LRFD - Bridge Design Specifications.

C. National Association of Architectural Metal Manufacturers (NAAMM):

1. ANSI/NAAMM MBG 531 - Metal Bar Grating Manual.
2. ANSI/NAAMM MBG 532 - Heavy Duty Metal Bar Grating Manual.
3. NAAMM MBG 533 - Welding Standards for Fabrication of Steel and Aluminum Bar Grating
4. NAAMM MBG 534 - Metal Bar Grating Engineering Design Manual

D. 2020 Building Code of New York State (NYSBC).

E. American Institute of Steel Construction (AISC):

1. AISC 325 - Steel Construction Manual, 15th Edition
2. AISC 207 - Certification Standard for Steel Fabrication and Erection, and Manufacturing of Metal Components
3. AISC 360 - Specification for Structural Steel Buildings..

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1.05 DESCRIPTION

A. Design Requirements

1. The design live load for grating covering floor openings shall be as designated on the Contract Drawings , but not less than a uniform load of 150 pounds per square foot or a concentrated load of 300 pounds distributed over a 12-inch square area at the center of span, whichever produces the greater stress.
2. The design live load for grating on platforms shall be as designated on the Contract Drawings but not less than a uniform load of 100 pounds per square foot.
3. Grating in areas subject to vehicular traffic shall be as designated on the Contract Drawings , but not less than the maximum weight vehicle which can access the area. All AASHTO axle wheel loads shall include a 30% impact factor. Forklifts or other similar wheeled vehicles shall have maximum wheel loads defined by the manufacturer. When wheel loads are not defined by the manufacturer, the wheel load shall be defined as 40 percent of the gross loaded weight of the maximum size vehicle to be accommodated.
4. The maximum allowable deflection due to dead load plus live load shall not exceed the span divided by 240, but not more than 1/4 inch.
5. Gratings shall be designed in accordance with the design criteria specified herein, and the NAAMM specifications, unless otherwise noted on the Contract Drawings or as required by the NYSBC.
6. Toe guards or plates shall be provided and placed at the following locations:
 - a. At open sides of grating platforms.
 - b. At grating platform locations coinciding with guard rail locations.
7. Toe guards or plates shall comply with OSHA 1910.29(k)(1).
8. Nosing plates shall be provided at the end of all stair grating treads.
9. The maximum main bearing bar depth is shown on the Contract Drawings and is to be based on loading requirements and the clear span as shown on the Contract Drawings.
10. Where dissimilar metals are in contact between the grating and structural supports as shown on the Contract Drawing, manufacturer shall protect against galvanic corrosion by providing isolation materials between each other.

1.06 QUALITY ASSURANCE

- A. Grating manufacturer shall have documented quality control processes in place to assure meeting ANSI/NAAMM standards.
- B. Grating manufacturer shall comply with ANSI/NAAMM standards.

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1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings and material specifications of all gratings for approval by the Engineer. Submit manufacturer's literature including load and deflection tables, anchor details, and standard installation details for each product submitted.
- B. Shop Drawings shall include the following:
 - 1. Placement drawings: including plans, elevations, details, sections showing construction, installation, and fastenings.
 - 2. Method of joining grating materials.
 - 3. Design of grating including engineering analysis and calculations shall be provided to the Engineer for review and approval, meeting the required performance and design criteria. Engineering analysis and calculations shall be signed and sealed by a Professional Engineer registered in the state of New York.
 - 4. Dissimilar metals isolation details. Unless otherwise noted on the Contract Drawings, contact between a galvanized surface and stainless steel surface shall be isolated with approved isolating materials to prevent galvanic corrosion. Submit locations and isolating material and details for review and approval.
- C. Gratings shall not be manufactured until the Contractor's Shop Drawings have been approved by the Engineer.
- D. Samples of grating and fastening devices shall be submitted for approval by the Engineer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Not Used

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gratings and grating fasteners
 - 1. Nucor Grating, Bethlehem, PA; www.nucorgrating.com
 - 2. Ohio Gratings, Inc., Canton OH; www.ohiogratings.com
 - 3. Indiana Gratings Inc., Martinsville, IN; www.indianagratingsinc.com

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4. McNichols, New Brunswick, NJ; www.mcnichols.com
5. Grating Pacific, Los Alamitos, CA; www.gratingpacific.com
6. Or approved equal.

B. Dissimilar metal isolation tape.

1. Pres-On, Bolingbrook, IL; www.preson.com
2. Lamatek, West Deptford, NJ; www.lamatek.com
3. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Type of Gratings

1. Unless otherwise shown or specified, gratings shall be one of the following types and shall be the product of one manufacturer:
 - a. Type "A" - Parallel bearing bars, with cross members at right angles.
 - b. Type "B" - Parallel bearing bars, with diagonal cross members.

B. Materials

1. Floor gratings and appurtenances shall be Type 316L Stainless Steel and shall conform to the requirements specified herein and to the following standards:
 - a. Main bearing bars, rectangular cross bars, and banding: ASTM A167; ASTM A240; ASTM A480; ASTM A666
 - b. Frames, Curb Angles, Braces, Skirt Angles, Bolts and Fastening Devices: ASTM A276; ASTM A480; ASTM F593, ASTM F594

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Gratings shall be accurately fabricated, free from warps, twists or other defects which affect the appearance and serviceability of the grating,
- B. The tops of the grating bearing bars and cross bars shall be in the same plane.
- C. Gratings shall have a mill finish unless otherwise noted on the Contract Drawings.
- D. All welds shall be ground smooth and conform to the requirements of Section 05 05 23.01 - Welding and NAAMM MBG 533.
- E. Openings in and edges of all grating sections shall be banded with bearing bars. Bands shall be welded to all intersecting members. Weld banding flush with the top surface of the grating. Edge banding shall be full height of grating.
- F. Grating Fabrication
 1. Type "A" Grating (Pressure Locked or Welded) shall consist of parallel bearing bars spaced not more than 1-3/16 inches on centers joined by cross

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members spaced not more than 4 inches on center (unless shown otherwise on the Contract Drawings), to form rectangular openings. Approved welded, electric-forged, slotted, friction fitted or interlocking joints shall be used in joining cross members to the bearing bars to give the grating the required strength, rigidity and durability. The distance between the support and the nearest cross bar shall not exceed 2 inches.

2. Type "B" Grating (Welded or Riveted) shall consist of parallel bearing bars spaced not more than 1-5/16 inches on center, joined by welded or riveted bent diagonal cross bars. Rivets shall be 1/4 inch in diameter and shall be spaced not more than 4 inches on center unless shown otherwise on the Contract Drawings. The distance between the support and the center of the nearest rivet shall not exceed 1 inch.
 3. Minimum grating depth shall be 1-1/4 inches with bearing bars not less than 3/16 inches thick.
 4. Welded cross members shall not be less than 3/16 inch in thickness. Mechanically interlocked cross members shall not be less than 1/8 inch in thickness. The depth of cross members shall not be less than one-half the depth of the bearing bars, but such depth need not exceed 1 inch. Riveted cross members shall be as specified for mechanically interlocked cross members.
 5. Serrated grating shall be provided where shown on the Contract Drawings. Depth of serrated grating shall be not less than 1/4 inch greater than required standard bar grating.
 6. Each section of grating shall be sized to weigh a maximum of 100 pounds unless noted otherwise on the Contract Drawings.
 7. Include anchors for locking frame into concrete as shown on the Contract Drawings.
- G. Grating Cut-outs
1. Cut-outs shall be provided in the grating for the passage of pipe, valve stems, columns and similar work. Where more than two bearing bars are included in the cut-out, banding bars of the same dimensions as the bearing bars shall be provided around the opening and welded or electric-forged to the component parts of the grating.
- H. Grating Stair Treads and Landings
1. Grating stair treads are shown on the Contract Drawings and shall be securely fastened to angles or carrier bars which in turn shall be fastened to stringers. The outer edge or nosing of stair treads shall be so constructed as to make it distinctly visible and contrasting with the other part of the tread. Non-slip nosings shall be furnished on all the stair treads and landings.
- I. Fabrication tolerances shall be in accordance with ANSI/NAAMM-532.

SECTION 05 53.01.02– STAINLESS STEEL FLOOR GRATINGS
CONTRACT KENS-EAST-2

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Field Measurements

1. The Contractor shall check all dimensions in the field after all piping and equipment are set in place and determine the exact dimensions and locations of openings and cut-outs.
2. Templates shall be made where required for location and size of openings and cut-outs.
3. The Contractor shall field verify all pertinent dimensions prior to grating fabrication.

3.02 INSTALLATION

- A. Installation

1. Prior to grating installation, Contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Any inconsistencies between Contract Drawings and supporting structure deemed detrimental to grating placement shall be reported to the Engineer prior to placement.
2. Gratings shall be installed with each section readily removable and replaceable. Adjacent units shall be neatly fitted together.
3. The clearance at the ends or between sections of gratings shall be a maximum of 1/4 inch.
4. Tops of gratings shall be set flush with surrounding construction.
5. Gratings shall be set with a full and uniform end bearing on the stainless steel frames to preclude rocking movement; wedges or similar shimming devices shall not be used.

- B. Fastening Devices

1. Approved fastening devices shall be installed to hold the gratings rigidly to the supports with means for easy removal.
2. Fastening devices shall not protrude above the walking surface of the grating.
3. Fasteners shall be installed in accordance with the manufacturer's recommendations.
4. Lifting devices shall be provided in accordance with the manufacturer's recommendations for all removable gratings. Locations of all removable

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CONTRACT KENS-EAST-2

gratings are indicated on the Contract Drawings. Lifting devices shall not protrude above the walking surfaces of the grating.

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Not Used

END OF SECTION

SECTION 05 56 00.01 – MISCELLANEOUS METAL CASTINGS
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor and materials as shown, specified, and required, to furnish and install all miscellaneous metal castings, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.08	Delivery, Storage, and Handling	3
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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 09 91 00 - Painting.

1.04 REFERENCES

- 1. American Association of State Highway and Transportation Officials (AASHTO):

SECTION 05 56 00.01 – MISCELLANEOUS METAL CASTINGS
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- a. LRFD - Bridge Design Specifications.
- 2. ASTM International:
 - a. A47 Ferritic Malleable Iron Castings
 - b. A48 Gray Iron Castings
 - c. A536 Ductile Iron Castings
 - d. B584 Copper Alloy Sand Castings for General Applications

1.05 DESCRIPTION

- A. Miscellaneous metal castings shall include all miscellaneous ferrous and non-ferrous castings to be furnished and installed by the Contractor.
- B. Included in this classification are manhole frames, covers and grades, stop plank grooves, cast iron brackets or other cast iron supports for piping, floor drains, traps, cleanouts, special malleable iron castings and inserts and other special castings of any nature or material, and all necessary bolts, nuts, washers, gaskets and other appurtenances required to join sections of castings.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Action Submittals:

- a. Submit Shop Drawings and material specifications for all castings furnished as part of the Work.
 - 1) Shop Drawings shall be submitted under separate cover for each type of casting.
 - 2) If a metal casting is a component or part of Work specified or shown elsewhere:
 - a) The Contract may elect to include the submittal information for the metal casting required herein under that separate submittal.
 - b) If the Contractor elects to include the metal casting submittal as part of another submittal, the Contractor shall submit a stand-alone, separate informational submittal for the metal casting indicating as such.

2. Information Submittals:

- a. Certificate of conformance to applicable reference standards.

SECTION 05 56 00.01 – MISCELLANEOUS METAL CASTINGS
CONTRACT KENS-EAST-2

- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents.
 - B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used
- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
- A. Iron Castings
 - 1. Castings shall be as manufactured by:
 - a. Neenah Foundry Company, Neenah, WI
 - b. Campbell Foundry, Harrison, NJ
 - c. Or approved equal.
- 2.02 MATERIALS / EQUIPMENT
- A. Design Requirements
 - 1. Castings exterior to structures shall be designed for an AASHTO HS-20 truck loading, unless otherwise noted on the Contract Drawings.
 - 2. Interior castings shall be designed for the loading designated on the Contract Drawings for the adjacent floor area. If no loading is designated, castings shall be designed for a minimum load of 300 pounds per square foot or as required for their intended use.
 - B. Metal castings shall conform to the requirements specified herein and to the following standards:
 - 1. Gray Iron: ASTM A48
 - 2. Ductile Iron: ASTM A536
 - 3. Malleable Iron: ASTM A47
 - 4. Manganese Bronze: ASTM B584
 - C. Where these metals are designated by class, grade, type, alloy, temper or coating, they shall conform to the requirements specified herein or as shown on the Contract Drawings.
 - D. Iron Castings

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CONTRACT KENS-EAST-2

1. Iron Castings shall include, but not be limited to frames, covers, and grates for trench drains, catch basins, and inlets; and stop log grooves.
 - a. Castings shall be of gray iron of uniform quality, free from defects, smooth and well cleaned by shotblasting.
 - b. Catalog numbers on the Drawings are provided only to show required types and configuration. All covers shall be cast with raised letters as designated on the Drawings.
2. Covers and Grates
 - a. Covers and grates shall be provided with matching frames. Cover shall fit flush with the surrounding finished surface. The cover shall not rock or rattle when loading is applied.
 - b. Round covers and frames shall have machined bearing surfaces.
 - c. Design loadings:
 - 1) Where located within a structure, a minimum design loading of 300 psf shall be used, unless noted otherwise.
 - 2) At all locations not within a structure, the design loading shall be a standard AASHTO H-20 truck loading, unless otherwise noted.
 - d. Manhole frames and covers and grates shall be Class 35 unless otherwise specified in the Contract.
3. Pier cleats, bollards, and machinery castings shall be Class 20 or 25.
4. Ductile iron castings shall be grade 80-55-06 unless otherwise specified in the Contract.

E. High Strength Yellow Brass: Commercial designation for this alloy is leaded manganese bronze and castings shall conform to the requirements of ASTM B584, copper alloy UNS No. C86500 or C86700.

F. Watertight gasketing, bolting, locking devices, patterns, lettering, pickholes, vents, or self-sealing features shall be as detailed on the Drawings.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Castings shall be true to pattern in form and dimensions without sharp unfiltered angles or corners, free from pouring faults, sponginess, cracks, blowholes and other defects in positions affecting their strength.

B. All castings shall be made accurately to the dimensions shown on the Contract Drawings and shall be planed or ground where marked or where otherwise necessary to secure perfectly flat and true surfaces. Allowance shall be made in patterns so that specified thicknesses will not be reduced.

C. Manhole covers and floor plates shall conform to the details shown on the Contract Drawings or in their absence to the standards of the Department of Environmental Protection and shall be true and seat evenly at all points.

SECTION 05 56 00.01 – MISCELLANEOUS METAL CASTINGS
CONTRACT KENS-EAST-2

- D. Catalog numbers indicated on the Contract Drawings are given to show required types and configurations. All covers shall be cast with raised letters as designated on the Contract Drawings.
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used
- PART 3 EXECUTION
- 3.01 EXAMINATION / PREPARATION
 - A. Not Used
- 3.02 INSTALLATION
 - A. Install products in complete accordance with the manufacturer's printed instructions and the approved shop drawings. In addition:
 - 1. All castings shall be erected to accurate grades and alignment and when placed in concrete or other surrounding materials, shall be carefully supported to prevent movement during placement of concrete or other materials.
- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Not Used
- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Provide field touch up painting of scratched or damaged surfaces, using primer, intermediate and finish paints provided by the manufacturer, in accordance with the requirements of this Section and Section 09 91 00 – Painting. In addition:
 - 1. Non-ferrous castings shall be painted only when specifically required in the Contract.
 - 2. Outdoor manhole frames and covers and grates are not required to be painted.

END OF SECTION

SECTION 05 56 00.01 – MISCELLANEOUS METAL CASTINGS
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NO TEXT ON THIS PAGE

SECTION 07 13 00 – SHEET WATERPROOFING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes sheet membrane waterproofing for below grade concrete.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. NYSBC - New York State Building Code
- B. ASTM C836 - Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course

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- C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension
- D. ASTM D570 - Standard Test Methods for Water Absorption of Plastics
- E. ASTM D882 - Standard Test Methods for Tensile Properties of Thin Plastic Sheeting-
- F. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
- G. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)
- H. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
- I. ASTM D3767 - Standard Practice for Rubber - Measurements of Dimensions
- J. ASTM D5385 - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
- K. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
- L. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.05 DESCRIPTION

- A. Environmental Conditions:
 - 1. Proceed with sheet membrane waterproofing work only when temperature and moisture conditions comply with the bentonite waterproofing manufacturer's written recommendations and when no rain or other damaging environmental condition is forecast for the time when the materials will be exposed to potential damage.
 - 2. Protect Work from precipitation, frost, and direct sun. Erect temporary shelters to protect Work in progress.
 - 3. Proceed with sheet membrane waterproofing only when weather conditions will permit unrestricted use of materials and quality control of the Work being installed, complying with the Section requirements and with the recommendations of the sheet membrane waterproofing manufacturer.
 - 4. Record decisions, conditions and agreements to proceed with the Work when weather conditions might be unfavorable. State the reasons for proceeding, with the names of the persons involved along with the changes, if any, or revisions, requirements or terms of the Contract.

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B. Pre-installation Conference:

1. Prior to the installation of each sheet membrane waterproofing system and associated work, the Contractor shall schedule and meet at the Site with the sheet membrane waterproofing installer and the foreman of the installer who will perform the work, the installer of each component of associated work, the installers of substrate construction to receive the waterproofing work, the installers of other work in and around the sheet membrane waterproofing work which must follow the waterproofing work, including mechanical work, if any, the Engineer and other representatives directly concerned with performance of the Work including where applicable, test agencies, product manufacturers, governing authorities and DEP. Record the discussions of the conference and the decisions and agreements (or disagreements) and furnish a copy of the record to each party attending. Review foreseeable methods and procedures related to the waterproofing Work, including but not necessarily limited to, the following:
 - a. Review project requirements, including Contract Drawings, Specifications, approved Shop Drawings and other Contract Documents.
 - b. Review required samples and submittals, both completed and yet to be completed.
 - c. Review status of substrates.
 - d. Review availability of materials, tradesman, equipment and facilities needed to make progress, avoid delays and protect the Work from damaging conditions until fully built into construction systems.
 - e. Review required inspection, testing, certifying and accounting procedures.
 - f. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
 - g. Review regulations concerning code compliance, environmental protection, health, safety, fire and similar considerations.
2. Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration.
3. Record any revisions or changes agreed upon, reasons therefor, and parties agreeing or disagreeing with them.

C. Scheduling:

1. Proceed with the sheet membrane waterproofing and associated work required for a completely finished below-grade waterproofing system only after projections and penetrations through the substrates have been installed, and when the substrate construction and framing of openings is complete.

SECTION 07 13 00 – SHEET WATERPROOFING
CONTRACT KENS-EAST-2

2. Proceed with and complete the Work only when materials, equipment and tradesmen required for the installation of the insulation, crushed stone trench drain, geotextile filter fabric, pavers and backfilling operations are at the site and are ready to follow with the Work in a manner which will not leave the sheet membrane waterproofing vulnerable to damage or deterioration.
3. Do not advance the installation of sheet membrane waterproofing materials beyond that which is necessary for proper sequencing of the Work and for which there is proper and secure protection from damaging weather and construction activities.
4. Schedule the installation of backfilling operations and perimeter insulation, gravel and pavers and other adjoining and substrate Work to coordinate with the Work of this Section in order to provide a successful, waterproof installation of the sheet membrane waterproofing Work.

D. Substitutions:

1. Do not change products, system components, or manufacturers after Shop Drawing approval by Engineer.
2. Clearly identify, in a manner which is highlighted to Engineer, all proposed substitutions, modifications, variations, unspecified features and "or equal" products. Provide complete comparative data with specified products at time of Shop Drawing submission.

1.06 QUALITY ASSURANCE

A. Source Quality Control:

1. Engage a single manufacturer who shall provide the services of a technical representative, who shall assist Contractor and Engineer by providing technical opinions on the adequacy of materials and methods of installation based on Shop Drawings approved by Engineer.
2. Provide such services during the time of delivery, storage, handling and installation of all sheet membrane waterproofing components, up to and including placement of crushed stone trench drains and completion of backfilling operations.
3. Provide a manufacturer who will provide complete technical services including preparation and review of Shop Drawings, installation methods and proposed detailing for the Work. Where the manufacturer requires additions, or changes to the Contract Documents these shall be made at no additional expense to DEP and only as acceptable to Engineer.
4. Provide only the highest quality materials and methods of construction and installation as recommended by the manufacturer and as acceptable to Engineer.

B. Installer Qualifications:

SECTION 07 13 00 – SHEET WATERPROOFING
CONTRACT KENS-EAST-2

1. Engage a single installer skilled, trained and with successful experience in the application of each product who is a licensee of the manufacturer, or who can submit evidence in writing of being acceptable to the manufacturer and who agrees to employ only tradesmen with specific skill and successful experience in this type of Work. Submit names and qualifications to Engineer along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owners, architects or engineers responsible for projects.
 - b. Approximate contract cost of the sheet membrane waterproofing.
 - c. Amount of area installed.
 2. Submit proof of acceptability of installer by manufacturer to Engineer.
- C. Performance Criteria:
1. Contractor's Review: Accompanying approval request, submit to engineer a written statement signed by Contractor, stating that the Contract Drawings and Specifications have been reviewed with an agent of the sheet membrane waterproofing material manufacturer and that he is in agreement that the selected systems are proper and compatible and that the details used for the Work are not in conflict with the manufacturer's details.
 2. Statement of Application: Upon completion of the Work, submit a notarized statement to Engineer signed by Contractor stating that the Work complies with the requirements of the manufacturer's printed instructions and were proper and adequate for the condition of installation and use.
- D. Testing Agency: Engage a testing laboratory regularly engaged in the testing of construction materials, and who complies with ASTM E329.
- E. Job Mock-Up:
1. Prior to the installation of sheet membrane waterproofing system, but after Engineer's approval of Shop Drawing submittals, erect a stepped-back job mock-ups using materials and application techniques specified for final Work. Provide special features and all components of the perimeter drain system including crushed stone and geotextile filter fabric, showing the correct configurations of the various parts and the workmanship quality which shall be achieved in the Work. Build mock-ups at the site, in location approved by Engineer, of full thickness and height and approximately 12 foot - 0 inches long. Indicate the proposed workmanship to be expected in the finished Work. Include methods of installation typical to the Work including wall penetration and system termination details using all system components and accessories specified and approved for the Work. Also include an area of honeycombing and fin removal for Engineer's approval. Obtain Engineer's acceptance of mock-up before start of Work. Retain and protect mock-up before start of Work. Retain and protect mock-up during

SECTION 07 13 00 – SHEET WATERPROOFING
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construction as a standard of judging completed Work. Do not alter or destroy mock-up until given written permission by Engineer.

2. Build as many job mock-ups as necessary in order to achieve Engineer's acceptance of the Work.
3. Sheet membrane waterproofing Work which proceeds without an approved job mock-up shall be stopped, removed and re-installed, after job mock-up approval, at no additional expense to DEP.

1.07 SUBMITTALS

A. The Contractor shall submit the Shop Drawings for approval by the Engineer. Submittals shall include, but not be limited to:

1. Samples: Submit for approval the following:
 - a. Each component of sheet membrane waterproofing system 12-inch by 12-inch for sheet, board and drainage panel and 12-inch lengths of each strip material specified for the Work.
 - b. Samples will be reviewed by Engineer for general appearance and as examples of the types of components to be installed on the job mock-ups. Compliance with other requirements is the responsibility of Contractor.
2. Shop Drawings: Submit for approval the following:
 - a. Copies of specifications, installation instructions and general recommendations from the sheet membrane waterproofing manufacturer, for each type of sheet membrane waterproofing product required. Include manufacturer's data substantiating that the materials comply with the requirements.
 - b. Drawings showing extent of each component of each system used in the Work and all details required for the Work referencing required system components provided as samples to Engineer. Provide Shop Drawings showing all construction and other conditions encountered in the Work and manufacturer's approved and recommended details appropriate to waterproof joints and transitions as required for full waterproofing system waterproof performance whether or not specific indication is made on the Contract Drawings to the details of the specified manufacturer.
3. Test Reports: Submit for approval the following:
 - a. Copies of test reports verifying compliance with physical properties specified herein.
 - b. Copies of testing agencies background and experience in performing similar tests to those specified.

SECTION 07 13 00 – SHEET WATERPROOFING
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4. Certificates: Submit for approval copies of certificates stating that the sheet membrane waterproofing systems installer has been approved, or is a licensee of the sheet membrane waterproofing manufacturer.
5. Contractor's Review: Accompanying approval request, submit to Engineer a written statement signed by Contractor, stating that the Contract Drawings and Specifications for waterproofing of cast-in-place below-grade concrete walls and foundations have been reviewed with an agent of the sheet membrane waterproofing manufacturer and that he is in agreement that the selected systems are proper, compatible and that the details shown are not in conflict with the sheet membrane waterproofing manufacturer's details. Show by copy of transmittal form that a copy of the statement has been transmitted to the manufacturer.
6. Statement of Application: Upon completion of the sheet membrane waterproofing Work, submit a notarized statement to Engineer signed by Contractor and sheet membrane waterproofing installer stating that the Work complies with the requirements of these Specifications and the installation methods were proper and adequate for the conditions of installation and use.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver materials in sheet membrane waterproofing manufacturer's original, unopened and undamaged containers, with information accurately representing container contents as approved by Engineer at time of Shop Drawing submission.
2. Include the following information on the label:
 - a. Name of material and supplier.
 - b. Installation, handling and protection requirements.
3. Deliver materials in sufficient quantities to allow uninterrupted continuity of the Work.

B. Storage of Materials:

1. Store materials in original, undamaged containers with manufacturer's labels and seals intact.
2. Store all materials in a dry, enclosed area, off the ground and away from all possible contact with water.
3. Prevent damage to materials during storage primarily by minimizing the amount of time they are stored at the site before being incorporated into construction systems.

C. Handling of Materials:

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1. Do not expose materials to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the site and shall not be incorporated into the Work.
2. Handle materials in a manner which prevents inclusion of foreign materials.
3. Do not open packages or containers until all necessary preparatory work is complete and installation will begin immediately. Do not allow materials to become wet or soiled or covered with ice or snow.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the manufacturer and provide to DEP the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. GRACE, Columbia, MD.
- B. GCP Applied Technologies Inc., Cambridge, Massachusetts
- C. Or approved equal;

2.02 MATERIALS / EQUIPMENT

- A. Sheet Membrane Waterproofing System: "Bituthene® System 4000 Membrane"
1. A self-adhesive, cold-applied composite sheet consisting of a thickness of 1.5 mm (0.060 in.) of rubberized asphalt and 0.1 mm (0.0004 in.) of cross-laminated, high density polyethylene film specially formulated for use with water-based surface conditioner. Provide rubberized asphalt membrane covered with a release sheet which is removed during installation. No special adhesive or heat shall be required to form laps.
 2. The physical properties of the sheet membrane waterproofing shall conform to the following:

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Property	Test Method	Typical Value
Color		Any
Thickness	ASTM D3767 Method A	1.5 mm (0.060 in.) nominal
Flexibility, 180° bend over 25 mm (1 in.) mandrel at -43°C (-45°F)	ASTM D1970	Unaffected
Tensile Strength, Membrane Die C	ASTM D412 Modified ¹	2240 k Pa (325 lbs./in. ²) minimum
Tensile Strength, Film	ASTM D882 Modified ¹	34.5 MPa (5,000 lbs./in. ²) minimum
Elongation, Ultimate Failure of Rubberized Asphalt	ASTM D412 Modified ¹	300% minimum
Crack Cycling at -32°C (-25°F), 100 Cycles	ASTM C836	Unaffected
Lap Adhesion at Minimum Application Temperature	ASTM D1876 Modified ²	880 N/m (5 lbs./in.)
Peel Strength	ASTM D903 Modified ³	1576 N/m (9 lbs./in.)
Puncture Resistance, Membrane	ASTM E154	222 N (50 lbs.) minimum
Resistance to Hydrostatic Head	ASTM D5385	70 m (231 ft.) of water
Permeance	ASTM E96, Section 12 - Water Method	2.9 ng/m ² s Pa (0.05 perms) maximum
Water Absorption	ASTM D570	0.1% maximum

- B. Vertical Prefabricated Drainage Composite: Hydroduct® 220 Drainage Composite
 - 1. Drainage Composite shall be designed to promote positive drainage while serving as a protection course.
- C. Horizontal Prefabricated Drainage Composite: Hydroduct® 660 Drainage Composite
 - 1. Drainage Composite shall be designed to promote positive drainage while serving as a protection course.
- D. Protection Board:
 - 1. Expanded Polystyrene Protection Board: 25 mm (1 in.) thick for vertical applications with the following characteristics. Adhere to waterproofing membrane with Bituthene Protection Board Adhesive.

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- a. Normal Density: 16 kg/m³ (1.0 lb./ft³)
 - b. Thermal Conductivity, K factor: 0.24 at 5°C (40°F), 0.26 at 24°C (75°F)
 - c. Thermal Resistance, R-Value: 4 per 25 mm (1 in.) of thickness
2. Asphalt Hardboard: A pre-molded semi-rigid protection board consisting of bitumen, mineral core and reinforcement. Provide 3 mm (0.125 in.) thick hardboard on horizontal surfaces not receiving steel reinforced slab. Where steel reinforcing bars are to be used, apply two layers of 3 mm (0.125 in.) thick hardboard or one layer of 6 mm (0.25 in.) thick hardboard.
- E. Miscellaneous Materials: Surface conditioner, mastic, liquid membrane, tape and accessories specified or acceptable to manufacturer of sheet membrane waterproofing.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Examination

- 1. The Contractor shall examine the surfaces to receive the sheet membrane waterproofing, and the conditions under which the sheet membrane waterproofing Work is to be performed, and notify Engineer in writing of any condition detrimental to the proper and timely completion of the Work and the performance of the waterproofing systems. Do not proceed with the sheet membrane waterproofing Work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.
- 2. All cast-in-place concrete shall have cured a minimum of two days prior to commencement of sheet membrane waterproofing systems Work.

- B. Preparation

- 1. Provide exterior below-grade walls of cast-in-place concrete free from voids and sharp projections before placing any sheet membrane waterproofing Work.
- 2. Remove surface irregularities on cast-in-place concrete and fill all holes, honeycombs, spalls and cracks using manufacturer's recommended joint seal parging. Repair areas of unacceptable consolidation.

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3. Remove grease, oil and other contaminants from surfaces of cast-in-place concrete and clean all surfaces with vacuums cleaners. Remove all dust, loose stones and debris.
4. Parge all construction joints to a minimum depth of 1/8 inch and 3-inch minimum width using manufacturer's recommended joint seal parging.
5. Seal all through wall projections using joint seal parging.

3.02 INSTALLATION

- A. Refer to manufacturer's literature for recommendations on application, including but not limited to, the following:
 1. Apply surface conditioner at rate recommended by manufacturer. Recoat areas not waterproofed if contaminated by dust. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of surface conditioner.
 2. Delay application of membrane until surface conditioner is completely dry. Dry time will vary with weather conditions.
 3. Seal daily terminations with troweled bead of mastic.
 4. Apply protection board and related materials in accordance with manufacturer's recommendations.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Adjusting
 1. System components which are dislodged, damaged, expanded, broken penetrated or crushed by subsequent installation operations or damaged by detrimental weather shall be immediately replaced with undamaged material in compliance with the Sections and properly protected as specified.
- B. Protection
 1. Do not allow construction traffic which is not associated with the installation of the sheet membrane waterproofing and related materials in the area of Work. Protect the area from access by other installers and Contractors until the Work of this Section has been incorporated into finished construction systems.
 2. Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.

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3. Only the original installer shall repair or replace deteriorated or defective Work.
- C. Cleanup
- a. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.

END OF SECTION

**SECTION 07 21 00 – THERMAL INSULATION
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the requirements for perimeter foundation insulation and rain-screen cavity insulation, and includes but is not limited to:
 - 1. Ridged Insulation for foundation walls; Mineral Wool Insulation for Cavity Walls and Rain Screen; miscellaneous materials and accessories as specified herein and as required to complete the Work.
- B. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all building insulation Work.
- C. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. NYSBC - New York State Building Code
- B. NYSECC - New York State Energy Conservation Code
- C. ASTM C177 - Steady-State Heat Flux Measurement and Thermal Transmission Properties by Means of the Guarded Hot-Plate Apparatus, Standard Test Method for
- D. ASTM C203 - Breaking Load and Flexural Properties of Block-Type Thermal Insulation, Standard Test Methods for
- E. ASTM C272 - Water Absorption of Core Materials for Structural Sandwich Constructions, Test Method for
- F. ASTM C303 - Dimensions and Density of Preformed Block-Type Thermal Insulation, Test Method for
- G. ASTM C518 - Steady-State Thermal Transmission Properties by Means of Heat Flow Meter Apparatus, Test Method for
- H. ASTM C520 - Density of Granular Loose Fill Insulation, Test Method for
- I. ASTM C531 - Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Monolithic Surfacing's, and Polymer Concrete, Test Method for
- J. ASTM C549 - Perlite Loose Fill Insulation, Specification for
- K. ASTM C578 - Rigid, Cellular Polystyrene Thermal Insulation, Specification for
- L. ASTM C665 - Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing, Specification for
- M. ASTM C1363 - Thermal Performance of Building Materials and

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- Envelope Assemblies by Means of a Hot Box Apparatus,
Standard Test Method for
- N. ASTM D449 - Asphalt Used in Damp-proofing and Waterproofing,
Specifications for
- O. ASTM D696 - Coefficient of Linear Thermal Expansion of Plastics
between -30 Degrees C and 30 Degrees C, Test Method
for
- P. ASTM D1621 - Compressive Properties of Rigid Cellular Plastics, Test
Method for
- Q. ASTM E84 - Surface Burning Characteristics of Building Materials,
Test Method for
- R. ASTM E96 - Gravimetric Determination of Water Vapor
Transmission of Materials, Test Method for
- S. ASTM E119 - Fire Tests of Building Construction and Materials, Test
Methods for
- T. UL 1479 - Fire Tests of Through-Penetration Firestops

1.05 DESCRIPTION

A. Substitutions:

1. Do not change products, system components, manufacturers after Shop Drawing approval by Engineer.
2. Clearly identify, in a manner which is highlighted to Engineer, all proposed substitutions, modifications, variations, unspecified features and "or equal" products. Provide complete comparative data with specified products at time of Shop Drawing submission.

B. Scheduling:

1. Proceed with the building insulation and associated Work only after curbs, blocking, OSB substrate board, nailer strips, vents, drains and other projections through the substrates have been installed, and when the substrate construction and framing of openings is complete.
2. Proceed with and complete the Work only when materials, equipment and tradesmen required for the installation of the building insulation and backfilling operations are at the site and are ready to follow with the Work in a manner which will not leave the Work vulnerable to damage or deterioration.
3. Do not advance the installation of building insulation materials beyond that which is necessary for proper sequencing of the Work and for which there

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is proper and secure protection from damaging weather and construction activities.

4. Do not begin stainless steel sheet metal cladding until testing confirms that all cavity spaces between the structure and OSB sheet metal substrate sheathing have been completely and uniformly filled with foamed-in-place cementitious insulation. Do not delay job progress or permit OSB substrate to degrade with exposure to detrimental weather conditions. Schedule installation of sheet metal cladding immediately after testing indicates that all cavities have been filled or after remedial foamed-in-place cementitious insulation Work has been completed. No final payment shall be made until testing confirms acceptability of the foamed-in-place cementitious insulation installation and acceptability of the OSB substrate by the sheet metal cladding manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer/Installer Qualifications:

1. Obtain all foamed-in-place cementitious insulation from a manufacturer who is a licensed manufacturer of the product developer and who will also be responsible for the installation of foamed-in-place cementitious insulation.
2. Engage single installers for each type of building insulation who are skilled, trained and have a record of successful experience in the application of each product and who have a record of performing Work in accordance with the recommendations and requirements of the manufacturer or who can submit evidence in writing of being acceptable to the manufacturer for production of guaranteed construction and who agrees to employ only tradesmen with specific skill and successful experience in each type of Work. Submit names and qualifications to Engineer along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owners, architects or engineers responsible for projects.
 - b. Approximate contract cost of the building insulation system installed.
 - c. Amount of area installed.

B. Product/Manufacturer Selection:

1. Obtain building insulations, requiring a hydro-chlorofluorocarbon blowing agent, from manufacturers who manufacture specified insulation using a blowing agent acceptable for use until the year 2020 complying with the requirements of the Copenhagen Amendments to the Montreal Protocol in all ways.

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2. Provide a manufacturer who will provide complete technical services including preparation and review of Shop Drawings, installation methods and proposed detailing for the Work.

C. Performance Criteria:

1. Thermal Conductivity: The thicknesses shown are for the thermal conductivity, k-value at 75 degrees F, specified for each material.
2. Provide adjusted thicknesses as directed by Engineer for the use of material having a different thermal conductivity.

D. Materials and Equipment Compliance:

1. Materials and equipment submitted for DEP's approval by the Contractor shall have met, at the time of their submittal, the certification and material acceptance requirements of the Town and NYS Authority Having Jurisdiction over the Work.
2. All material provided under this Section shall comply with the Contract.
3. Comply with all applicable requirements of governing authorities and codes for all Work.

1.07 SUBMITTALS

A. Contractor shall submit Shop Drawings for approval of the Engineer. Submittals shall include, but not be limited, to:

1. Samples: Submit for approval the following:
 - a. 12-inch by 12-inch sample of each insulation product and each accessory and miscellaneous material to be used in the Work.
 - b. Samples will be reviewed by Engineer for general appearance and as examples of the types of components to be installed on the job mock-ups specified in other Sections. Compliance with other requirements is the responsibility of Contractor.
2. Shop Drawings: Submit for approval the following:
 - a. Copies of specifications, installation instructions and general recommendations from the building insulation manufacturers, for each type of building insulation product. Include manufacturer's data substantiating that the materials comply with the requirements.
 - b. Complete selection of firestop manufacturer's recommended systems for each condition and kind of penetration encountered in the Work. Coordinate with equipment manufacturers for required number and kind of penetrations through fire rated construction. Provide a schedule of penetrations and the fire stop system to be included in the Work for each condition and kind of penetration encountered.

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- c. Drawings showing extent of the Work and all details required for the Work referencing system components provided as samples to Engineer.
3. Test Reports: Submit for approval the following:
 - a. Copies of test reports verifying compliance with physical properties and environmental features specified herein.
 - b. Copies of testing agencies background and experience in performing similar tests to those specified.
4. Certificates: Submit for approval copies of certificates stating that the manufacturer of the foam-type rigid board insulation has used an environmentally safe blowing agent complying with the requirements of the Sections.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver building insulation products in manufacturer's original, unopened, factory-sealed containers, bearing manufacturer's name and labels, accurately representing container contents as approved by Engineer at time of Shop Drawing submission.
2. Damaged materials unsuitable for use shall be rejected by Engineer and permanently removed from site by Contractor.
3. Do not deliver insulation materials to the project site before the time of installation.
4. Deliver materials in sufficient quantities to allow uninterrupted continuity of the Work.

B. Storage of Materials:

1. Store materials in original, undamaged containers with manufacturer's labels and seals intact.
2. Store all materials in a dry, enclosed area, off the ground and away from all possible contact with water, ice or snow.
3. Prevent damage to materials during storage primarily by minimizing the amount of time they are stored at the job-site before being incorporated into construction systems.

C. Handling of Materials:

1. Handle materials carefully in order to avoid damage and breakage or compressing of boards to less than their specified thickness or other damage.
2. Do not open containers, or expose materials to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the Site and shall not be incorporated into the Work.

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3. Handle materials in a manner which prevents inclusion of foreign materials.
4. Do not open packages or containers until all necessary preparatory Work is complete and installation will begin immediately. Do not allow materials to become wet or soiled or covered with ice or snow.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide one of the following for perimeter foundation insulation:

1. STYROFOAM 100 HIGH LOAD as manufactured by:
 - a. The Dow Chemical Company, Midland, MI.
2. CAVITYMATE ULTRA and Square Edge STYROFOAM, as manufactured by:
 - a. The Dow Chemical Company, Midland, MI.
3. Or approved equal.

- B. Provide one of the following for rain-screen cavity insulation:

1. Thermafiber® RainBarrier® continuous insulation as manufactured by:
 - a. THERMAFIBER, INC. ONE OWENS CORNING PARKWAY
TOLEDO, OHIO, USA 43659 888-TFIBER1 [834-2371]
www.owenscorning.com/thermafibe
2. JM CladStone™ 45 Water & Fire Block Insulation as manufactured by:
 - a. Johns Manville, Building Insulation Division
P.O. Box 5108 | Denver, CO 80217-5108
www.JM.com or call 800-654-3103
3. Cavityrock ® Exterior Insulation for Cavity Wall and Rainscreen Applications as manufactured by:
 - a. Rockwool
8024 Esquesing Line, Milton, ON L9T 6W3
Tel: 800-265-6878
4. Or approved equal.

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2.02 MATERIALS / EQUIPMENT

A. Perimeter Foundation Insulations: Provide the following:

1. Rigid, closed-cell, thermally stabilized, very high-load-resisting, extruded, hydrogenated chlorofluorocarbon blown, foam board insulation consisting of 100 percent virgin extruded polystyrene modified resin complying with ASTM C578, Type V.
2. Provide a blowing agent with lowest available ozone depletion potential, such as HCFC-142b, or better. HCFC-141b shall not be approved by Engineer.
3. Physical Properties: Provide the following:
 - a. Thermal Conductivity (k), ASTM C177 and ASTM C518: 0.20 Btu/in./hr./sf/°F.
 - b. Compressive Strength (psi at 5% deformation) ASTM D1621: 100 psi minimum.
 - c. Flexural Strength, ASTM C203: 100 psi minimum.
 - d. Coefficient of Thermal Expansion, ASTM D696: 3.5×10^{-5} inches/in./F.
 - e. Water Vapor Absorption, ASTM C272: Less than 0.1% by volume maximum.
 - f. Water Vapor Permeance, ASTM E96: 0.3-0.8 perms/inch maximum.
 - g. Flame Spread, ASTM E84: 5.
 - h. Smoke Developed, ASTM E84: 165 maximum.
4. Thickness: As shown in Contract Drawings, in order to maintain code compliance.
5. Width: 24-inches
6. Length: 96-inches

B. Mineral Wool for Cavity Walls and Rain Screens: Provide the following:

1. Provide a high-density, non-combustible, semi-rigid stone wool insulation board designed for exterior cavity wall and rainscreen applications.
2. Provide all associated components for proper fastenings of mineral wool to the concrete structure.
3. Physical Properties: Provide the following:
 - a. Minimum Compressive Strength = 475 lbs/ft²
 - b. Flame Spread = ASTM E84: 0
 - c. Smoke Development = ASTM E84: 0

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- d. Combustability = Non-combustable
 - e. Vapor Transmission = ASTM E96: (25 - 50 perm)
 - f. Water Vapor Sorption = <0.1% by volume
 - g. Thermal Resistance = ASTM C518: R-15, R-23, R-30
 - h. Maximum Water Absorption, ASTM C272: 0.10% by volume
4. Size: 24-inches by 96 inches by 2-inches thick and 16-inches by 96-inches by 2-inches thick.

C. Miscellaneous Materials and Accessories: Provide the following:

- 1. Adhesive for Bonding Insulation: The type recommended by the insulation manufacturer, and complying with fire-resistance requirements.
- 2. Mechanical Anchors: Type and size shown or, if not shown, as recommended by the insulation manufacturer for the type of application shown and condition of substrate.
- 3. Protection Board: Fiberboard sheathing or heavy duty asphaltic panels as recommended by the insulation manufacturer.
- 4. Adhesive Tapes: Complete selection of insulation manufacturer's recommended taping materials.
- 5. Bitumen: Asphalt, ASTM D449

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Contractor shall verify that foamed-in-place cementitious insulation shall be mixed using the quantities, proportions and the pressures required in the manufacturer's written specifications and comply with the intended use.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Examination
 - 1. The Contractor shall examine the substrate and the conditions under which the Work is to be performed, and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Engineer.
- B. Preparation
 - 1. Verify that surfaces to receive building insulation are clean of all debris, dirt and other contamination before installation begins in any area.

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2. Correct unacceptable Work to meet the requirements of the Section

3.02 INSTALLATION

A. General:

1. Contractor shall ensure the maintenance of a continuous thermal envelop around the building by allowing no gaps where materials change, when installing all types of insulation.
2. Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, submit to Engineer specific recommendations from manufacturer for approval before proceeding with the Work.
3. Extend all insulations full thickness over entire surface to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation.
4. Apply the number of layers of insulation specified herein, each of the required thickness to provide the thermal value indicated, unless otherwise shown or required, to make up the total thickness.

B. Pre-installation Conference:

1. Prior to the installation of the foamed-in-place cementitious insulation and associated Work, Contractor shall schedule and meet at the site with the installer of the foamed-in-place cementitious insulation, sheet metal cladding installer, the installer of each component of associated work, Engineer and other representatives directly concerned with performance of the Work. Review foreseeable methods and procedures related to the foamed-in-place cementitious insulation Work, including but not necessarily limited to, the following:
 - a. Review project requirements, including Drawings, Sections and other Contract Documents.
 - b. Review required submittals, both completed and yet to be completed.
 - c. Review status of substrates including curing of foamed-in-place insulation, structural loading limitations and similar considerations.
 - d. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - e. Review required inspection, testing, certifying and accounting procedures.
 - f. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
 - g. Review regulations concerning environmental protection, health, safety, fire and similar considerations.

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- h. Review procedures needed for protection of substrates during the remainder of the stainless steel cladding construction period.
 - 2. Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration.
 - 3. Record any revisions or changes agreed upon, reasons therefor, and parties agreeing or disagreeing with them.
- C. Environmental Conditions:
- 1. Do not install building insulation when weather conditions are such that conditions do not comply with the building insulations manufacturer's written recommendations. Install building insulations only when damaging environmental condition are not forecasted for the time when the system material components will be exposed to potential damage.
 - 2. Install foamed-in-place cementitious insulation only when the combination of interior and exterior temperatures are such that the temperature at the point of application is 40°F and rising during the application process and 48 hour initial curing period.
 - 3. If Contractor wishes to advance the foamed-in-place cementitious insulation Work when weather conditions are not within manufacturer's recommended temperature ranges provide enclosures with heat to maintain manufacturer's recommended temperatures during the initial curing period. Erecting and maintaining all such enclosures and the provision of heat and heating equipment shall be at no additional expense to the City.
 - 4. Record decisions, conditions and agreements to proceed with the Work when weather conditions might be unfavorable. State the reasons for proceeding, with the names of the persons involved along with the changes, if any, or revisions, requirements or terms of the Contract.
 - 5. Proceed with the Work only when temperature and moisture conditions comply with the manufacturer's written recommendations.
- D. Board-Type Perimeter Insulation:
- 1. Install perimeter insulation after concrete foundation Work has been poured and after sodium bentonite panels and prefabricated drainage mats are in-place and acceptable to Engineer.
 - 2. Apply double 2 foot-0-inch-wide continuous layers of insulation of the required thickness as shown in the Contract Drawings. Stagger joints in insulation and butt insulation tightly together.
 - 3. Protect top surface of horizontal insulation (from damage during backfilling Work) by application of one of the types of protection course materials recommended by the insulation manufacturer.

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4. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of board-type perimeter insulation.
5. Tape bottom edge of insulation before temporarily attaching insulation to wall with mastic.
6. Tape all joints in vertical wall insulation.
7. Protect insulation on vertical surfaces (from damage during backfilling) by application of one of the types of protection course materials recommended by the insulation manufacturer. Set in adhesive in accordance with the recommendations of the manufacturers of the insulation and the protection course material.

E. Mineral Wool for Cavity Walls and Rain Screens:

1. Install exterior wall mineral wool insulation after all Concrete Work is complete.
2. Apply insulation as shown in the Contract Drawings to the thickness as shown therein .
3. Apply to only exterior portion of concrete structure unless otherwise noted in Contract Drawings.
4. Fit as snug as possible around all fenestrations (windows, door, louvers), to maintain a continuous envelop around the building.
5. Cut material as needed to fit around any of the following but not limited to: Rain Screen frame structure; through wall penetrating pipes or conduits; flashing. However must be continuous after installation.
6. Fasten insulation in accordance with manufacture for a secured installation of all materials.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Foamed-In-Place Cementitious Insulation: Contractor shall conduct a timed, field density check at the beginning, middle and end of each day's application. Check shall be done in accordance with manufacturer's instructions and a log of results maintained and submitted to Engineer on a daily basis.
- B. In order to assure that foamed-in-place insulation has been installed in a continuous layer completely insulating all areas of the structure, infrared thermographic testing shall be performed at the completion of the insulation Work for each structure before beginning the insulation Work on the next structure, at no additional expense to the City.
- C. Submit results of all testing to Engineer along with recommendations for remedial Work. Do not delay job progress. Coordinate the submission of tests and remedial Work in a manner which does not impact the acceptability of OSB

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substrate and which permits expeditious completion of the sheet metal cladding Work.

3.04 **STARTUP / DEMONSTRATION**

A. Not Used

3.05 **ADJUSTING / PROTECTION / CLEANUP**

- A. All components of the Work shall be protected from detrimental weather and until construction operations including, but not limited to, backfilling, framing and sheathing, aluminum siding and concrete unit masonry Work, is completed and acceptable to Engineer. Protect Work from precipitation, frost and direct sun.
- B. Protection:
1. Do not overload the building structure or damage in-place construction system with the weight of stored materials or use of equipment.
 2. Provide continuous protection of materials against damage, wetting and moisture absorption primarily by storing materials under cover and above ground and away from all other construction traffic.
 3. Protect materials against damage by construction activities.
- C. Work which cannot for reasons acceptable to Engineer be covered with complete construction system before onset of weather detrimental to the Work shall be completely covered and protected in such a manner as to deflect water and weather from the installation without damaging adjacent Work.
- D. To not allow construction traffic which is not associated with the installation in the area of Work. Protect the area from access by other installers and Contractors until the Work of this Section has been incorporated into finished construction systems.
- E. System components which are dislodged, damaged, broken, penetrated or crushed by subsequent installation operations or damaged by detrimental weather shall be immediately replaced with undamaged material in compliance with the Sections and properly protected as specified.
- F. Only the original installer shall repair or replace deteriorated or defective Work.
- G. Building insulations which have become wet, damaged, or deteriorated shall be promptly removed from the Site, even if discovered in the completed Work.

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END OF SECTION

SECTION 07 21 60 - STRUCTURAL THERMAL BREAKS
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all equipment, materials, and services for the fabrication, delivery, unloading, handling, storing, and erection of all structural thermal break Work as shown on the Contract Drawings and specified herein.

B.

C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

1. Section 05 12 00 - Structural Steel
2. Section 05 05 23.02 - Miscellaneous Metal Fastenings

SECTION 07 21 60 - STRUCTURAL THERMAL BREAKS
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1.04 REFERENCES

A. ASTM:

1. C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
2. D638 - Standard Test Method for Tensile Properties of Plastics.
3. D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
4. D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer.
5. D732 - Standard Test Method for Shear Strength of Plastics by Punch Tool.
6. D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
7. D2863 - Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).

1.05 DESCRIPTION

A. NOT USED

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Manufacturer regularly engaged in the manufacturing of structural thermal breaks of similar type to that specified for a minimum of 10 years.

B. Installer's Qualifications.

1. Installer regularly engaged in erection of structural steel framing of similar type to that specified for a minimum of 10 years.

1.07 SUBMITTALS

A. The Contractor shall submit Shop Drawings and material specifications for the approval of the Engineer. Submittals shall include, but not be limited to:

1. Dimensions and locations of structural thermal break plates, structural thermal break washers, and brushings.
2. Size and location of holes in structural thermal break plates.
3. Outside diameter and inside diameter for structural thermal break washers and brushings.
4. Structural steel connection details, including bolt and washer sizes.

B. Samples: Submit manufacturer's samples of the following:

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1. Structural Thermal Break Plates: Minimum 2 inches by 2 inches.
 2. Thermal break washers.
 3. Thermal break brushings.
- C. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- D. Warranty Documentation: Submit manufacturer's standard warranty.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and installation locations if needed.
- B. Storage and Handling Requirements:
1. Store and handle materials in accordance with manufacturer's instructions.
 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 3. Store materials in clean, dry area indoors.
 4. Do not store materials directly on floor or ground.
 5. Store materials out of direct sunlight.
 6. Keep materials from freezing.
 7. Protect materials during storage, handling, and installation to prevent damage
 8. Do not install materials under ambient conditions outside manufacturer's limits.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fabreeka International, Inc., Stoughton, MA; www.fabreeka.com
- B. Armatherm, Acushnet, MA; www.armatherm.com
- C. Schock USA, Inc., Princeton, NJ; www.schoeck.com

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D. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Structural Thermal Breaks:

1. Description:
 - a. Load-Bearing, structural thermal break/insulation material to prevent thermal bridging between flanged, bolted, structural steel framing members and columns at connections.
2. Dimensions: Structural thermal break thicknesses are indicated on the Contract Drawings. Width and length to match width and length of structural elements as shown on the Contract Drawings.
3. Ultimate Mechanical Properties, Nominal:
 - a. Tensile Strength, ASTM D 638: 11,000 psi.
 - b. Flexural Strength, ASTM D 790: 25,000 psi.
 - c. Compressive Strength, ASTM D 695: 40,000 psi minimum.
 - d. Compressive Modulus, ASTM D695:
 - 1) 6155 psi minimum
 - e. Shear Strength, ASTM D 732: 15,000 psi.
 - f. Operating Temperature Range: Minus 40 degrees F to 220 degrees F
 1. Loss in Ultimate Strength at 220 degrees F: 30 percent.
4. Flame Resistance, Nominal:
 - a. Limiting Oxygen Index, ASTM D 2863: 21.8 percent.
5. Thermal Properties, Nominal:
 - a. Coefficient of Thermal Expansion, ASTM D 696: $2.2 \text{ in/in/degree C} \times 10^{-5}$.
 - b. Thermal Conductivity, ASTM C 177: 0.26 BTU in/hr/ft²/degree F (0.259 W/m* degree K).
 - c. Heat Flow Resistance, R-Value:
 - 1) 1-Inch (25.4 mm) Thickness: 3.85 minimum.
6. Density: 107.83 pcf.
7. Coefficient of Friction:
 - a. Compression Load 5000 psi: 0.27 μ s.
 - b. Compression Load 10,000 psi: 0.26 μ s.

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B. ACCESSORIES

1. Thermal Break Washers:
 - a. Material: Same as structural thermal break plates.
 - b. Thickness: ¼ inch.
 - c. Outside and Inside Diameter: Determined by structural bolt diameter Refer to Recommended Washer and Bushing Sizes in manufacturer's product data.
2. Thermal Break Bushings:
 - a. Material: Elastomeric material.
 - b. Length: Determined by thickness of steel end plate.
 - c. Outside and Inside Diameter: Determined by structural bolt diameter Refer to Recommended Washer and Bushing Sizes in manufacturer's product data.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Examine locations to receive structural thermal breaks.
- B. Notify Architect or Structural Engineer of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.02 IMPLEMENTATION

- A. Install structural thermal breaks in accordance with manufacturer's recommended instructions at locations indicated on the Contract Drawings.
- B. Install sizes of structural thermal break plates, washers, and bushings as indicated on the Contract Drawings.
- C. Install hardened USS Grade 8 flat washers on both sides of thermal break washers in accordance with the Contract Drawings.
 1. Steel Washer Outside Diameter: Greater than or equal to thermal break washer outside diameter.

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- D. Install bushings in oversized holes in steel end plates to accept outside diameter of bushings.
- E. Bolted Structural Steel Connections: Install bolted structural steel connections as specified in Section 05 12 00 – Structural Steel and 05 05 23 – Miscellaneous Metal Fastenings.
 - 1. Bolt torque values are provided by Engineer and are determined by required clamping force, proper tension of bolts, and long-term creep.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Adjusting
 - 1. Remove and replace with new material, damaged components that cannot be successfully repaired, as determined by Engineer.

END OF SECTION

SECTION 07 22 16 – ROOF BOARD INSULATION
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the requirements for roofing insulation systems including extruded polystyrene rigid foam board-type insulation beneath all sheet metal roofing, insulation of high load bearing over concrete sub base.
- B. The Work also includes all miscellaneous materials and accessories and a Job Conditions Report from the installer of the composite roofing insulation containing information specified. Contractor shall also include the presence of full time on-site composite roofing manufacturer's Technical Representative and provide a ten-year composite roofing insulation performance warranty. Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish, install and field test roofing insulation Work.
- C. The Contractor shall implement practices and procedures to meet the project's sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 07 56 00 - Fluid-Applied Roofing
- B. Section 07 61 00 - Sheet Metal Roofing

1.04 REFERENCES

- A. NYSBC - New York State Building Code
- B. NYSECCC - New York State Energy Conservation Code
- C. ASTM C150 - Standard Specification for Portland cement
- D. ASTM C177 - Steady-State Heat Flux Measurement and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus, Test Method for
- E. ASTM C203 - Breaking Load and Flexural Properties of Block-Type Thermal Insulation, Test Method for
- F. ASTM C272 - Water Absorption of Core Materials for Structural Sandwich Construction, Test Method for
- G. ASTM C303 - Dimensions and Density of Preformed Block-Type Thermal Insulation, Test Method for
- H. ASTM C495 - Compressive Strength of Lightweight Insulating Concrete, Test Method for
- I. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- J. ASTM C550 - Measuring Trueness and Squareness of Rigid Block Thermal Insulation, Test Method for
- K. ASTM C578 - Rigid Cellular Polystyrene Thermal Insulation, Specification for
- L. ASTM C796 - Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam, Test Method for
- M. ASTM C869 - Foaming Agents Used in Making Preformed Foam for Cellular Concrete, Specification for
- N. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal

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- Expansion of Plastics Between –30°C and 30°C with a Vitreous Silica Dilatometer
- O. ASTM D1621 - Compressive Properties of Rigid Cellular Plastics, Test Method for
- P. ASTM D1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics, Test Method for
- Q. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products
- R. ASTM E84 - Surface Burning Characteristics of Building Materials, Test Method for
- S. ASTM E96 - Water Vapor Transmission of Materials, Test Method for
- T. FM - Factory Mutual Incorporated, Approval Guide
- U. UL - Building Materials Directory Fire Resistance Directory

1.05 DESCRIPTION

- A. System Design Requirements
1. Roofing insulation Work shall withstand the uplift forces of wind, as defined by the roofing guarantee. Refer to Section 07 53 00 - Elastomeric Membrane Roofing, and Section 07 61 00 - Sheet Metal Roofing.
 2. Failures of the roofing insulation Work in bond or anchorage to the substrate, or within the insulation, will be considered failures of materials or workmanship under the insulation performance warranty.
- B. Sustainable Design Requirements
1. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.
 2. Insulation shall be produced using a blowing agent with zero ozone-depleting potential. HCFC-142b or HCFC-141b shall not be used.
 3. Recycled Content of Roof Insulation Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 15 percent.
- C. Substitutions
1. Manufacturer of the primary roofing systems shall be manufacturers who find the generic types of insulation specified herein as acceptable and bondable if installed according to the roofing manufacturer's standards for complete product and performance responsibility.

SECTION 07 22 16 – ROOF BOARD INSULATION
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2. The thickness of the composite insulation system, the maximum step between layers of expanded polystyrene rigid board insulation, and the minimum slope-to-drain shall not vary from what is shown in the Contract Drawings, specified, and approved.

1.06 QUALITY ASSURANCE

A. Composite Roofing Insulation Installer Qualifications:

1. Subcontract roofing insulation Work to an installer approved in writing, who has qualified for appointment and has been trained by the manufacturer of the composite roofing insulation system.
2. Engage a single installer skilled, trained and with successful experience in the installation of the type of composite roofing insulation specified, and equipped to perform workmanship in accordance with both the requirements of the manufacturer of the composite roofing insulation and of the single-ply roofing manufacturer so that there will be unequivocal responsibility for the performance of the roofing insulation Work.
3. Submit proofing of acceptability of installer by manufacturer to Engineer.

B. Performance Criteria:

1. The thicknesses shown in the Contract Drawings are for the thermal conductivity, k-value at 75 F specified for each material.
2. Comply with Factory Mutual Technical Advisory Bulletin 1-29 for recommendations concerning requirements for 1-90 securement.
3. Provide composite roofing insulation system recommended by the manufacturer for use on non-vented substrates.

C. Erection Tolerances: Provide the following for composite roofing insulation:

1. Provide minimum of 1/8-inch leveling slurry coat of insulating concrete over the top of cast-in-place concrete roofing decks.
2. Finished system shall not pond water and shall provide a uniformly sloped surface to low point of roof drains. If at any time up to the time of Final Acceptance the roofing shows signs of ponding water, the composite roofing insulation system shall be repaired to provide uniform slope to drain.

D. Requirements of Regulatory Agencies: Comply with fire-resistance ratings as shown, and as required by governing authorities and the New York State Building Code and comply with the following roofing insulation requirements:

1. Materials and equipment submitted for DEP's approval by the Contractor shall have met, at the time of their submittal, the certification and material acceptance requirements of the Town and NYS Authority Having Jurisdiction over the Work.

SECTION 07 22 16 – ROOF BOARD INSULATION
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2. All material provided under this Section shall comply with the Detailed Specifications.
3. Comply with all applicable requirements of governing authorities and codes for all Work.
4. U.L. requirements for Roofing Deck Constructions which are rated "UL Construction No. 1".
5. Factory Mutual requirements for "Class 1" construction, for fire hazard and 1-90 wind resistance.

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings for approval of the Engineer. Submittals shall include, but not be limited to:
 1. Samples: Submit for approval the following:
 - a. Each fastener to be used in the Work.
 - b. 12-inch by 12-inch sample of specified rigid board-type insulation and composite insulation system.
 2. Shop Drawings: Submit for approval the following:
 - a. Manufacturer's specifications and installation instructions for type of insulation required. Include data substantiating that the materials comply with specified requirements.
 - b. Weights of all equipment to be used on roofing.
 - c. Field verified locations of all roof penetrations, drain locations, and deck deflections.
 - d. Complete layout of all roofing insulation showing sizes, placement and number of courses and methods of fastening.
 - e. All required roofing insulation details approved by the roofing insulation manufacturer and the manufacturer of the respective roofing systems.
 - f. Laboratory test results for Thermal Resistance Values based on ASTM C177 or ASTM C518 for actual composite roofing insulation system shown and specified.
 3. Certifications: Submit Job Conditions Report as specified and, in addition, include a notarized statement from the full-time on-site Technical Representative and installer that the composite roofing insulation system was installed according to manufacturer's written recommendations.
 4. Sustainable Design Submittals:
 - a. Environmental Materials Reporting Form (EMRF) Recycled Content. Provide the following information:
 - 1) Name of Product and Manufacturer.

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- 2) Cost of product: Material cost only (excluding labor and equipment).
- 3) The percentage (by weight) of post-consumer and pre-consumer recycled content for the submitted product.
- b. VOC Reporting Form:
 - 1) For adhesives used onsite and within the building's weatherproofing system provide the VOC content in grams/Liter (g/L) less water and exempt compounds.
- 5. Sustainable Design:
 - a. Recycled Content: Submit percentage of recycled content for each material or product. No product shall contain CFC, HCFC (hydrochlorofluorocarbon) or any Resin base chemical.
 - b. Regional Materials: Submit location of product manufacturer and distance from manufacturing location to the project site.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

- 1. Do not deliver roofing insulation materials to the project site before time of installation.
- 2. Deliver materials in manufacturer's original, undamaged packages or acceptable bulk containers.
- 3. Materials shall be manufactured and delivered from manufacturing locations that are closest to the project site to reduce transportation costs and emissions.

B. Storage of Materials:

- 1. Do not allow roofing insulation materials to become wet or soiled, or covered with ice or snow.
- 2. Store packaged materials to protect them from the element and physical damage.

C. Handling of Materials:

- 1. Comply with manufacturer's recommendations for handling, storage and protection.
- 2. Do not use cement which shows indication of moisture damage, caking or other signs of deterioration.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

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1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the manufacturer and provide to DEP the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Roofing insulation systems shall be as manufactured by:

1. Firestone; Polyiso Insulation
2. Sika sarnafil; Styrofoam Deckmate Plus insulation
3. Or an approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Extruded Polystyrene Roofing, High Load bearing Insulation: Provide the following above all liquid-applied membrane waterproofing inverted roofing beneath cast-in-place concrete rooftop wearing slabs:

1. Rigid, closed-cell, thermally stabilized, very high load bearing extruded foam board insulation consisting of extruded polystyrene modified resin complying with ASTM C578, Type V.
2. Physical Properties: Provide the following:
 - a. Thermal Conductivity (k), ASTM C177 and ASTM C518: 0.20 Btu/in./hr./sf/EF.
 - b. Thermal Resistance per inch, ASTM C177 and ASTM C518: 5.0 deg F x h x sq. ft. /Btu x in. at 75 deg F.
 - c. Compressive Strength (psi at 5% deformation) ASTM D1621: 100 psi minimum.
 - d. Flexural Strength, ASTM C203: 100 psi minimum.
 - e. Coefficient of Thermal Expansion, ASTM D696: 3.5×10^{-5} inches/inches x deg F.
 - f. Water Vapor Absorption, ASTM C272: 0.3% by volume maximum.
 - g. Water Vapor Permeance, ASTM E96: 0.8 perms/inch maximum.
 - h. Flame Spread, ASTM E84: 5.
 - i. Smoke Developed, ASTM E84: 165 maximum.
3. Thickness: Two layers each 2-inches thick.
4. Width: 24-inches.
5. Length: 96-inches.

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2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examination

1. The Contractor shall examine the substrate and the conditions under which the roofing insulation Work is to be performed, and notify Engineer in writing of any unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.
2. Environmental Requirements:
 - a. Do not install insulation when weather conditions are such that the deck is not completely dry, or where there is no assurance that the insulation can be completely protected from the weather by the end of the day.
 - b. For applications of composite roofing insulation system when the temperature is expected to fall below 40°F submit written installation recommendations of the composite insulation system manufacturer confirming acceptability of the conditions encountered. Contractor shall verify that composite roofing insulation system installed under such adverse weather conditions meet all material and performance requirements specified. Record actual conditions of installation, including intervals between system component placement, weather and temperature conditions, temporary uses of roofing (if any) and other pertinent installation factors and submit notarized information signed by manufacturer's full-time on-site technical representative to Engineer.
 - c. Hot water is not available at the project site and shall be supplied by composite roofing insulation installer as required by installation conditions.
 - d. Potable water is not available at the project site and shall be provided by composite roofing insulation installer.

B. Preparation

1. Pre-Roofing Conference: Provide both a representative of the composite roofing insulation system manufacturer and the foreman of the installer who

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will actually work on this job at the pre-roofing conference specified in Section 07 53 00 – Elastomeric Membrane Roofing.

2. Verify that fire-resistant cement board insulation underlayment is in place on sloping metal decks and that channel-shaped attachment angles and adjustable radiused hat sections are properly installed over all areas to receive sheet metal roofing Work.
3. Do not overload the building structure with the weight of stored materials or use of equipment.
4. Sequencing:
 - a. Proceed with and complete the Work only when materials, equipment and tradesmen required for the installation of the roofing membrane and sheet metal roofing over the insulation are at the site and are ready to follow with this Work immediately (same day) behind the insulation Work.
 - b. Do not install any more board-type insulation each day than can be covered with the complete sheet metal roofing system by the end of that working day.
 - c. Follow composite roofing insulation manufacturer written requirements for installation timing sequence for Work. Do not place more leveling slurry coat than can be completely covered with insulation within 30 minutes nor more expanded polystyrene insulation than can be covered with insulating concrete within 4 hours of placing insulation.

3.02 INSTALLATION

A. General:

1. Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's full-time on-site Technical Representative for specific recommendations before proceeding with the Work. All such discussions shall be recorded in writing in Job Conditions Report and shall be incorporated into the Work only when acceptable to Engineer.
2. Coordinate heights of wood blocking to provide flush transition between roofing insulation Work and perimeter wood blocking.
3. Extend insulations full thickness as shown over entire surface of the roofs.
4. Cut and fit board-type insulation tightly around obstructions, and fill voids with insulation. Keep back 1/4 inch for all vertical flashings.

B. Laying Board-Type Insulation Units for Sheet Metal Roofing System:

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1. Apply four courses of rigid board insulation over entire surface of roofs receiving sheet metal roofing between continuous adjustable radiused hat sections.
 2. Mechanically fasten in accordance with the requirements of the applicable fire and insurance ratings and primary roofing manufacturer's recommendations, and apply in accordance with the recommendations of the manufacturer of the insulation, mechanical fastener and completed roofing system manufacturer.
 3. Install insulation board with the long joints between boards perpendicular with incline of deck. Cut roofing insulation and taper edges of boards where curvature of deck requires, to fit snugly beneath oriented strand board sheet metal roofing substrate Work. Remove ridges between insulation boards and provide a smooth transition between boards following curvature of adjustable radiused hat sections.
- C. Laying Composite Roofing Insulation System for Single-Ply Roofing System:
1. Place insulating concrete using approved equipment after sufficient mixing time to provide a consistent, thoroughly uniform consistency that will screed to a smooth surface and achieve the compressive strength specified.
 2. Provide insulating concrete leveling slurry to a depth of 1/8-inch above the top of deck.
 3. Place expanded polystyrene rigid board insulation into the slurry within 30 minutes of insulating concrete placement with joints staggered in a running bond pattern.
 4. Tightly butt all rigid boards together and install in a manner that provides full contact of slurry to board, and with adequate pressure to cause insulating concrete to enter the locking/keying openings of the rigid board.
 5. Install rigid boards in a stair-stepped configuration with maximum step down of 1 inch between boards, over entire plane of roof surface beneath all single-ply roofing. Cut boards as required in order to maintain 2 inches of insulating concrete cover at insulation step in compliance with slope-to-drain and high point and low point elevations shown.
 6. Within four hours of rigid board placement place 2 inches of insulating concrete over rigid boards and screed to a smooth, consistently dense, uniformly sloped plane leading to roof drains at low points. Insure that all locking/keying openings in rigid board are completely filled with insulating concrete. Provide finish and other system features acceptable to single-ply roofing installer.
 7. Include reinforcing mesh as part of the composite roofing insulation system to help control crack formation and distribute forces within the roofing insulation system.
 8. Provide high and low point elevations shown.

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- D. Laying Board-Type Insulation Units for Liquid-Applied Membrane Waterproofing Inverted Roofing:
 - 1. Apply two courses of very high load bearing rigid board insulation over entire surface of roofs.
 - 2. Adhesively adhere boards, staggering joints between courses.
 - 3. Be prepared to follow immediately with cast-in-place concrete sloped-to-drain wearing slab.

- 3.03 FIELD TESTING / QUALITY CONTROL
 - A. Retain a minimum of four 3-inch by 6-inch cylinder material specimens for each day's pour. Protect specimens from damage and temperature extremes and test in accordance with ASTM C495. Submit results of test as part of notarized Job Conditions Report and submit to Engineer.
 - B. Check cast density hourly at the point of placement. Include reports as part of notarized Job Conditions Report information and submit to Engineer.
 - 1. Final Acceptance will be contingent upon the receipt by the Engineer of a Job Conditions Report certifying conformance of the Work with the requirements of the Section and which includes all information required.

- 3.04 STARTUP / DEMONSTRATION
 - A. Not Used

- 3.05 ADJUSTING / PROTECTION / CLEANUP
 - A. Adjusting
 - 1. Insulation which has become wet, damaged, or deteriorated shall be promptly removed from the job, even if already installed.
 - 2. Correct all improperly sloped, chipped, cracked, improperly set, ridged or rough areas in the insulation to provide substrate acceptable to roofing manufacturer and Engineer.
 - B. Protection
 - 1. Do not permit construction period traffic over completed roofing insulation Work, except as required for roofing.
 - 2. Protect insulation Work from exposure to moisture, damage and deterioration, primarily by prompt installation of roofing Work to be placed over the insulation.
 - 3. Do not expose completed Work to prolonged exposure to elements in excess of seven days.
 - 4. Do not use completed roofing insulation as a temporary working surface without protection approved by insulation installer.

SECTION 07 22 16 – ROOF BOARD INSULATION
CONTRACT KENS-EAST-2

END OF SECTION

**SECTION 07 27 26 –
 FLUID-APPLIED MEMBRANE AIR AND VAPOR BARRIERS
 CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Work shall include, but is not limited to, the application of the specified low VOC, one component, polymer modified, cold applied liquid air/vapor barrier membrane and flexible flashing for use behind the exterior wall claddings.
- B. Seal and bridge open gaps and open-air pathways including:
 - 1. Connections of walls to foundations
 - 2. Connections of walls to the roof air barrier
 - 3. Seismic and expansion joints
 - 4. Openings and penetrations in the building envelope
 - 5. Ties, screws, bolts and similar penetrations
 - 6. All other leakage pathways through opaque walls
- C. Provide labor and materials necessary to complete the air barrier and associated flexible flashing suitable for use as part of a secondary drainage system for the exterior cladding systems.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Specification 07 22 16 - Roof Board Insulation
- B. Specification 07 62 00 - Sheet Metal Flashing and Trim
- C. Specification 07 90 00 - Joint Protection

1.04 REFERENCES

- A. NYSBC - New York State Building Code
- B. ASTM C920 - Elastomeric Joint Sealants, Standard Specification for
- C. ASTM C1193 - Use of Joint Sealants, Standard Guide for
- D. ASTM D146 - Sampling and Testing Bitumen-Saturated Felts and Fabrics Used in Roofing and Waterproofing, Standard Test Methods
- E. ASTM D412 - Vulcanized Rubber and Thermoplastic Elastomers-Tension, Standard Test Methods for
- F. ASTM D4541 - Pull-Off Strength of Coatings Using Portable Adhesion Testers, Standard Test Methods for
- G. ASTM E96 - Water Vapor Transmission of Materials, Standard Test Method for
- H. ASTM E283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen, Standard Test Method for
- I. ASTM E783 - Field Measurement of Air Leakage Through Installed Exterior Windows and Doors, Standard Test Method for
- J. ASTM E1105 - Field Determination of Water Penetration of Installed

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Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference, Standard Test Method for

K. ASTM E1186 - Air Leakage Site Detection in Building Envelopes and Air Barrier Systems, Standard Practices for

L. ASTM E2178 - Air Permeance of Building Materials, Standard Test Method for

M. ASTM E2357 - Determining Air Leakage of Air Barrier Assemblies, Standard Test Method for

N. NFPA 285 - Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components, Standard Fire Test Method for

1.05 DESCRIPTION

- A. This Section describes the general requirements for fluid applied air and vapor barrier that consists of the collection of air and vapor barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air and vapor movement through the wall.

1.06 QUALITY ASSURANCE

A. Performance Criteria:

1. General: Membrane air and vapor barrier shall be capable of performing as a continuous vapor- permeable air barrier and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Membrane air barriers shall accommodate substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without moisture deterioration and air leakage exceeding performance requirements.
2. Liquid Air Vapor Barrier System: One component, polymer modified, cold applied liquid air/vapor barrier membrane.
 - a. Performance Specification:
 - 1) Air Leakage ASTM E2357: 0.04 cfm / ft² @ 75 Pa (1.57 lbs / ft²).
 - 2) Air Permeability ASTM E2178: 0.004 cfm / ft² @ 75 Pa (1.57 lbs / ft²).
 - 3) Water Vapor Permeance ASTM E96 (Method B): ≤0.1 perms.
 - 4) Elongation ASTM D412: 1500 %.

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FLUID-APPLIED MEMBRANE AIR AND VAPOR BARRIERS
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- 5) Tensile Strength ASTM D412: 15 psi.
- 6) Thickness of Membrane Air Barrier: Not less than 80 mils wet and 40 mils dry, applied in single continuous coat.
- 7) Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- 8) Adhesion to Substrate: Minimum 30 PSI when tested according to ASTM D 4541.
- 9) VOC Content: Less than 10 g/L.

B. Allowable Installation Tolerances:

1. Do not install Work until substrate preparation and tolerances have been approved by the Engineer, fluid applied air and vapor barrier manufacturer's technical representative, the fluid applied air and vapor barrier installer and the Contractor has verified to the Engineer that substrates are within tolerances specified and acceptable to produce approved Work. Work advanced for any reason without such verification shall be stopped, removed and replaced with new material after substrate is approved at no additional expense to the City.
2. Substrate Tolerances:
 - a. Out-of-Plane: 1/8 inch maximum in 10 foot - 0 inches and 1/16 inch maximum in any 12 inches measured along the plane.
 - b. Maximum Offset in Plane Alignment: 1/16 inch.
 - c. Variation From Slope: 1/8 inch maximum in 10 foot - 0 inches.

C. Installer Qualifications:

1. Engage a single installer skilled, trained and with minimum three years experience in the installation of fluid applied air and vapor barrier and with successful experience in the application of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of work. Submit names and qualifications to Engineer along with the following information on a minimum of three successful projects.
 - a. Names and telephone numbers of owners, architects or engineers responsible for projects.
 - b. Approximate contract cost of the metal roofing panel.
 - c. Amount of area installed
2. Engage either the fluid applied air and vapor barrier manufacturer or submit proof to Engineer of acceptability of installer to fluid applied air and vapor

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barrier manufacturer. Provide an installer who is pre-qualified by the manufacturer of the fluid applied air and vapor barrier.

- D. Manufacturer Qualifications: A qualified manufacturer with minimum five years experience in manufacture of air barrier membrane as one of its principal products.
- E. Pre-installation Conference:
1. Prior to the installation of the fluid applied air and vapor barrier and associated work, the Contractor shall schedule and meet at the site with the fluid applied air and vapor barrier installer, the installer of each component of associated Work, the installers of deck or substrate construction to receive air and vapor barrier Work, the installers of other Work in and around air and vapor barrier which must follow the air and vapor barrier work, including mechanical work, Engineer and other representatives directly concerned with performance of the work. Review foreseeable methods and procedures related to the fluid applied air and vapor barrier Work, including but not necessarily limited to, the following:
 - a. Review project requirements, including Working Drawings, Specifications and other Contract Documents.
 - b. Review required submittals, both completed and yet to be completed.
 - c. Review status of substrate including drying, structural loading limitations and similar considerations.
 - d. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - e. Review required inspection, testing, certifying and accounting procedures.
 - f. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
 - g. Review regulations concerning code compliance, environmental protection, health, safety, fire and similar considerations.
 - h. Review procedures needed for protection of roofing during the remainder of the construction period.
 2. Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration.
 3. Record any revisions or changes agreed upon, reasons therefor, and parties agreeing or disagreeing with them.
- F. Job Mock-Up:

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1. Prior to the installation of fluid applied air and vapor barrier systems, but after issuance of the Engineer's approval of Working Drawing submittals, erect stepped-back job mock-ups using substrate preparation, materials and application techniques specified and approved for final Work. Provide all components of the fluid applied air and vapor barrier systems showing the correct installation, substrate preparation and the workmanship quality which shall be achieved in the Work. Build mock-ups at the site, in location approved by Engineer, of full thickness and approximately 12 foot - 0 inches long and 12 foot - 0 inches square for horizontal surfaces. Indicate the proposed workmanship to be expected in the finished Work. Include methods of installation typical to the Work including wall and roof penetration details, system termination details and installation of the glass fiber concrete panel rainscreen to follow the Work of this Section. Obtain the Engineer's acceptance of mock-ups before start of Work. Retain and protect mock-ups before start of Work. Retain and protect mock-ups during construction as a standard of judging completed Work. Do not alter or destroy mock-ups until given written permission by Engineer.
2. Build as many job mock-ups as necessary in order to achieve Engineer's acceptance of the Work.
3. Fluid applied air and vapor barrier Work which proceeds without approved job mock-ups shall be stopped, removed and re-installed, after job mock-up approval, at no additional expense to the City.

G. Materials and Equipment Compliance:

- a. Materials and equipment submitted for DEP's approval by the Contractor shall have met, at the time of their submittal, the certification and material acceptance requirements of the Town of Mount Pleasant and NYS by the Engineer.
- b. All material provided under this Section shall comply with the Contract.
- c. Comply with all applicable requirements of governing authorities and codes for all Work.

1.07 SUBMITTALS

A. Samples: Submit for approval the following:

1. Fluid applied air and vapor barrier system applied to a 12-inch by 12-inch by 2-inch thick concrete sample demonstrating specified surface preparation to be used on job mock-up and specified thickness of fluid applied air and vapor barrier. Apply air and vapor barrier to only one-half

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of the sample board, leaving the other half-visible and showing specified substrate preparation.

2. Samples will be reviewed by Engineer for general appearance and as examples of the types of components to be installed on the job mock-ups. Compliance with other requirements is the responsibility of Contractor.
- B. Shop Drawings: Submit for approval the following:
1. Copies of specifications, installation instructions and general recommendations from the Fluid applied air and vapor barrier manufacturer, for each type of fluid applied air and vapor barrier product.
 2. Drawings showing extent of each component of each system used in the Work and all details for the Work referencing system components provided as samples to Engineer. Provide Working Drawings coordinated with cast-in-place concrete, Fluid applied air and vapor barrier system and glass fiber concrete rainscreen showing all construction, system terminations and other conditions encountered in the Work and manufacturer's approved and recommended details appropriate to waterproof these joints and transitions as required for full fluid applied air and vapor barrier system performance whether or not specific indication is made on the Contract Drawings to the details of the specified manufacturer.
- C. Test Reports: Submit for approval the following:
1. Copies of applicable test reports verifying compliance with physical properties specified herein.
 2. Copies of testing agencies background and experience in performing similar tests to those specified.
- D. Certificates:
1. Copies of certificates stating that the fluid applied air and vapor barrier systems installer has been approved, or is a licensee of the fluid applied air and vapor barrier manufacturer.
 2. Evidence of installer's experience.
 3. Evidence prior to delivery that materials and components furnished conform to the requirements of the Specifications.
 4. Evidence of acceptance of the substrate by the fluid applied air and vapor barrier manufacturer.
 5. Evidence that the material used in the Work has been manufactured within one year of installation and has, for that entire time, been constantly stored between 50°F and 80°F, and in accordance with the manufacturer's written recommendations.

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6. 6. Include a notarized statement from the full-time on-site Technical Representative and installer that the fluid applied air and vapor barrier system was installed according to manufacturer's written recommendations and as shown in Contract Drawings.

E. Contractor's Review: The Contractor shall submit to the Engineer a written statement as specified. Show by copy of transmittal form that a copy of the statement has been transmitted to the manufacturer.

F. Statement of Application: The Contractor shall submit to the Engineer a written statement as specified.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver materials in fluid applied air and vapor barrier manufacturer's original, unopened and undamaged containers, with information accurately representing container contents as approved by Engineer at time of Working Drawing submission.

2. Include the following information on the label:

a. Name of material and supplier.

b. Installation, handling and protection requirements.

3. Deliver materials in sufficient quantities to allow uninterrupted continuity of the Work.

B. Storage of Materials:

1. Store materials in original, undamaged containers with manufacturer's labels and seals intact.

2. Store all materials in a dry, enclosed area, off the ground and away from all possible contact with water and in a location where temperature can be Prevent damage to materials during storage primarily by minimizing the amount of time they are stored at the job-site before being incorporated into construction systems.

C. Handling of Materials:

1. Do not handle, open or mix component materials unless fluid applied air and vapor barrier can be properly handled as recommended by the manufacturer of the fluid applied air and vapor barrier.

2. Do not open containers, or expose materials to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the site and shall not be incorporated into the Work.

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3. Handle materials carefully and in a manner which prevents contamination and inclusion of foreign materials.
4. Do not open packages or containers until all necessary preparatory Work is complete, approved and installation will begin immediately. Do not allow materials to become wet or soiled or covered with ice or snow.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the manufacturer and provide to DEP the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Product and Manufacturer:

1. Tremco ExoAir 130 by Tremco, Inc., Beachwood OH; (866) 321-6357; Website www.tremcosealants.com.
2. Fire Resist Barritech NP by A. Carlisle Coatings & Waterproofing, Incorporated. 900 Hensley Lane, Wylie, TX 75098. Phone 1-800-527-7092. Website <http://www.carlisleccw.com>
3. AIR & VAPOR BARRIER Fire Resist Barritech NP60 by:
Carlisle Coatings & Waterproofing
900 Hensley Lane | Wylie, TX 75098 | 800.527.7092 | www.carlisleccw.com
4. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Membrane Air and Vapor Barrier:

1. Fluid-Applied, Vapor-Retarding Membrane Air Barrier: Elastomeric, UV-resistant, synthetic membrane, formulated for application in a range of 80 mils wet and 40 mils dry.

- B. Primer: Liquid primer meeting VOC limitations, recommended for substrate by membrane air barrier manufacturer, when installing modified bituminous self-adhered membranes:

1. ExoAir Primer by Tremco, Inc.

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2. SURE-SEAL Low VOC EPDM Primer by Carlisle Coatings & Waterproofing, Inc.
 3. Or approved equal.
- C. Transitions:
1. Counterflashing Strip: Modified bituminous, 40 mils (1.0 mm) thick self-adhering composite sheet consisting of 32 mils (0.8 mm) of SBS rubberized asphalt laminated to an 8 mils (0.2 mm) high-density, cross-laminated polyethylene film, for counterflashing of metal flashings and for substrate transitions and for termination of air barrier to bituminous roof membranes and to air barrier terminations at openings.
 2. High Temperature Flashing Strip and Underlayment: Butyl, 24 mil thick self-adhering composite sheet consisting of 20 mils of butyl laminated to 4 mil polyethylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F.
 3. Foil Flashing Strip: Butyl, 22 mil thick self-adhering composite sheet consisting of 16 mils of butyl laminated to 6 mil polyethylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F.
 4. Opening Transition Assembly: Cured low-modulus silicone extrusion, with reinforcing ribs, sized to fit opening widths, with aluminum race for insertion into aluminum framing extrusions, with the following characteristics:
 - a. Tear Strength: 110 lb/in (19.3 kN/m)
 5. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with manufacturer's recommended silicone sealant for bonding extrusions to substrates.
- D. Reinforcing Fabric:
1. High strength mesh fabric consisting of open-weave glass fiber saturated with synthetic resins formulated for high moisture resistance, for reinforcing of liquid applications; not less than 2.5 oz/sq. yd (85 g/sq. m).
- E. Liquid Joint Sealants:
1. ASTM C 920, single-component polyurethane, approved by air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories.

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2. ASTM C 920, single-component, neutral-curing silicone, approved by air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories post installation of the membrane.

F. Sprayed Polyurethane Foam Sealant:

1. Sprayed Polyurethane Foam Sealant: Foamed-in-place, 1.5- to 2.0-lb/cu. ft. (24- to 32-kg/cu. m) density, with flame-spread index of 25 or less per ASTM E 162, for filling of gaps at openings and penetrations.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Source Quality Control:

1. Engage a single manufacturer who shall provide the services of a technical representative who shall assist the Contractor and the Engineer by providing technical opinions on the adequacy of materials, methods of installation and field testing methodology and significance of test results based on Working Drawings approved by Engineer.
2. Provide such services during the time of delivery, storage, handling, job mock-up construction, installation and testing of all fluid applied air and vapor barrier components.
3. Provide a manufacturer who will provide complete technical services including preparation and review of Working Drawings, installation methods and proposed detailing for the Work. Where the manufacturer requires additions, or changes to the Contract Drawings and Contract Specifications these shall be made at no additional expense to the City and only as acceptable to Engineer.
4. Fluid applied air and vapor barrier system shall incorporate only the highest quality materials, environmental features, and methods of construction and installation as recommended by the manufacturer and as acceptable to Engineer.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examination

1. Surface Condition: Before applying air barrier materials, examine substrate and conditions to ensure substrates are fully cured, smooth, clean, dry, and free from high spots, depressions, loose and foreign particles and other

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deterrents to adhesion, and conditions comply with manufacturer's written recommendations.

- a. Verify concrete and masonry surfaces are visibly dry, have cured for time period recommended by membrane air barrier manufacturer, and are free from release agents, curing agents, and other contaminants.
 - b. Test for capillary moisture by method recommended in writing by air barrier manufacturer.
 - c. Verify masonry joints are filled with mortar and struck flush.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Preparation

1. Clean, prepare, and treat substrate including any steel being directly fastened to the structure, in accordance with air barrier manufacturer's written instructions.
 - a. Mask adjacent finished surfaces.
 - b. Remove contaminants and film-forming coatings from substrates.
 - c. Remove projections and excess materials and fill voids with substrate patching material.
 - d. Prepare and treat joints and cracks in substrate per ASTM C 1193 and membrane air barrier manufacturer's written instructions.
2. Commencement of Work: Commence work once air barrier substrates are adequately protected from weather and will remain protected during remainder of construction.
3. Sequencing of Work: Coordinate sequencing of air barrier work with work of other sections that form portions of building envelope air barrier to ensure that flashings and transition materials can be properly installed and inspected. Roofing systems shall be capped and sealed, or top of walls protected, in such a way as to eliminate the ability of water to saturate the wall or interior space, both before and after, air barrier system installation. Coordinate installation of Fluid Applied Roofing with the roofing trade to ensure compatibility and continuity with the roofing system.
4. Subsequent Work: Coordinate air barrier work with work of other sections installed subsequent to air barrier to ensure complete inspection of installed air barrier and sealing of air barrier penetrations necessitated by subsequent work.

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3.02 INSTALLATION

A. General:

1. Apply fluid air-barrier material to form a seal with transition materials and accessories to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply fluid air-barrier material within manufacturer's recommended application temperature ranges.

B. Membrane Air Barrier: Apply fluid air barrier material in full contact with substrate to produce a continuous seal according to membrane air barrier manufacturers written instructions.

1. Vapor and Air Barrier: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements, 40 dry film thickness depending on substrate, applied in one or more equal coats, roller- or spray-applied.

C. Connect and seal exterior wall air-barrier membrane continuously to subsequently-installed roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, wall openings, and other construction used in exterior wall openings, using approved transitions and accessory materials.

D. Wall Openings: Apply approved sealant to adhere silicone extrusion to perimeter of windows, curtain walls, storefronts, doors, and louvers. Apply (opening transition assembly or preformed silicone sealant extrusion) according to air barrier transition manufacturer's written instructions.

E. All steel being directly fastened to the structure (as shown in the Contract Drawings), shall also be coated with the vapor and air barrier to provide a continuous seal

F. Seal punctures, voids, and seams, including around all welded or bolted steel for rain-screen frames and any other steel being fastened directly to the structure. Patch with approved transition and accessory materials following air barrier manufacturer's recommendations and extend repair beyond repaired areas to maintain continuity.

G. Do not cover air barrier until it has been tested and inspected by testing agency.

H. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.03 FIELD TESTING / QUALITY CONTROL

A. Field Testing:

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1. Testing Agency: Contractor shall engage a qualified Inspector to perform tests and inspections, including documenting of membrane air barrier prior to concealment.
 - a. Inspections and testing shall be carried out at the following rate:
 - 1) Up to 10,000 sq. ft.: One inspection.
 - 2) 10,001 to 35,000 sq. ft.: Two inspections.
 - 3) 35,001 to 75,000 sq. ft.: Three inspections.
 - 4) 75,001 to 125,000 sq. ft.: Four inspections.
 - 5) 125,001 to 200,000 sq. ft.: Five inspections.
 - 6) Over 200,000 sq. ft.: Six inspections.
 - b. Scope of Testing: Testing shall include the following:
 - 1) Qualitative air-leakage testing per ASTM E1186.
 - 2) Quantitative air-leakage testing per ASTM E783.
 - 3) Photo documentation of work to be subsequently concealed.
 2. Coordination of Testing: Cooperate with testing agency. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.
 - a. Do not cover Work until testing and inspection is completed and accepted.
 3. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.
 4. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.
- B. Quality Control:
1. Commencement of Work: Commence work once air barrier substrates are adequately protected from weather and will remain protected during remainder of construction.
 2. Sequencing of Work: Coordinate sequencing of air barrier work with work of other sections that form portions of building envelope air barrier to ensure that flashings and transition materials can be properly installed and inspected. Roofing systems shall be capped and sealed, or top of walls protected, in such a way as to eliminate the ability of water to saturate the wall or interior space, both before and after, air barrier system installation.

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Coordinate installation of Fluid Applied Roofing with the roofing trade to ensure compatibility and continuity with the roofing system.

3. Subsequent Work: Coordinate air barrier work with work of other sections installed subsequent to air barrier to ensure complete inspection of installed air barrier and sealing of air barrier penetrations necessitated by subsequent work.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Protection:

1. Protect membrane vapor and air barrier from damage from subsequent work. Protect membrane materials from exposure to UV light for period in excess of that acceptable to membrane air barrier manufacturer; replace overexposed materials and retest.
2. Inspect and make necessary repairs before covering. Repair or replace damaged material according to manufacturer's literature.
3. Product and accessories are not designed for permanent exposure. Cover with insulation or exterior cladding as soon as schedule allows.
4. The Contractor is responsible for maintaining a continuous vapor and air barrier around the building and must not allow any gaps in the application.
5. If any areas where the vapor and air barrier have already been applied are damaged, it shall be the Contractors responsibility to reapply and retest those areas according to the requirements of the Contract.

- B. Cleanup:

1. Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.
2. At the completion of the work, clean or replace adjacent work, as may be required, marred by the work of this Section.
3. Remove all materials and debris and leave the site of the work in clean condition.

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END OF SECTION

**SECTION 07 44 53 – GLASS FIBER CONCRETE PANEL RAINSCREEN
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the general requirements for all Work pertaining to Glass Fiber Reinforced Concrete Rainscreen Panels Systems and all related components including but not limited to:
 - 1. Glass Fiber Reinforced Concrete Rainscreen Panels,
 - 2. Stiffener ribs, galvanized steel angle brackets,
 - 3. Galvanized steel vertical Sub-framing systems,
 - 4. Extruded aluminum clips,
 - 5. Horizontal rail sub framing,
 - 6. Finishes/tinting color, coatings, and surface treatments,
 - 7. Shims and thermal /bimetallic isolators including all thermal breaks,
 - 8. Anchors and all attachments to main structural back up walls,
 - 9. Flashing, weather-seals, cover plates and formed metal trim
 - 10. Adhesives, stick pins, insulation, vapor barrier, sealants, transition membranes, gaskets, and related accessories,
 - 11. Penetrations for services as required, and
 - 12. Pre-construction mockups, samples and/or testing
- B. Definition of Glass Fiber Reinforced Concrete (GFRC) Panel Assembly: Glass fiber reinforced panels, attachment system components, metal subframe and accessories necessary for a complete glass fiber reinforced concrete panel cladding system.
- C. The Contractor's design, materials and workmanship shall comply with all current codes and reference standards listed herein. Comply with all appropriate national and local government regulations and obtain all necessary approvals from the statutory authorities. In the event of conflict between referenced standards, this specification, or within a document itself, the more stringent standard or requirement shall govern.
- D. Provide labor and materials necessary to complete all Work pertaining to the Glass Fiber Reinforced Concrete Rainscreen Panel system and all associated items for use as the exterior cladding systems.
 - 1. Design Contract Work using performance requirements and design criteria indicated in this and associated sections.
 - a. This specification together with the Related Sections and Contract Drawings define the scope of Work including:

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- 1) Mandatory geometry of visible facade surfaces.
 - 2) Performance parameters.
 - 3) Minimum acceptable standards ~~and establishment of a regime~~ for verification of the design, fabrication, and installation processes.
- b. The Contractor shall be responsible for completing the design and for the procurement, fabrication, verification, and installation of the Contract Work. Drawings and Specifications do not necessarily indicate or describe in detail all work required for the full performance and completion of the Contract Work. The Contractor shall provide all items required for proper completion of the Contract Work
- c. It shall be the Contractor's responsibility to warrant the Contract Work to the Owner, and to ensure that all materials and Work meet the requirements of this and the Related Sections.
2. Ensure that all people engaged in the design, fabrication and installation of the Contract Work are adequately trained, proficient and experienced.
- a. Employ a Registered Professional Engineer in the State of New York who is specifically experienced in projects similar to the systems referenced in this Section in material, design and extent to provide design and engineering services, prepare, stamp and certify the Contract Work.
- 1) The Contractor's engineer shall have a minimum of three (3) successfully completed projects to be qualified to certify the adequacy of the design and related calculations.
 - 2) Engage NFRC accredited agency to prepare, stamp and certify any thermal reports for façade and fenestration systems.
- b. The same Engineer shall prepare and stamp any required mock-up drawings and calculations as well as submittal drawings and structural and thermal calculations.
3. Co-ordinate design, site and trade interfaces: All interfaces shall meet the requirements of the Contract Documents. Contractor shall be responsible for the coordination of designs of interfaces between the Contract Work of adjacent trades including, but not limited to:
- a. External finishes and paving
 - b. Internal finishes
 - c. Structural frame

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- d. Mechanical services
- e. Electrical services
- f. Fire detection and extinguishing systems
- g. Building maintenance systems (BMS)
- h. Security systems
- i. Lighting and electrical systems
- j. Lightning protection
- k. Gutters / drainage systems
- l. Miscellaneous metals
- m. Other facade components not in Contract

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or Allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 07 13 00 - Sheet Waterproofing
- B. Section 07 21 00 - Thermal Insulation
- C. Section 07 27 26 - Fluid Applied Membrane Air and Vapor Barrier
- D. Section 07 62 00 - Sheet Metal Flashing and Trim.
- E. Section 07 90 00 - Joint Protection

1.04 REFERENCES

- A. NYSBC - 2020 New York State Building Code
- B. NYSECC - 2020 New York State Energy Conservation Code
- C. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA A9-91 & Addendum (2000), “Metal Curtain Wall Fasteners”.
 - 2. AAMA 2605, “Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels”.
- D. American Concrete Institute (ACI):
 - 1. ACI 549.3R, “Report on Glass Fiber-Reinforced Concrete Premix”
 - 2. ACI SP-224, “Thin Reinforced Cement-Based Products and Construction Systems”
- E. American Institute of Steel Construction (AISC):
 - 1. “Steel Construction Manual”
 - 2. ANSI/AISC 360, “Specification for Structural Steel Buildings”
 - 3. Design Guide 22, “Façade Attachments to Steel-Framed Buildings”
- F. American Society of Civil Engineers (ASCE):
 - 1. “Standard 7: Minimum Design Loads for Buildings and Other Structures”.
- G. American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE):
 - 1. ASHRAE 90.1, “Energy Standards for Buildings Except Low Rise Residential Buildings”.

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2. “Fundamentals Handbook”
- H. American Society for Testing and Materials (ASTM):
1. ASTM A240/A240M, “Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications”
 2. ASTM A370, “Standard Test Methods and Definitions for Mechanical Testing of Steel Products”
 3. ASTM A380, “Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems”
 4. ASTM A743/743M, “Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application”
 5. ASTM A780/A780M, “Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings”
 6. ASTM A923, “Standard Test Methods for Detecting Detrimental Intermetallic Phase in Duplex Austenitic/Ferritic Stainless Steels”
 7. ASTM A967, “Standard Specification for Chemical Passivation Treatments for Stainless Steel Parts”
 8. ASTM B117, “Standard Practice for Operating Salt Spray (Fog) Apparatus”
 9. ASTM B209, “Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate”.
 10. ASTM B221, “Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes”.
 11. ASTM B429/B429M, “Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube”.
 12. ASTM B449, “Standard Specification for Chromates on Aluminum”
 13. ASTM C33, “Standard Specification for Concrete Aggregates”
 14. ASTM C144, “Standard Specification for Aggregate for Masonry Mortar”
 15. ASTM C150, "Standard Specification for Portland Cement"
 16. ASTM C185, “Standard Test Method for Air Content of Hydraulic Cement Mortar”
 17. ASTM C228, “Test Method for Test for Sodium Oxide and Potassium Oxide in Portland Cement by Flame Photometry”
 18. ASTM C260, “Standard Specification for Air-Entraining Admixtures for Concrete”

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19. ASTM C494, "Standard Specification for Chemical Admixtures for Concrete"
20. ASTM C496, "Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens"
21. ASTM C531, "Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion for Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes"
22. ASTM C612, "Standard Specification for Mineral Fiber Block and Board Thermal Insulation."
23. ASTM C618, "Standard Specification for Coal Fly Ash and Raw Calcinated Natural Pozzolan for Use in Concrete"
24. ASTM C873, "Standard Test Method for Compressive Strength of Concrete Cylinders Cast in Place in Cylindrical Molds"
25. ASTM C947, "Standard Test Method for Flexural Properties of Thin-Section Glass-Fiber-Reinforced Concrete (Using Simple Beam with Third-Point Loading)"
26. ASTM C979/C979M, "Standard Specification for Pigments for Integrally Colored Concrete"
27. ASTM C1185, "Standard Test Methods for Sampling and Testing Non-Asbestos Fiber-Cement Flat Sheet, roofing and Siding Shingles, and Clapboards"
28. ASTM C1186, "Standard Specification for Flat Fiber-Cement Sheets"
29. ASTM C1228, "Standard Practice for Preparing Coupons for Flexural and Washout Tests for Glass Fiber Reinforced Concrete (GFRC)"
30. ASTM C1229, "Standard Test Method for Determination of Glass Fiber Content in Glass Fiber Reinforced Concrete (GFRC) (Wash-Out Test)"
31. ASTM C1230, "Standard Test Method for Performing Tension Tests on Glass Fiber Reinforced Concrete (GFRC) Bonding Pads"
32. ASTM C1560, "Standard Test Method for Hot Water Accelerated Aging of Glass-Fiber Reinforced Cement-Based Composites"
33. ASTM C1666, "Standard Specification for Alkali Resistant (AR) Glass Fiber for GFRC and Fiber-Reinforced Concrete and Cement"
34. ASTM D523, "Standard Test Method for Specular Gloss".
35. ASTM D 578, "Standard Specification for Glass Fiber Strands"
36. ASTM D1400, "Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base".

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37. ASTM D2244, “Standard Test Method for Calculation of Color Tolerances and Color Differences from Instrumentally Measures Color Coordinates”
 38. ASTM D3363, “Standard Test Method for Film Hardness by Pencil Test”.
 39. ASTM D4214, Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films”
 40. ASTM D7018, “Standard Terminology Relating to Glass Fiber and its Products”
 41. ASTM D7089, “Standard Practice for Determination of the Effectiveness of Anti-Graffiti Coating for Use on Concrete, Masonry and Natural Stone Surfaces by Pressure Washing”
 42. ASTM E84, “Standard Test Method for Surface Burning Characteristics of Building Materials”
 43. ASTM E136, “Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C”
 44. ASTM E488, “Standard Test Method for Test of Anchors in Concrete Elements”
 45. ASTM G48, “Standard Test Methods for Pitting and Crevice Corrosion Resistance of Stainless Steels and Related Alloys by Use of Ferric Chloride Solution”
 46. ASTM G155, “Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials”
- I. American Welding Society
1. AWS A5.10, “Specification for Bare Aluminum and Aluminum-Alloy Welding Electrodes and Rods”.
 2. AWS D1.1, “Structural Welding Code - Steel”.
 3. AWS D1.2, “Structural Welding Code - Aluminum”.
 4. AWS D1.3, “Structural Welding Code - Sheet Steel”.
 5. AWS D1.6, “Structural Welding Code - Stainless Steel”.
- J. National Association of Architectural Metal Manufacturers (NAAMM):
1. “Metal Finishes Manual”.
- K. National Fire Protection Association Codes and Standards (NFPA):
1. NFPA 268, “Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source”.

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2. NFPA 285, “Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.”

L. Precast / Prestressed Concrete Institute

1. PCI MNL 128, “Recommended Practice for Glass Fiber Reinforced Concrete Panels”
2. PCI MNL 130, “Manual for Quality Control for Plants and Production of Glass Fiber Reinforced Concrete Products”

M. Society for Protective Coatings (SSPC):

1. SSPC-Paint 42, “Epoxy Polyamide/Polyamidoamine Primer, Performance-Based”.
2. SSPC-PS Guide 12, “Guide to Zinc-Rich Systems”.
3. SSPC-PS 28.01, “Two-Coat Zinc-Rich Polyurethane Primer / Aliphatic Polyurea Topcoat System, Performance-Based”.
4. SSPC-PS 28.02, “Three-Coat Moisture-Cured Polyurethane Coating System, Performance-Based”.

1.05 DESCRIPTION

A. Refer to the Contract Drawings.

B. Scheduling:

1. Proceed with the GFRC Rainscreen Assembly after application of vapor barrier, vertical frames, insulation, all other framing of openings, and any other associated/adjacent Work is completed.
2. Proceed with and complete the Work only when materials, equipment and tradesmen required for the installation of other system components are at the Site and are sufficiently advanced to permit the unencumbered installation of the GFRC Rainscreen Assembly in order to provide a completed system at each Work area.

C. Substitutions:

1. Do not change materials, colors, textures, panels sizes, joint sizes, or construction details after Shop Drawing approval by Engineer.
2. Provide all materials specified for all Work. Calculations that are based on performance criteria shall also be submitted as part of Shop Drawing approval process and shall indicate if heavier gage material or other related products are to be used instead of those shown within the Contract Drawings. All such substitutions shall be at no additional expense to DEP.

D. Performance Requirements:

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1. General Prescriptive Requirements:
 - a. Provide Contract Work where indicated and specified in related sections and Drawings.
 - b. Panels must not have any visible fasteners or telegraphing on the panel faces or any other compromise of a neat and flat appearance.
 - c. All elements outside of the vapor barrier plane shall be of materials suitable for external conditions and shall not deteriorate as a result of weathering:
 - 1) They shall resist the deleterious effects of water, cleaning agents, temperature variations expected from the specified temperature ranges, gaseous pollutants (including ozone), and weak acids deriving from gaseous pollutants dissolved in water and UV radiation to which they may be exposed during installation and in service.
 - 2) Separators shall be included to prevent bimetallic corrosion.
 - 3) All fasteners outside or through the vapor barrier shall be 316 stainless steel.
 - 4) All fasteners that penetrate through vapor barrier shall be sealed with chemically compatible material to the fastener and adjacent materials.
 - 5) All brackets outside the vapor barrier shall be of 316 stainless steel or aluminum.
 - 6) Significant structural connections that occur outboard of the vapor barrier plane may not utilize different metals unless:
 - a) The connection can incorporate bimetallic separators.
 - b) The connection can be fully inspected after installation is complete using the projects maintenance access system.
 - d. Materials used in the Contract Work shall be chemically compatible with their adjacent materials.
 - e. Where flexible or sheet vapor control materials are connected together or to other systems they shall be lapped and continuously sealed with chemically compatible materials and mechanically restrained.
 - f. Where insulation must be locally reduced in thickness, high performance insulation shall be provided to match the overall performance of the surrounding insulation.

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- g. Site applied sealant shall not be acceptable as part of the primary weather sealing system unless shown on the Architectural Drawings or noted within this section.
- h. The air / vapor barrier shall be designed to resist the maximum design wind load.
- i. All external areas of the Contract Work shall be accessible for maintenance and repair.
- j. Loads imposed on the Contract Work shall be adjusted as necessary for the type and orientation of maintenance equipment anticipated. The Contract Work shall sustain safely, and without damage access and specified maintenance loads.
- k. All gaskets, where possible, shall be accessible for inspection / replacement.

E. General Performance:

- 1. Glass fiber concrete panel wall cladding system to be based on Contract drawings and specifications, (contract documents), which indicate sizes, profiles, finishes, and dimensional requirements of the exterior panel wall cladding system and are based on specified types/models.
- 2. Design and install glass fiber concrete panels and attachment system to provide in conjunction with wall substrate and air barrier a weather-tight wall assembly utilizing rain screen principle.
- 3. Design Panels, including comprehensive engineering and analysis by a qualified professional engineer according to PCI MNL 128 “Recommended Practice for Glass Fiber Reinforced Concrete Panels”, appropriate standards and per the manufacturer’s recommendations.
- 4. Panels shall meet the performance and loading criteria specified in related Sections which require GFRC panels and to the requirements specified herein.
- 5. System shall be flat with no noticeable warp, buckling, deflections or other surface irregularities within manufacturer’s specified tolerances.
- 6. Panel thicknesses indicated are preliminary. Confirm Panels thicknesses by analyzing project loads and in-service conditions for each associated façade system where they will be incorporated.
 - a. Thinner Panels than indicated may be used only with the approval of the Design Team.
- 7. Comply with performance requirements specified, and as validated by Pre-construction Mock-up testing as described in Related Sections

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- a. PCI MNL 128, “Recommended Practice for Glass Fiber Reinforced Concrete Panels”
 - b. PCI MNL 130, “Manual for Quality Control for Plants and Production of Glass Fiber Reinforced Concrete Products”
8. Contract Work as specified shall:
- a. Withstand and accommodate the stresses and movements induced by the specified cambers, estimated deflections, relative deflections and the long-term movements associated with the settlement of the foundations, or any other movements of the structure, changes in temperature, moisture content and chemical changes.
 - b. Include suitable allowances for the specified construction tolerances.
 - c. Have a resistance to combustion and fire spread appropriate to each part.
 - d. Prevent casual and unlawful entry into the building.
 - e. Cleaning and maintenance of the Contract Work shall be carried out easily, without interfering with the function of the building.
 - f. Panels, assemblies, and decorative capping pieces shall remain securely held and shall not be displaced.
9. Failure
- a. Failure shall include the inability of the Contract Work to meet the performance requirements set forth in this and all Related Sections including:
 - 1) Structural failures including rupturing, cracking, or puncturing.
 - 2) Deterioration of glass fiber reinforced concrete, sub-frame and other materials beyond normal weathering.
 - 3) Discoloration, fading, chalking, excessive non-uniformity, pitting, cracking, peeling, corrosion, cracking or crazing of finish.
 - 4) Excessive deflections.
 - 5) Thermal stresses transferring to/from Contract Work to the building structure.
 - 6) Noise or vibration created by wind and thermal and structural movements.
 - 7) Loosening or weakening of fasteners, attachments, and other components.

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- 8) Failure of touch-up finish to match factory finish.
 - 9) Staining of adjacent components or wetting of interior building components.
 - 10) Failure to fulfill other specified performance requirements.
10. Detailed Design Principles
- a. The Contract Work adopts a cladding panel rainscreen system, complete with cladding panels, insulation, air and vapor barrier, supporting framing and backup main structure.
 - b. This system shall be:
 - 1) Designed to allow for panels to be shop fabricated and field installed.
 - 2) Designed to incorporate concrete walls inboard of the air and vapor barrier to resist the full loads applied to the system.
 - 3) Pressure equalized to the air and vapor barrier plane of the system.
 - 4) Incorporate a drainage system behind the rainscreen panels that drains to the exterior. This system shall:
 - 5) Allow complete drainage of water from rebates to outside.
 - 6) Eliminates standing water on/or around the Panels.
 - 7) Allow ventilation behind the rainscreen Panels.
 - 8) Incorporate a continuous air and vapor barrier outboard of the concrete wall.
 - 9) Provide accommodation for the most onerous movement when all tolerances are accounted for.
 - 10) Incorporate thermal isolation devices / thermal breaks to minimize thermal bridging.
 - 11) Be capable of having panels replaced from the outside of the building.
 - 12) Be open jointed between cladding panels, with panel joint reveals to hide the insulation and air and vapor barrier components.
11. Durability Performance:
- a. Panels used shall withstand the specified deleterious and degrading effects of radiation from the sun, weathering, atmospheric pollution, vandalism, vermin, fungi, and other growths for the required service

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life without maintenance in excess of routine cleaning and minor repairs.

- b. The stainless-steel components of the Contract Work shall meet the corrosion performance requirements herein when tested as per ASTM B117 and ASTM A923.

12. Structural Performance:

- a. The Contract Work shall transmit and resist all design loads and their combinations as defined by the associated system and its related sections, to the building structure via the points of attachment as designed and built, with an adequate margin of safety appropriate to each material and product as required by Code and the listed Reference Standards.

- 1) Design loads to include all site loads as per Contract Drawings.

13. As required by Code, the various load cases and combinations of load cases acting on structural elements shall be considered.

- a. No permanent deformation or damage to any components of the Contract Work, adjacent elements or supporting structure shall be accepted under any of the above load cases and combinations of load cases and impact loads during construction, excluding blast loads.
- b. Buckling and overall structural system stability shall be considered in the design of all elements. Framing members and systems shall be designed to stated strength and stability provisions outlined in the above references.
- c. Coordinate all loads imposed on the building structure with the project Structural Engineer.

14. Movement Performance:

- a. The Contract Work shall accommodate the movements specified and developed by the associated system and their related sections without any reduction in the performance below the minimum levels required herein. These shall include but are not limited to:

- 1) Movements due to design gravity and live loads.
- 2) Movements under repeated cycles of the design wind loads.
- 3) Movements due to seismic loads.
- 4) Changes in dimension and shape arising from specified building movements, including settlement, shrinkage, elastic shortening, floor beam deflections, creep, wind sway, twisting and racking and thermal and moisture movement.

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These shall include the movements due to any joint in the supporting structure or building frame.

- b. Coordinate all building movement assumptions with the project Structural Engineer and as per the Structural Drawings.
15. Deflection Performance:
- a. For GFRC panels, limit center-of-Panel deflection under any load combinations of the referenced façade system to $1/360$ times the short side length.
 - b. For Panels with free edges, limit edge deflection under any load combinations of the referenced façade system to $2L/360$ of the Panel edge length (L).
 - c. For aluminum rails, limit deflection at mid span to $L/240$ and cantilever deflections to $2L/240$.
16. The Panels shall accommodate the following thermal movements without any reduction in the specified performance:
- a. Allow for thermal movements resulting from the maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and night-time-sky heat loss.
 - b. Use associated façade system environmental conditions for analysis.
 - c. Due to changes in the temperature of the supporting structure and interfacing construction.
17. The Panels shall accommodate the following moisture movements without any reduction in the specified performance:
- a. Due to changes in the moisture content of its components and wetting due to rain.
 - b. Expansion of absorbed or retained moisture due to freezing.
 - c. Due to changes in the moisture content of the supporting structure and interfacing construction.
 - d. The Contractor shall avoid in their design and detailing the introduction of locked-in stresses that may be detrimental to the performance of the Contract Work during the service life.
 - 1) The stresses that are referred to are those that can develop in an individual panel, if the various fasteners and connections that secure that panel in position are so rigid that they do not allow for thermal or other movement in that panel.
18. Weatherproofing Performance:

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- a. The Contract Work, including all weatherproof joints between it and other elements of Contract Work, shall prevent leakage of water into the interior of the building from the weathering line of the assembly, under the action of wind pressure kinetic energy, gravity, surface tension, or capillary action as per Code. It shall also prevent water entering into those parts of the Contract Work that would be adversely affected by the presence of water.
 - 1) All weatherproof joints within the Contract Work shall maintain their water tightness under the loads and movements specified herein.
 - 2) The weathering principles incorporated within the Contract Work and interfacing with adjacent elements of Contract Work shall be compatible with the weathering principles adopted by the adjacent elements.
 - 3) Detailing and waterproofing must ensure that water from ponding or reservoirs will be directed away from the Contract Work such that water will not build up a pressure head or impose forces onto the façade seals and components.
 - 4) Detailing must ensure that water that is collected within elements of the contract Work is positively drained to the outside of the Contract Work.
- 19. The Contract Work shall incorporate elements and details to provide for a continuous air and vapor barrier system:
 - a. Elements to the exterior of the vapor barrier plane shall be designed to be suitable to be in exterior conditions and shall be designed to experience weathering without any loss in performance as specified.
 - b. No element of the Contract Work shall be encapsulated between two vapor barrier planes.
 - c. Vapor control elements shall maintain their performance and properties for the expected service life of the system.
 - d. Where vapor control elements will be exposed to the interior conditions during construction, suitable materials shall be selected to ensure the elements are not easily damaged during the installation of the Contract Work or adjacent constructions.
 - 1) Materials that are considered easily damaged include but are not limited to foil facing attached to other products, including insulation.
 - e. GFRC joints to be dry and uncaulked.
 - f. For complete waterproof system, employ metal flashing:

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- 1) At bottom of system.
 - 2) At penetrations: Windows, doors, louvers, etc.
 - 3) At floor line or other locations which accommodate vertical movement.
 - 4) End Dams: provide shop-formed end dams where drainage flashing terminates at openings.
 - 5) Configuration shall be triangular shaped, full width of horizontal flashing leg by 1 inch high.
 - 6) Attachment: Solder joints and miters for an air and water tight condition
20. Energy Performance:
- a. Contract Work and components shall have certified energy performance ratings as determined by the standards referenced by Code.
 - b. The Contract Work shall wherever possible incorporate the use of thermal breaks.
 - c. The design environmental conditions are:
 - 1) Exterior extreme annual dry bulb temperature and coincident wind speed:
 - 2) Maximum dry bulb: 89.9 deg. F at 8.4 mph
 - 3) Minimum: 9 deg. F at 10.8 mph
 - 4) Interior design dry bulb temperature, relative humidity and interior air film coefficient:
 - 5) 70 deg. F \pm 2 deg. F at 30% \pm 5% RH and 0.7 Btu/hr - sq. ft. - deg. F
 - d. Thermal Transmittance (U-factor):
 - 1) The Contract Work shall have an overall assembly U-factor of not more than 0.104, accounting for all frame effects.
 - e. Condensation Resistance:
 - 1) Provide systems whose internal condensation and drainage systems will prevent uncontrolled condensation inboard of the vapor barrier plane, under the most onerous environmental conditions specified in this section.
21. Static pressure air infiltration:

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- a. Maximum air leakage through the Contract Work areas of the project shall be the lesser of the requirements determined according to Code or the following:
 - 1) For non-operable portions of the Contract Work the maximum air infiltration rate shall be no more than 0.03 cfm/sf to ASTM E283.

- 22. Fire Performance:
 - a. All Contract Work shall comply with the relevant fire resistance, smoke sealing and fire stopping recommendations as stated in the Code
 - b. Panel and back up assembly shall meet Class A as per ASTM E84.
 - c. Panel and back up assembly shall be classified as non-combustible per ASTM E136
 - d. Component materials shall not give off toxic fumes.
 - e. Refer to related sections.

- 23. Lightning Protection and Grounding Performance:
 - a. The Contractor shall coordinate as necessary with the General Contractor responsible for the lightning protection and grounding systems as required by Code for the building and shall agree appropriate connection points with him for review by the Architect.
 - 1) No external tapes or visible connections will be accepted.
 - 2) All vertical and horizontal metallic framework elements and supporting structures of the facade shall be electrically continuous for the purposes of lightning protection and grounding. Provide bonding of the framework to the rest of the lightning protection and grounding system. Ensure all non-conductive thermal breaks are electrically continuous.

- 24. Infestation:
 - a. Materials used in the Contract Work shall be designed not to be attacked or infested by micro-organisms, fungi, insects or other vermin.

- 25. Brackets and Fasteners:
 - a. Panels shall meet the performance requirements specified for the associated façade system. Refer to related sections for requirements.
 - b. GFRC inserts and anchors shall be tested according to ASTM C1230 to validate design values.

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- 1) Test results for use in precast or cast-in-place concrete shall not be used for anchor design in GFRC. GFRC shall be tested by its self.
- 2) Cast-in fixings/sockets and anchors into the GFRC shall be stainless steel.
- 3) Where flex anchors are used, anchors shall not protrude into the GFRC backing.
 - a) Bonding pad installation procedures must remain the same as were used in tests to determine design values.

26. Handling and Lifting Devices:

- a. Handling and lifting devices shall be fabricated from ductile material and fixed to a visually concealed location on the Panel.
- b. Contractor shall include design calculation for lifting and handling of GFRC panels.

F. Sustainable Design Requirements:

1. Recycled content of Glass Fiber Concrete Panel: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 15 percent.
2. Regional Materials: Glass fiber concrete panel shall be manufactured within 500 miles of Project site, from materials that have been extracted, harvested, or recovered within 500 miles of Project site.
 - a. **This shall apply only if the Manufacture within the 500 miles, manufacturers the materials that meet design criteria.**
3. Low Emitting Materials: Paints, coatings, sealants, and adhesives used on site and within the building's weatherproofing system shall meet the VOC content limits listed below.

1.06 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. A qualified manufacturer that participates in PCI's Plant Certification Program and is designated as a PCI-Certified Plant for Group G, Glass Fiber Reinforced Concrete.
 1. Manufacturer's responsibility includes fabricating and installing GFRC panels and providing professional engineering services needed to assume engineering responsibility for GFRC panels.

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2. Engineering responsibility includes preparation of Shop Drawings and comprehensive engineering analysis, based on GFRC production test values, by a qualified professional engineer experienced in GFRC design.
- B. Certification of Materials:
1. Prior to commencement of fabrication, obtain certification from the manufacturer of each Panel type that the material is of the correct type, strength, size, finish, etc. and is suitable for the project application. Provide copies of all such certification to the Architect and Owner for inspection.
 2. Mill Certificates: Obtain certified mill test report from manufacturer of structural-steel shapes and hollow structural sections used in panel framing indicating compliance of these products with requirements.
- C. Welding Certificates:
1. Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- D. Source Limitations:
1. Obtain GFRC panels from single source from single manufacturer.
 2. GFRC backup system including vertical track, clips, related gaskets/isolators, shall be provided by the same firm unless otherwise noted by the architect.
 3. All pigments shall be ordered from a single lot.
- E. Installer Qualifications:
1. Engage an experienced Installer, who has specialized in the erection and installation of types of systems similar to that required for this Project, to erect the GFRC panels and backup system.
 2. Installer shall be an approved company as recommended by the manufacturer who has engaged in similar Work for a period of no less than 5 years.
- F. Quality Control:
1. Establish and maintain a quality-control program for manufacturing GFRC panels according to PCI MNL 130 and PCI MNL 128.
- G. Mockup:
1. Provide full Mockup of the Glass Fiber Concrete Panel Rainscreen system, for review by the Engineer of Record.
 2. The Mockup shall be completed only after all required shop drawings and colors are selected and approved by the Engineer of record.

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3. Provide one completely assembled wall area with size and extent as directed by the Designer, installed with all related accessories, in composite configurations designed to fulfill the performance criteria, and representative of the design as shown on the Drawings.
 - a. Mock-up shall be standalone, independent from the building.
 - b. Mock-up shall be installed simulating actual materials, colors, finishes, construction conditions, including actual structural supports and connections. Use means, methods and techniques proposed for final installation.
 - c. Locate mock-up in location as directed by the Engineer.
 - d. Personnel assembling mock-up shall be the same personnel that will perform the actual Work at the project site.
 - e. Upon review and approval by the Designer and Engineer, the sample panel shall remain in place for the duration of construction and shall be used as a basis of comparison for all Work.
- H. Preconstruction testing
 1. Perform and provide results of Panel insert and anchor testing.
- I. Pre-Installation Conference
 1. Installer to contact GFRC panel manufacturer, Construction Manager and Engineer, prior to installation of initial GFRC panel to witness first panel installation.
 - a. Prior to the installation of the glass fiber concrete panel and associated Work, Contractor shall schedule and meet at the site with the installer of the glass fiber concrete cladding panel and the installers of each components of associated works, Engineer and other representatives directly concerned with performance of the Work. Review foreseeable methods and procedures related to the glass fiber concrete cladding panel Work, including but not necessarily limited to, the following:
 - 1) Review project requirements, including Drawings, Sections and other Contract Documents.
 - 2) Review required submittals, both completed and yet to be completed.
 - 3) Review status of substrates.
 - 4) Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.

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- 5) Review required inspection, testing, certifying and accounting procedures.
- 6) Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
- 7) Review regulations concerning environmental protection, health, safety, fire and similar considerations.
- 8) Review procedures needed for protection of substrates during the remainder of the glass fiber concrete cladding panel construction period.
- 9) Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration.
- 10) Record any revisions or changes agreed upon, reasons therefor, and parties agreeing or disagreeing with them.

J. Installer Qualifications:

1. Engage a single installer skilled, trained and with successful experience in the installation of custom finished, low slope, stainless steel, standing seam, sheet metal roofing and with successful experience in the erection of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit names and qualifications to Engineer along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owners, architects or engineers responsible for projects.
 - 1) Approximate contract cost of the sheet metal roofing. c. Amount of area installed.
2. Engage either the sheet metal roofing manufacturer or submit proof to Engineer of acceptability of installer to sheet metal roofing manufacturer. Provide an installer who is pre-qualified by the manufacturer of the sheet metal roofing.
3. Installers shall wear roofing manufacturer's recommended footwear and hand wear for all Work.
4. Have installed five projects of similar scope and magnitude that have been in service for a minimum of (5) five years with satisfactory performance of the roof system.

1.07 SUBMITTALS

A. Samples for Initial Selection:

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1. For review of anticipated range for all finishes, colors, and textures:
 - a. Manufacturers Material Cut-Sheet of all applicable materials for submissions.
 - b. Manufacturers Samples of all applicable materials for submissions.
- B. Samples for Verification:
 1. For each type of exposed finish required, in manufacturer's standard sizes but no less than 12 inch x 12 inch, with actual thickness, representative of finishes, color, and textures of exposed surfaces.
 2. For each GFRC panel sample, provide one (1) additional sample which includes an area of 10% which has had the finish of the panel removed and repaired according to the manufacturers' recommendations.
- C. Fabrication Sample:
 1. Of each vertical-to-horizontal intersection of assemblies, made from 12in lengths of full-size components and showing details of the following:
 - a. GFRC panel at corners with actual thickness, finish, color and texture
 - b. Sub framing, plates, fasteners
 - c. Embed anchor
 - d. Joinery, including concealed welds.
 - e. Anchorage.
 - f. Sheet metal trim and closure pieces
- D. Sustainable Design Submittals:
 1. Provide submittals in accordance with any related Division 01 "Sustainable Design Requirements" sections and those indicated herein..
 2. Environmental Materials Reporting Form (EMRF) Recycled Content and Regional Materials. Provide the following information:
 - a. Name of Product and Manufacturer.
 - b. Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
 - c. The percentage (by weight) of post-consumer and pre-consumer recycled content for the submitted product.
 - d. Indicate the location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.
 3. VOC Reporting Form. Provide the following information:

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- a. For all coatings, sealants, and adhesives used on site and within the building's weatherproofing system provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.
- E. Product Data:
1. For each type of product indicated, include construction details, material descriptions, design mixes, dimensions of individual components and profiles and finishes.
- F. Product Test Reports:
1. Compatibility testing between all adjacent materials, components and systems.
 2. Manufacturer guidelines highlighting fabrication tolerances and defects.
 3. Certification from GFRC fabricator that the GFRC fabricator has reviewed the details and thicknesses and finds same suitable for the purpose intended in accordance with his published literature and in accordance with these specifications.
- G. Shop Drawings and Coordinated Calculations:
1. Provide for the approval of the Engineer prior to fabrication. All drawings and calculations shall:
 - a. Be stamped and signed by NYS Professional Engineer who's responsible for their preparation.
 - b. Submit Shop Drawings based on the compliant solutions, calculations, samples and other supporting evidence. These drawings shall illustrate the design including continuity of air and weather seals, vapor barrier, insulation, drainage routes and ventilation, allowance for movements, tolerances and fixings, and sequencing, shape and layering of elements at these locations.
 - c. Include in shop drawings the following, for coordination with the Project Structural Engineer:
 - 1) Clearly labeled loads imposed by the façade on the building structure.
 - 2) Clearly labeled direction and magnitude of deflections allowed for at connections to building structure.
 - d. Elevations for each condition indicating glass fiber concrete panel and vertical and horizontal track locations, in addition to locations of those angles that are to be welded and bolted to wall.

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- e. Section drawings, if necessary, to convey proper fabrication/installation for all unit types.
 - f. Installation details: Attachment methods, fasteners, joints, corners, openings, intersections with adjacent materials, flashings, and closures.
 - g. The general requirements for torquing of bolts shall be highlighted on the Contractor's drawings and tightening torque values to be clearly stated
2. Structural Calculations:
- a. Include a Structural analysis of the GFRC panel, subcomponents, fixings and all other related components due to wind load, live load, environmental conditions, and thermal factors anticipated at the completed project. Calculations shall be performed in accordance with the appropriate recognized standards, codes of practice and procedures, and using diagrams and extracts from Drawings to explain what is being analyzed. Basic data used and all assumptions made must be clearly stated. Evidence that the engineer responsible for the calculations has appropriate qualifications and is a Professional Engineer registered in the jurisdiction the building is to be built shall be provided. Evidence of internal checking of the calculations by the Contractor shall also be provided.
 - b. Structural Calculations shall include the following:
 - 1) All load cases, load factors and combinations of load cases including dead loads, imposed loads, live loads, thermal loads, snow and ice loads, rain loads, impact loads, blast loads, seismic loads and barrier loads as appropriate.
 - 2) Description or diagram of load paths to explain the structural system, which sets out the detailed structural calculations to follow. Calculations for all major elements of the system including stiffeners, connections and fasteners used to join elements.
 - 3) Details of assumptions for stress limits for factored or unfactored loads as appropriate for different materials including references to codes giving such values.
 - 4) Demonstrate that the total combined maximum stress in each material and element used is less than the stress limit of each respective material or element.
 - 5) Component utilization.

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- 6) An assessment of overall stability and resistance to buckling and / or progressive collapse.
 - 7) Deflection values and diagrams.
 - 8) Thermal movements and stresses.
 - 9) Tables of reactions.
 - 10) Calculations for all nominal, minimum and maximum joint widths and movements allowing for all load combinations, building movements, fabrication and erection tolerances.
 - a) Thermal movements calculations shall be based on surface temperatures of materials due to both solar heat gain and night-time-sky heat loss.
 - b) Calculations for brackets and fasteners incorporating movement allowance shall anticipate the most onerous position for the application of loads.
 - 11) Where finite analysis models are used, identification of restraint types, property types, axis systems and applied loads. Checks are also required to demonstrate that the global reactions are in accordance with the loading assumptions
- c. Contractor shall include design calculation for lifting and handling of GFRC panels.
3. Thermal Calculations:
- a. General
 - 1) Heat transfer calculations shall be carried out in accordance with the requirements of NFRC standards and approved software, unless otherwise noted.
 - 2) Where NFRC approved software is not suitable for providing analysis for complex elements the contractor may, subject to the approval of the Architect, use an alternative software program. This software program must be capable of modeling to the same level of detail and with the same methodology and inputs as the NFRC approved programs. Sample, comparative results to NFRC approved software are to be provided to demonstrate compliance.
 - 3) Contractor to assess the heat transfer through system details by 2-dimensional numerical analysis. 3-dimensional analysis is required for locations where significant thermal bridging occurs.

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- 4) Models shall be developed such that the specified boundary conditions are applied realistically:
 - 5) Where the contract Work does not define the inner or exterior most surface, the additional construction layers shall be modeled as to provide a surface to apply the appropriate boundary conditions.
 - 6) Models shall be extended to a plane of symmetry for the application of adiabatic boundary conditions.
- b. U-value calculations:
- 1) Shall be summarized as thermal transmittance (U-value) for the center of the panels, edge effects and frames of each relevant system type. Overall U-values for each relevant system type shall be calculated as a weighted average of constituent areas.
 - 2) Calculations shall be provided to the extent that 95% (by area) of the Contract Work is determined.
 - 3) Calculations shall include all thermal bridging elements including those that are discontinuous.
- c. Solar Heat Gain Coefficient (SHGC) calculations
- 1) Calculations shall be provided to NFRC 200 standards.
- d. Visible Light Transmittance (VLT) calculations
- 1) Calculations shall be provided to NFRC 200 standards.
- e. Condensation resistance calculations
- 1) Contractor to demonstrate by calculation that the Contract Work resists condensation under the specified environmental conditions. Calculations must demonstrate the interior surface temperature (relative to the defined vapor barrier line) remains higher than the dew point temperature.
 - a) Dew point calculations are to be submitted for review.
 - 2) Calculations are to be determined via heat transfer analysis to determine system section temperatures. The calculation methodology shall follow NFRC standards with the exception of the following:
 - a) Boundary conditions for calculations shall be according to the internal and external temperatures

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and film coefficients which are specified in the corresponding system specification.

- 3) Calculation results are to be presented such that the dew point temperature can be clearly seen with respect to the simulated section temperatures and vapor barrier line.

H. LEED Submittals:

1. As per related sections

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened, factory-sealed containers, bearing manufacturer's name and labels, accurately representing container contents as approved by Engineer at time of Shop Drawing submission.

1. Inspect glass fiber concrete panels and aluminum attachment components immediately upon delivery at site. Notify manufacturer of damage prior to installation of materials.
2. Damaged materials unsuitable for use shall be rejected by Engineer and permanently removed from site by Contractor.

B. Unload, store, and erect GFRC Panels in a manner to prevent bending, warping, twisting, and surface damage.

1. Do not expose materials to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the Site and shall not be incorporated into the Work.
2. Protect components from adverse job conditions prior to installation
3. Handle materials in a manner which prevents inclusion of foreign materials.
4. Protect components from other trades after installation.

C. Store GFRC panels to protect from contact with soil, staining, and physical damage:

1. Store GFRC Panels with non-staining resilient supports in same positions as when transported.
2. Store panels on platforms or pallets, covered with suitable weather-tight and ventilated covering.
3. Store GFRC Panels to ensure dryness, with positive slope for drainage of water.
4. Do not store GFRC Panels in contact with other materials that might cause staining, denting, or other surface damage.
5. Do not allow materials to become wet or soiled or covered with ice or snow.
6. Do not stack platforms or pallets one on top of another.

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7. Place stored panels in a manner to have identification marks clearly visible.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Warranty shall state that the Contract Work is in accord with Drawings and Specifications, as amended by any changes authorized by the Architect, free from defects in materials and workmanship and weather tight for a period of 10 years from date of Substantial Completion.

- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace GFRC wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

2. Finish Warranty Period: 15 years from date of Substantial Completion.

- C. The Contractor shall be responsible for damage to the building and furnishings occasioned by defective materials or workmanship or damage as part of repairs to the Contract Work.

- D. The Warranty, the enforcement or lack of enforcement thereof, shall not deprive the Owner of other actions, rights or remedies available to him. Warranty shall be in form approved by the Owner. Warranty does not cover damage resulting from vandalism or acts of nature exceeding specified performance criteria.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers are subject to compliance with requirements documented herein.

- B. A qualified manufacturer that participates in PCI's Plant Certification Program and is designated a PCI-Certified Plant for Group G – Glass Fiber Reinforced Concrete. Proof of current Precast-Prestressed Concrete Institute (PCI) Plant Certification shall be obtained prior to commencement of fabrication.

1. Certification shall be maintained throughout the production of the glass fiber reinforced concrete units. Production shall immediately stop if at any

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time the manufacturer's is revoked, regardless of the status of completion of the Contract Work. Production shall not be allowed to re-start until necessary corrections are made and certification has been re-established. In the event certification(s) cannot be re-established in a timely manner, causing project delays, the manufacturer, at no additional cost, shall contract out the remainder of the units to be manufactured at a PCI-certified plant.

C. Manufacturers:

1. Subject to compliance with requirements, provide custom assemblies as indicated on Architectural Drawings. Products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Rieder Gruppe, FiberC
 - b. DKI – David Kucera Inc. website: <https://www.dkiconcrete.com/>
 - c. Building Blocks <https://www.buildingblocks.com/>
 - d. Clark pacific, 710 Riverpoint Court, Suite 100 West Sacramento, CA 95605
 - e. Or approved equal

2.02 MATERIALS / EQUIPMENT

A. GFRC Materials

1. Portland Cement: ASTM C 150; Type I, II, or III.
 - a. For surfaces exposed to view in finished structure, use white cement of same type, brand, and source throughout GFRC production.
 - b. Metakaolin: ASTM C 618, Class N.
 - c. Subject to compliance with performance requirements, other cement materials may be incorporated into the Work. Comprehensive testing data shall be submitted to Engineer for review prior to incorporation into the Work.
2. Glass Fibers: Alkali resistant, with a minimum zirconia content of 16 percent, 1 to 2 inches long, specifically produced for use in GFRC, and complying with PCI MNL 130 and ASTM C1666.
3. Sand: Washed and dried silica, complying with composition requirements in ASTM C 144; passing No 20 sieve with a maximum of 2 percent passing No 100 sieve.
4. Facing Aggregate: ASTM C 33, except for gradation, and PCI MNL 130, 1/4 inch maximum size.

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- a. Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match sample.
 - b. Coarse Aggregates: ASTM C33, except for gradation, and PCI MNL 130, 1/4 inch maximum size. Selected, hard, and durable; free of material that reacts with cement or causes staining; to match sample.
 - c. Fine Aggregates: Natural sand or sand manufactured from coarse aggregates, ASTM C33, except for gradation, with a maximum of 5 percent passing No 100 sieve and a maximum of 3 percent passing No 200 sieve.
5. Coloring Admixture: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, nonfading, and alkali resistant.
 6. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of GFRC and complying with chemical limits of PCI MNL 130.
 7. Polymer-Curing Admixture: Acrylic thermoplastic copolymer dispersion complying with PCI MNL 130.
 8. Chemical Admixtures: ASTM C 494/C 494M, containing not more than 0.1 percent chloride ions.
 9. Fly ash or other pozzolans used as admixtures shall conform to ASTM C618.
 10. Set accelerators containing calcium chloride may cause severe shrinkage in the cement-rich GFRC mixes and corrosion of embedded items and shall not be used.

B. GFRC Mixes

1. Backing Mix: Proportion backing mix of portland cement, glass fibers, sand, and admixtures to comply with design requirements. Provide nominal glass-fiber content of not less than 5 percent by weight of total mix.
2. Face Mix: Proportion face mix of portland cement, sand, facing aggregates, and admixtures to comply with design requirements.
 - a. Facing material compatibility with backing shall be considered when developing mix designs.
3. Polymer-Curing Admixture: 6 to 7 percent by weight of polymer-curing admixture solids to dry Portland cement.
4. Air Content: 8 to 10 percent; ASTM C 185.
5. Coloring Admixture: Not to exceed 10 percent of cement weight

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C. GFRC Finishes

1. **Tint color, finish, and texture, to be used or referenced as standard:**
 - a. **Anthracite/Matt (GR06/f101/greyscale), by Rieder, or Approved Equal**
2. **Tint color to be consistent throughout panel.**
3. Architect to approve finish by control sample.
 - a. Panel faces shall be free of joint marks, grain, or other obvious defects.
 - b. Smooth-Surface Finish: Provide free of sand streaks, honeycombs, and excessive air voids, with uniform color and texture.
 - c. Textured-Surface Finish: Impart by form liners to provide surfaces free of sand streaks, honeycombs, and excessive air voids, with uniform color texture.
 - d. Retarded Finish: Use chemical-retarding agents applied to concrete forms and washing and brushing procedures to expose aggregate and surrounding matrix surfaces after form removal.
 - e. Sand- or Abrasive- Blast Finish: Use abrasive grit, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces.
 - f. Acid-Etched Finish: Use acid and hot-water solution equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces.

D. GFRC Sealers

1. Sealers shall comply with the performance requirements set forth in this specification.
2. Basis-of-Design product: a. Prosoco, SLX100 Water & Oil Repellent.

E. Mold Materials

1. Molds: Rigid, dimensionally stable, nonabsorptive material, warp and buckle free, that will provide continuous and true GFRC surfaces; nonreactive with GFRC and capable of producing required finish surfaces.
 - a. Mold-Release Agent: Commercially-produced liquid release agent that will not bond with, stain, or adversely affect GFRC surfaces and will not impair subsequent surface or joint treatments of GFRC.
2. Form Liners: Units of face design, texture, arrangement, and configuration to match GFRC design reference sample. Provide solid backing and form supports to ensure that form liners remain in place during GFRC application. Use with manufacturer's recommended liquid-release agent

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that will not bond with, stain, or adversely affect GFRC surfaces and will not impair subsequent surface or joint treatments of GFRC.

3. Surface Retarder: Chemical liquid set retarder capable of temporarily delaying hardening of newly placed GFRC faced mix to depth of reveal specified.

F. Steel Materials

1. Stainless Steel

- a. Alloy and temper recommended by manufacturer and meeting the requirements and standards listed herein for type of use and finish indicated in accordance with:
 - 1) Plate, Sheet and Strip: ASTM A240/A240M
 - 2) Castings: ASTM A743/A743M
- b. With a Pitting Resistance Equivalence Number (PREN) greater than 27.4 calculated using the formula 'PREN = 100% x Cr + 3.3% x Mo + 16% x N' based on the minimum compositions for Chromium, Molybdenum and Nitrogen given in ASTM A240 or equivalent.
- c. In areas where stainless steel may be used in proximity to a water feature, sea spray, or salts, the alloy chosen shall neither corrode nor exhibit any surface pitting in its installed condition, nor shall it require regular maintenance to prevent corrosion.
 - 1) Non-austenitic alloys including the following shall be used:
 - a) Duplex stainless steel type 2205 (UNS S32205)
 - b) 317L

G. Aluminum Support Assembly

1. Provide aluminum C clips and rails to support GFRC cladding.
 - a. Aluminum extrusions: 6063-T6
2. Basis of Design product:
 - a. Subject to compliance with requirements, provide custom assemblies as indicated on Architectural Drawings. Products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Rainscreen Materials. Website
<https://www.rainscreenmaterials.com/rails>

H. Metal Materials

1. Aluminum components

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- a. Alloy and temper recommended by manufacturer and meeting the requirements and standards listed herein for type of use and finish indicated in accordance with:
 - 1) Sheet and Plate: ASTM B209
 - 2) Extruded Bars, Rods, Profiles, and Tubes: ASTM B221
 - 3) Extruded Structural Pipe and Tubes: ASTM B429
 - 4) Structural Profiles: ASTM B308/B308M
 - 5) Welding Rods and Bare Electrodes: AWS A5.10 / A5.10M
 - 6) Castings: ASTM B26, ASTM B85, or ASTM B108 as appropriate
2. Steel Components:
 - a. Alloy and temper recommended by manufacturer and meeting the requirements and standards listed herein for type of use and finish indicated in accordance with:
 - 1) Structural Shapes, Plates, and Bars: ASTM A36/A36M/A572
 - 2) Cold-Rolled Sheet and Strip: ASTM A1008/A1008M
 - 3) Hot-Rolled Sheet and Strip: ASTM A1011/A1011M
 - 4) Galvanized Sheet: ASTM A653/A653M
 - b. Architecturally Exposed Structural Steel (AESS) Framing
 - 1) All members exposed to view shall be classified as “Architecturally Exposed Structural Steel”.
 - 2) All tolerances for AESS location, verticality and straightness shall be in accordance with the requirements of the AISC Code of Standard Practice for Steel Buildings and Bridges but with tolerance figures halved.
 - 3) Where possible splices in AESS members shall be avoided.
 - a) Splices in AESS shall be made with butt field welds ground flush at locations approved by the Architect.
3. Stainless Steel
 - a. Alloy and temper recommended by manufacturer and meeting the requirements and standards listed herein for type of use and finish indicated in accordance with:
 - 1) Plate, Sheet and Strip: ASTM A240/A240M
 - 2) Castings: ASTM A743/A743M

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- b. The alloy chosen shall neither corrode nor exhibit any surface pitting in its installed condition, nor shall require regular maintenance to prevent corrosion.
 - 1) Alloys including the following or better shall be used:
 - a) Duplex stainless steel type 2205 (UNS S32205)
 - 2) 316 in areas where stainless steel may be used in proximity to a water feature, sea spray, or salts, non-austenitic alloys including the following or better shall be used:
 - a) Duplex stainless steel type 2205 (UNS S32205)
 - b) 317LMetal Finishes

I. Metal Finishes

1. Aluminum components

- a. High-Performance Organic Finish
 - 1) Two or Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat and clear topcoat.
 - 2) Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 3) Color and Gloss: Black as per Architect

2. Steel Components

- a. All exposed non-stainless-steel components shall be protected by two coats of a zinc-rich primer and three coats of alkyd paint as chosen by the Architect.
- b. Carbon steel bars, shapes and plates:
 - 1) Finish: Zinc coated by hot-dip process according to ASTM A123/A123M, after fabrication, or ASTM A153/A153M, as applicable.
- c. Concealed components:
 - 1) Utilize a zinc-rich, corrosion-resistant primer, complying with SSPCPS Guide applied immediately after surface preparation and pretreatment.
 - 2) Select surface preparation methods according to recommendations in SSPC-SP and prepare surfaces according to applicable SSPC standard.

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- d. Hot dip galvanizing shall be performed in accordance with ASTM A123.
 - e. Following pickling operations, the steel shall be held at more than 212 deg F to ensure a uniform temperature, either prior to, or after fluxing.
3. Stainless Steel Components
- a. Surface preparation:
 - 1) Remove, tool and die marks and stretch lines, or blend into finish.
 - b. Polished finishes:
 - 1) Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 2) Run grain of directional finishes with long dimension of each piece.
 - 3) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
4. General
- a. Finishes shall be chosen such that touch-up finishes match factory finish.
 - b. Discoloration, fading, chalking, excessive non-uniformity, pitting, cracking, peeling, corrosion, or crazing of finish shall not be allowed.
 - c. The terms below used in conjunction with finish Guarantee are defined as follows:
 - 1) "Excessive fading": means a change in appearance that is perceptible and objectionable as determined by the Architect when viewed visually in comparison with the original color range standards.
 - 2) "Excessive non-uniformity": means non-uniform fading during the period of the guarantee to the extent that adjacent parts have a color difference greater than the original acceptable color range.
 - 3) "Will not pit or otherwise corrode": means there shall be no pitting or other type of corrosion of finish discernible from a distance of ten (10) feet, resulting from the natural elements in the atmosphere at the Project site.

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- 4) Deterioration includes, but is not limited to, the following:
- 5) Color fading more than 5 Hunter units when tested according to ASTM D2244.
- 6) Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
- 7) Cracking, checking, peeling, or failure of paint to adhere to bare metal.

J. Sheet Metal

1. Provide sheet metal flashings and trim as required for cladding system in accordance with Section 07 62 00 – Sheet Metal Flashing and Trim:
2. Provide corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials constructed with one of the following waterproof materials:
 - a. Stainless steel, ASTM A240/A240M of thickness recommended by manufacturer
 - b. Coated aluminum
 - c. One of the following membrane materials:
 - 1) Flexible ethylene-propylene diene monomer (EPDM)
 - 2) Silicone sheet
3. Shop form components to profiles, dimensions, and thicknesses indicated on Drawings. Items to be provided include:
 - a. Cavity drainage flashings: Aluminum flashing at bottom of air cavities and pressurized compartments to gravity drain water from cavity.
 - b. Flashing joint profiles at horizontal joint conditions Formed profiles fabricated and installed to shed water within horizontal joint condition (noncontinuous, interrupted at vertical U profile).
 - c. Window sills and transition pieces to adjacent materials and other exposed trim: Aluminum fabrications with mill aluminum finish. Attach with clips or other means to avoid exposed fasteners.
 - d. Form sheet metal fabrications in longest possible lengths. Turn back all exposed edges to form hem. Fabricate vertical faces with bottom edge formed outward and hemmed to provide drip.

K. Brackets, Fasteners, Anchorage And Auxiliary Materials

1. General:

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- a. All brackets and fasteners shall be designed so that there will be no risk of loosening due to the effects of vibrations, or to the cyclic effects of load, deflections and thermal movements.
 - b. The design of brackets for site drilled fasteners shall allow for the possibility of reinforcement or other obstructions being encountered and the fixing position being moved as a result of this event occurring.
 - c. No reinforcement or other obstructions shall be cut without the approval of the Architect or Structural Engineer.
2. Fasteners
- a. Fastener design shall be no less than the most stringent standards as required by Code and its reference standards, or the following requirements:
 - 1) Allowable loads for fasteners shall be the lesser of the fastener manufacturers' requirements or per AAMA TIR A9 with the most recent amendments.
 - 2) When utilizing a fastener that is not included in any of the above references, available standards or design guides, a minimum factor of safety of 2 shall be used for permissible load design of anchoring assemblies.
 - b. Fastener design shall account for any reduction in safe working loads due to their spacing, location in areas of tension, near edges or proximity to cast in inserts/existing fasteners, or thickness of shims.
 - c. Unless shown in the Architectural Drawings, no exposed fasteners are to be visible.
 - 1) Where exposed fasteners are shown and required, countersunk security heads shall be used.
 - d. All fastener materials shall be compatible with GFRC materials.
 - e. All exterior fasteners or fasteners in wet areas shall be 316 stainless steel. Weather coatings for corrosion resistance shall not be used.
 - f. Where post drilled or site fasteners are used for connections to the external structural steel frame, the integrity of the steel corrosion protection system shall not be compromised.
 - g. The general requirement for torqueing of bolts shall be highlighted in the shop drawings and tightening torque values are to be clearly stated.
 - h. The Contractor shall provide to the Architect for review documentation that demonstrates the use of all proprietary fasteners

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installed have been reviewed and approved by the fastener manufacturer and shall, prior to the installation, submit the manufacturer's written certification that the details proposed by the Contractor are appropriate for their intended use.

3. Bracket and anchorage:
 - a. The design of brackets and anchorage shall allow for adjustments by 1 inch in small increments in and out, up and down and side to side in the position of the Contract Work supports relative to other constructions to accommodate the full variations in the underlying construction and fabrication tolerances.
 - b. Shimming required to accommodate local variations in construction tolerances only. The maximum allowable shim dimension shall be stated in the shop drawings.
 - c. Concrete and masonry inserts shall be hot-dip galvanized cast-iron, malleable-iron, or steel inserts as required by ASTM A 123 / A 123M or ASTM A 153 / A 153M.

L. Insulation

1. Refer to related sections.
2. Unfaced, mineral-wool board insulation:
 - a. Shall comply with ASTM C612; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E84.
 - b. Shall pass ASTM E136 for combustion characteristics.
 - c. Nominal density of 6 lb/cu. ft. Type II, with a minimum thermal resistivity of 4.2 deg F x h x sq. ft./Btu x in. at 75 deg F.
 - d. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 10 percent.
 - e. Fiber Color: Darkened.
3. Insulation Fasteners
 - a. Fasteners shall be designed to fully restrain insulation against all design loads.
 - b. Fastener materials shall be suitable for the environmental conditions the insulation will be exposed to.
 - c. Adhesively attached, spindle-type anchors shall utilize plate welded to projecting spindle and shall be capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.

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- d. Anchor adhesive shall have demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
4. Thermal insulation shall be inert, durable, not water soluble, rot and vermin proof, CFC and HCFC free, shall be inorganic and not support mold fungal or bacteria growth and shall provide the specified performance for the service life of the Contract Work. Due allowance shall be made for the reduced performance of insulation due to the effects of moisture and ageing.
5. Thermal insulation shall be sufficiently robust and cohesive to allow it to be removed and replaced in service without loss of material or performance. It shall not be injurious to human health when being properly installed, when in service and when being removed or replaced.

M. Attic Stock

1. At or before practical completion, deliver to site in strong protective packages marked for identification, and store where directed, the following additional units, components and materials for future replacement or repairs:
 - a. As per Owner's requirements.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. GENERAL FABRICATION AND WORKMANSHIP

1. Use of welding shall be minimized as much as feasible. If required, Contractor shall submit full welding procedures to demonstrate hardness remain within the required limits.
2. Metals shall be welded in accordance with the relevant standards using methods to avoid distortion. The type, size and spacing of welds shall be shown on drawings and reviewed by the Architect, prior to fabrication.
3. Welds shall be fully bonded throughout their length without holes, inclusions, cracks or porosity so that the long term performance is not compromised and the welds are strong enough for the design requirements.
4. The welds shall be ground smooth and flush with adjoining surfaces where visible or impinging on other work. The completed welded construction shall be finished to prevent corrosion. All welds shall be cleaned as necessary to ensure durability of the connections.
5. Tooling shall not contain elements of carbon steel touching stainless steel elements.
6. Field modification of the GFRC panel and related components shall be made only with the approval of the Structural Engineer responsible for the design.

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7. Aluminum
 - a. Profiles are to be sharp, straight, and free of defects or deformations.
 - b. All formed or extruded shapes shall be fabricated prior to finishing.
 - c. Joints shall be accurately formed without lipping or offsets in visible surfaces unless designed otherwise. Other joints shall be rigidly secured to prevent all but designed movement, unless designed otherwise.
 - d. Accurately fitted joints with ends coped or mitered.
8. Cutting:
 - a. Grinding, cutting and shaping of metals shall be carried out using tools which will not contaminate them with particles which could stain or corrode them.
 - b. Steel Components
 - 1) Use of arc cutting and acetylene gas cutting shall be minimized as much as feasible. If required, Contractor shall submit full welding procedures to demonstrate hardness remain within the required limits.
 - 2) Mild steel cut or shaped by either flame cutting or Plasma cutting shall be to procedures agreed by the Architect. These procedures shall demonstrate that the surface hardness is less than 270 Hv 10. Random inspection of the steel shall be required to ensure that the hardness level is not exceeded. Alternatively, all cut edges shall be surface dressed to remove hardened material.
 - 3) All punched holes shall be undersized by 40 mil and be reamed to the finished size.

B. MOLD FABRICATION

1. Construct molds that will result in finished GFRC complying with profiles, dimensions, and tolerances indicated, without damaging GFRC during stripping. Construct molds to prevent water leakage and loss of cement paste.
 - a. Coat contact surfaces of molds with form-release agent.
 - b. Coat contact surfaces of molds with surface retarder.
2. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during GFRC application. Coat form liner with form-release agent.
3. Locate, place, and secure flashing reglets accurately

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C. GFRC FABRICATION

1. Proportioning and Mixing: For backing mix, meter sand/cement slurry and glass fibers to spray head at rates to achieve design mix proportions and glass-fiber content according to PCI MNL 130 procedures.
2. Spray Application: Comply with general procedures as follows:
 - a. Spray or place face mix in thickness indicated on Shop Drawings.
 - b. Proceed with spraying backing mix before face mix has set, using procedures that produce a uniform thickness and even distribution of glass fibers and matrix.
 - c. Consolidate backing mix by rolling or other technique to achieve complete encapsulation of glass fibers and compaction.
3. Measure thickness with a pin gage or other acceptable method at least once for each 5 sq.ft of panel surface. Take not less than six measurements per panel.
4. Hand form and consolidate intricate details, incorporate formers or infill materials, and over spray before material reaches initial set to ensure complete bonding.
5. Attach panel frame to GFRC before initial set of GFRC backing, maintaining a minimum clearance of 1/2 inch from GFRC backing, and without anchors protruding into GFRC backing.
6. Build up homogeneous GFRC bonding pads over anchor feet, maintaining a minimum thickness of 1/2 inch over tops of anchor feet, before initial set of GFRC backing.
7. Inserts and Embedments: Build up homogeneous GFRC bosses or bonding pads over inserts and embedments to provide sufficient anchorage and embedment to comply with design requirements.
8. Curing: Employ initial curing method that will ensure sufficient strength for removing units from mold. Comply with PCI MNL 130 procedures.
 - a. Keep moisture off the surface of mixes with polymer curing admixtures during first 3 hours of curing. Maintain temperature between 60 and 120 deg F during the first 12 to 16 hours.
9. Prevent drying of moist cured mixes during first 24 hours. Maintain units in surface-damp condition at a temperature above 60 deg F in a minimum of 95 percent relative humidity for a period of 7 days.

D. MARKING

1. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings to identify strong points for lifting,

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permit assembly or installation in a particular sequence; or where interlocks occur; or where confusion could arise among components critically different from one another. Marks shall be concealed when installed or made in such a way as not to affect the performance of the Work upon removal.

E. FABRICATION TOLERANCES

1. Fabrication Tolerances
2. Manufacture GFRC panels so each finished unit complies with half of the tolerances specified in PCI MNL 130.
3. Metal cutting tolerances for framework shall be:
 - a. $\pm 1/16$ in on length of vertical members
 - b. $\pm 1/32$ in on length of horizontal members
 - c. $\pm 1/64$ in on the length and width of metal sheets.
 - d. $\pm 1/32$ in on length of diagonal of metal sheets and not more than $\pm 1/16$ in difference in the length between the two diagonals.

F. SEALER APPLICATION

1. Test a minimum of 4ft by 4ft area for each type of Panel finish.
2. Sealer shall be applied as per the sealer manufacturer's instructions.
3. Sealer on test area shall be fully cured before proceeding with full sealer application.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examination

1. Examine structure and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance.
 - a. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Erection

1. Comply with all related section requirements and product manufacturer's recommended guidelines.

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2. Do not install damaged components.
3. Fit joints to produce joints free of burrs and distortion.
4. Rigidly secure all non-moving elements.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Metal Protection
 - a. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
 - b. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
7. Establish level lines for panel coursing and positioning of support rails.
 - a. Attach horizontal rails with engineered fasteners and anchors to accomplish performance requirements specified.
 - b. Attach rails to substrate at 24 inches or at a distance as recommended by system suppliers in accordance with lateral loads and system dead load requirements.
 - c. Provide 1 to 2 inches of space between ends of adjacent rails for expansion and contraction of aluminum.
8. Install clips, hangers, and other accessories required for connecting GFRC panels to supporting members and Backup materials.
 - a. Use shims and bimetallic separators as needed to avoid contact between dissimilar materials.
9. Lift GFRC panels and install without damage.
10. Install glass fiber concrete panel cladding system to wall assembly specified in accordance with the approved shop drawings and their manufacturer's instructions.
11. Install GFRC panels level, plumb, square, and in alignment. Provide temporary support and bracing as required to maintain position, stability, and alignment of panels until permanent connections are completed.
 - a. Maintain horizontal and vertical joint alignment and uniform joint width.
 - b. Remove projecting hoisting devices.

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- c. Starting at bottom of wall, install GFRC panels by hooking clips on to horizontal aluminum C rails.
 - d. See drawing for joint pattern. Install panels with continuous horizontal joints (unless otherwise noted on drawings). Vertical and horizontal joints shall be open approximately 5/8 inch wide.
12. Welding: Comply with applicable AWS D1.1 and AWS D1.3 requirements for welding, appearance, quality of welds, and methods used in correcting welding Work.
- a. Protect GFRC panels from damage by field welding or cutting operations, and provide noncombustible shields as required.
13. At bolted connections, use lock washers or other acceptable means to prevent loosening of nuts.
- C. Erection Tolerances
1. Erect GFRC panels to comply with the following noncumulative tolerances:
- a. Plan Location from Building Grid Datum: Plus or minus ½ inch (13 mm).
 - b. Top Elevation from Nominal Top Elevation: As follows:
 - 1) Exposed Individual Panel: Plus or minus ¼ inch (6 mm).
 - 2) Nonexposed Individual Panel: Plus or minus ½ inch (13 mm).
 - 3) Exposed Panel relative to Adjacent Panel: ¼ inch (6 mm).
 - 4) Nonexposed Panel relative to Adjacent Panel: ½ inch (13 mm).
 - c. Support Elevation from Nominal Elevation: As follows:
 - 1) Maximum Low: ½ inch (13 mm).
 - 2) Maximum High: ¼ inch (6 mm).
 - d. Maximum Plumb Variation over the Lesser of Height of Structure or 100 Feet (30 m): 1 inch (25 mm).
 - e. Plumb in Any 20 Feet (6 m) of Element Height: ¼ inch (6 mm).
 - f. Maximum Jog in Alignment of Matching Edges: ¼ inch (6 mm).
 - g. Maximum Jog in Alignment of Matching Faces: ¼ inch (6 mm).
 - h. Face Width of Joint: As follows (governs over joint taper):
 - 1) Panel Dimension 20 Feet (6 m) or Less: Plus or minus ¼ inch (6 mm).

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- 2) Panel Dimension More Than 20 Feet (6 m): Plus or minus 5/16 inch (8 mm).
 - i. Maximum Joint Taper: 3/8 inch (10 mm). 10. Joint Taper in 10 Feet (3 m): ¼ inch (6 mm).
 - j. Differential Bowing, as Erected, between Adjacent Members of Same Design: ¼ inch (6 mm).
 - 2. Install aluminum rails to comply with the following maximum tolerances:
 - a. Plumb: 1/8 inch in 10 feet; non-cumulative.
 - b. Level: 1/8 inch in 20 feet; non-cumulative.
 - c. Alignment: End to end or edge to edge offset of adjoining consecutive element to 1/16 inch.
 - d. Location and Plane: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.
 - e. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.
 - D. Sealer Application
 - 1. Test a minimum of 4ft by 4ft area for each type of Panel finish.
 - 2. Sealer shall be applied as per the sealer manufacturer's instructions.
 - 3. Sealer on test area shall be fully cured before proceeding with full sealer application.
- 3.02 INSTALLATIONINSTALLATION
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Not Used
- 3.04 STARTUP / DEMONSTRATION
- 3.05 ADJUSTING / PROTECTION / CLEANUP
- A. Replacement
 - 1. Replace components out of tolerance and/or exhibiting scratches, stains, or other defects. Leave the Work clean and free of defects at time of Owner's acceptance.
 - B. Repairs
 - 1. Repairs will be permitted provided structural adequacy of GFRC panel and appearance are not impaired, as approved by Architect.
 - a. Damages that affect the structural integrity of the GFRC panel shall be discussed with the Structural Engineer.

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2. Production blemishes shall be corrected at the plant.
 3. Mix patching materials and repair GFRC so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces.
 - a. Composite patching mix reinforced with glass fibers shall be used if necessary.
 4. Repairs shall be performed in advance of final cleaning and joint sealing.
 5. Prepare and repair accessible damaged galvanized coatings with galvanizing repair paint according to ASTM A780.
 6. Wire brush, clean, and paint accessible weld areas on prime-painted components with same type of shop primer.
 7. Remove and replace damaged GFRC panels when repairs do not comply with requirements.
- C. Cleaning And Protection
1. Cleaning:
 - a. Cleaning shall be performed no earlier than three (3) days after any GFRC Panel repairs have been completed.
 - b. At least 9 sq.ft inconspicuous area shall be cleaned and checked to be certain that the cleaning procedures are not detrimental to the GFRC or adjacent materials prior to proceeding with the cleaning of all exposed surfaces of the Panels.
 - c. The effectiveness of the cleaning on the sample area shall be judged after the surface has been allowed to dry for at least one week.
 - d. Cleaning shall be performed when exterior temperature and humidity allow rapid drying in order to reduce the possibility of efflorescence and discoloration.
 - e. Clean soiled surfaces using materials which will not harm glass fiber concrete panel units or adjacent materials, as recommended by the glass fiber concrete panel manufacturer (clean with mild detergent using a natural bristle brush, starting from top of building to the bottom). Use non-metallic tools in cleaning operations. Pressure washer not to exceed 1200 psi.
 - f. Upon completion of installation, remove protective coatings or coverings and clean aluminum surfaces, exercising care to avoid damage of finish.
 - g. Remove excess sealant compounds, dirt or other foreign substances.

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- h. Remove and replace glass fiber concrete panel units that are broken, chipped, cracked, abraded or damaged during construction period. Reinstall in accordance with their manufacturer's instructions
- 2. Protection:
 - a. Protect installed products until completion of project.
 - b. Protect cladding from roof runoff, splashed water, mud, sealants, bitumen, and other contaminants from remaining construction activities.
 - c. Without damaging completed Work, provide protective boards at exposed external corners which may be damaged by construction activities.
 - d. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 44 53 – GLASS FIBER CONCRETE PANEL RAINSCREEN
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NO TEXT ON THIS PAGE

**SECTION 07 53 00 – ELASTOMERIC MEMBRANE ROOFING
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the general requirements for a loose-laid, ballasted, single-ply elastomeric roofing system and for a complete water- and weather-tight installation of the system complying with all governing codes and standards and including the system manufacturer’s standard ten year warranty in addition to a two-year construction guarantee.
- B. The Contractor shall provide all labor, materials, equipment and incidentals necessary to perform the work of this Section as shown on the Contract Drawings, specified herein or in the Contract, or required otherwise for a complete installation.
- C. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 03 32 00 -- Joints in Concrete
- B. Section 07 22 16 -- Roof Board Insulation
- C. Section 07 62 00 -- Sheet Metal Flashing and Trim

1.04 REFERENCES

- A. NYSBC -- New York State Building Code
- B. ASTM D312 -- Asphalt Used in Roofing, Specification for
- C. ASTM D395 -- Rubber Property - Compression Set, Standard Test Methods for
- D. ASTM D412 -- Vulcanized Rubber and Thermoplastic Elastomers – Tension, Standard Test Methods for
- E. ASTM D471 -- Rubber Property - Effect of Liquids, Standard Test Method for
- F. ASTM D542 -- Index of Refraction of Transparent Organic Plastics, Standard Test Method for
- G. ASTM D573 -- Rubber - Deterioration in an Air Oven, Standard Test Method for
- H. ASTM D624 -- Tearing Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers, Standard Test Method for
- I. ASTM D1149 -- Rubber Deterioration - Cracking in an Ozone Controlled Environment, Standard Test Methods for
- J. ASTM D2137 -- Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics, Standard Test Methods for
- K. ASTM D2240 -- Rubber Property - Durometer Hardness, Standard Test Method for
- L. FM 1-28 -- FM Global Property Loss Prevention Data Sheet, Wind Design

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- M. FM 1-29 -- F Global Property Loss Prevention Data Sheet, Roof Deck Securement and Above-Deck Roofing Components
 - N. FM 1-28R -- FM Global Property Loss Prevention Data Sheets, Roof Systems
 - O. FM 1-49 -- FM Global Property Loss Prevention Data Sheet, Perimeter Flashing
 - P. South Coast Air Quality Management District (SCAQMD)
 - 1. Rule 1113 -- Architectural Coatings
 - 2. Rule 1168 -- Adhesives and Sealants
- 1.05 DESCRIPTION
- A. The single ply roofing system to be provided under this Section shall include a complete system of loose-laid elastomeric roofing laminated to a non-woven polyester fleece backing which is capable of direct installation on composite roof insulation without the use of an intermediate protection board and is provided with elastomeric base flashing. The system shall also include all materials and system components required for puncture protection, heavy duty roof walkway, one-way breather vents, and other features necessary to complete the Work.
 - B. Installation of the System shall meet the requirements of FM Approval Rating Class 1-90 construction for composite cementitious wet fill insulation substrates. The work of this Section shall also be coordinated with the results of Sections 07 22 16-Roof Board Insulation and 07 62 00 – Sheet Metal Flashing and Trim, and the FM publications referenced above.
 - C. Sustainable Design Requirements: Products applied on site and within the building's weatherproofing system shall comply with VOC limits of authorities having jurisdiction and the following VOC limits of when calculated according to SCAQMD Rule 1113 and Rule 1168:
 - 1. Multipurpose Construction Adhesive: VOC not more than 70 g/L.
 - 2. Plastic Foam Adhesives: VOC not more than 50 g/L.
 - 3. Single-Ply Roof Membrane Sealants: VOC not more than 450 g/L.
 - 4. Nonmembrane Roof Sealants: VOC not more than 300 g/L.
 - 5. Sealant Primers for Nonporous Substrates: VOC not more than 250 g/L.
 - 6. Sealant Primers for Porous Substrates: VOC not more than 775 g/L.
 - 7. Other Adhesives and Sealants: VOC not more than 250 g/L.

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- D. Project-specific system/design requirements will be provided in the Contract (if necessary) to update the requirements given herein or to supplement other requirements given in the Contract Drawings.
- E. Scheduling:
 - 1. Proceed with the roofing and associated work only after curbs, blocking, continuous wood sleepers, vents, drains and projections through the substrate have been installed, and when the substrate construction and framing of openings is completed.
 - 2. Proceed with and complete the Work only when materials, equipment and skilled tradesmen required for the installation of other roofing membrane system components are at the Site and are ready to follow with the Work immediately after composite roof insulation is acceptable for installation of the complete single-ply roofing system.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Engage a single installer skilled, trained and with successful experience in the installation of single-ply roofing systems, who is a recognized roofing contractor, with specific skill and successful experience in the type of roofing specified, and equipped to perform workmanship in accordance with the Drawings and Specifications, manufacturer's written instructions for guaranteed construction and the approved Shop Drawings and who agrees to employ only tradesmen with specific skill and successful - experience in this type of Work. Submit names and qualifications to Engineer along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owners, architects or engineers responsible for projects.
 - b. Approximate contract cost of the single-ply roofing system.
 - c. Amount of area installed.
 - 2. The roofing installer shall be an approved roofing applicator who has qualified for appointment and has been trained by the manufacturer.
 - 3. Proof of acceptability of installer by manufacturer to Engineer.
- B. Performance Criteria: Provide the following:
 - 1. Except as otherwise shown, comply with the written specifications and recommendations of the roofing manufacturer. In addition, comply with FM Publication 1-28 Technical Advisory Bulletin for Class 1-90 wind up-

SECTION 07 53 00 – ELASTOMERIC MEMBRANE ROOFING
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lift resistance. Select appropriate entries in Table 3 of 1-28 for submission to Engineer for approval.

2. Single-ply roofing system, base and other flashings shall be permanently weather- and watertight, and not deteriorated in excess of manufacturer's published limitations.
3. Provide stone ballast weight distributions over entire roof surfaces in all areas not shown to receive heavy-duty roof walkway pavers and pedestal system. Comply with FM wind uplift criteria, ballast and paver locations, weights of materials required in fields, perimeters and corners of roof areas, and approval recommendations contained in 1-29 paragraph 2.7 'Single-Ply Membrane Covers: General.'
4. Provide heavy-duty walkway protection pavers at all traffic concentration points regardless of traffic frequency and whether or not shown.
5. Specified manufacturer's installation and product specifications and details unless more stringent criteria shown or specified is acceptable to the single-ply roofing system manufacturer specified.

C. Requirements of Regulatory Agencies:

1. Comply with applicable insurance rating bureau requirements as required by the New York City Building Code, unless more restrictive requirements are specified.
2. Provide materials and roofing systems which have been tested, listed and labeled by Underwriters Laboratories' Incorporated for Class "A" rating, and bear the UL label on each package or are shipped to the Site with a UL Certificate of Compliance.
3. Provide roofing materials which have been tested, listed and FM labeled for Class "A" maximum flame spread rating.
4. The Office of Technical Certification and Research (OTCR) of the New York City Department of Buildings: Where, in order to be incorporated into the work, a particular item or product system specified by Engineer requires acceptance by the New York City Commissioner of Buildings, Contractor shall ensure that the product manufacturer has obtained such approval, without additional expense to DEP, and in providing DEP with an approved certified copy from the Approved Independent Agency, for the item or product system which shall be submitted to Engineer as part of the Shop Drawing approval process. Contractor may submit, in place of products specified by Engineer, products which are "equal" in all ways to the product specified that is NYC code prescribed or an alternate to the code. Such "or approved equal" product submissions shall not change the requirements of these Sections as to performance, required features or properties, as

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determined by Engineer, and shall not require additional compensation to Contractor or additional expense to DEP. Final acceptance of “equal” is at the sole determination of Engineer

5. Comply with all applicable requirements of governing authorities and codes for all Work.
6. In those instances where the Commissioner of Buildings requires a certificate of compliance of the manufacturer or producer certifying that the item or product system was tested and is equivalent to material of the same kind and quality regularly being manufactured by such manufacturer or producer Contractor shall provide all such certificates to the Commissioner of Buildings without additional expense to DEP.

D. Source Quality Control:

1. Obtain elastic sheets from only one manufacturer, who publishes complete information on the specified roofing system, and offers to guarantee the completed roofing installation as required.
2. Take field dimensions prior to preparation of Shop Drawings.

E. Allowable Installation Tolerances:

1. Do not install Work until substrate preparation and tolerances have been approved by Engineer, single-ply roofing system manufacturer’s Technical Representative and the single-ply roofing system installer and Contractor have verified to Engineer that substrates are within tolerances specified and acceptable to produce approved Work. Work advanced for any reason without such verification shall be stopped, removed and replaced with new material after substrate is approved at no additional expense to DEP.
2. Substrate Tolerances:
 - a. Out-of-Plane: 1/8 inch maximum in 10 foot - 0 inches and 1/16 inch maximum in any 12 inches measured along the plane.
 - b. Maximum Offset in Plane Alignment: 1/16 inch.
 - c. Variation From Slope: 1/8 inch maximum in 10 foot - 0 inches.

1.07 SUBMITTALS

A. The Contractor shall submit the following for review and approval by the Engineer:

1. Samples: Submit for approval the following:
 - a. 12-inch by 12-inch sheet of each item specified and 6-inch long pieces of each required system component to be used in the Work.
 - b. Each fastener type required marked as to type of material and with their intended purpose in the Work.

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- c. All components of the single-ply roofing system, flashing and ballast systems labeled with their intended use in the Work.
 2. Shop Drawings: Submit for approval the following:
 - a. Shop Drawings completely dimensioned using field-verified dimensions on plans of each roof area. Also accurate location of all roof penetrations, roof mounted equipment, curbs, skylights and other features on the roof as specified by Engineer. Contractor shall submit all details requiring consideration and the performance of the details shall be approved by the single-ply roofing system manufacturer for guaranteed construction as specified.
 - b. Manufacturer's specifications and product manuals indicating product information correlated to specified requirements, manufacturer's installation instructions, maintenance instructions and other data as may be required by Engineer.
 - c. Copies of the FM Global Property Loss Prevention Data publications and appropriate Technical Advisory Bulletins published by Factory Mutual indicating compliance with wind uplift pressure-resistant performance criteria, ballast and paver requirements and the requirements for FM Approved 1-90 system construction and perimeter securement conditions.
 3. Contractor's Review: Accompanying approval request, submit to Engineer a written statement signed by Contractor, stating that the Drawings and Sections for roofing and flashing have been reviewed with an agent of the roofing material manufacturer and that he is in agreement that the selected systems are proper, compatible and that the details shown are not in conflict with the roofing manufacturer's roofing and flashing details. Show by copy of transmittal form that a copy of the statement has been transmitted to the manufacturer.
 4. Statement of Application: Upon completion of the Work, submit a statement to Engineer signed by Contractor stating that the Work complies with the requirements of these Sections and the installation methods comply with the manufacturer's printed instructions and were proper and adequate for the condition of installation and use.
- B. Sustainable Design Submittals:
 1. VOC Reporting Form. Provide the following information:
 - a. For all adhesives and sealants, applied on site and within the building's weatherproofing system, provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.

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1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver materials to the site in sufficient quantities to ensure uninterrupted progress of the Work.
2. Deliver materials in manufacturer's original, unopened containers and rolls with labels intact and legible.
3. Materials requiring fire resistance classification shall be delivered to the job with labels attached and packaged as required by labeling service.

B. Storage of Materials:

1. Store materials in a dry, well ventilated, weather tight place, and in a manner which will ensure that there is no possibility of significant moisture pick-up.
2. Store in a manner which complies with fire and safety regulations.
3. Store emulsions at temperatures above 40°F.

C. Store materials on clean raised platforms with weather protective covering when stored outdoors. Handling of Materials:

1. Handle rolled goods so as to prevent damage to edge or ends.
2. Select and operate material handling equipment so as not to damage existing construction or applied roofing.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the manufacturer and provide to DEP the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.
- B. In addition to above Contractor shall provide DEP with manufacturer's standard ten-year warranty for loose laid roofing system.
- C. Specified single-ply roofing system manufacturer's standard details for guaranteed construction shall represent a minimum standard for the Work. Provide details shown on the Contract Drawings and in FM Publications, where not in direct and irreconcilable conflict with specified single-ply roofing system manufacturer's requirements for guaranteed construction. Where such details are so considered by the single-ply roofing system manufacturer, provide a written statement from the manufacturer explaining the technical reasons for such determinations as part of Shop Drawing submittals.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Firestone: RubberGard EcoWhite EPDM Roofing System
2. Sitka Sarnafil: EcoSmart Roofing System
3. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Loose-Laid Roofing Systems: Provide the following:

1. Ethylene Propylene Diene Monomer Synthetic Rubber Sheetting: Provide white synthetic rubber sheetting laminated to a 0.075-inch thick non-woven polyester fleece backing. Comply with the following:
 - a. Rubber Membrane Thickness (not including polyester backing):
 - 1) 0.060-inches for base flashings.
 - 2) 0.060-inches for loose-laid system.
 - b. Hardness Durometer A, ASTM D2240: 60 ±10 points
 - c. Tensile Strength, ASTM D412: 1305 pounds per square inch minimum
 - d. Elongation at Break, ASTM D412: 500% minimum at 75 F
 - e. Brittleness Temperature, ASTM D2137: -75 F
 - f. Tear Resistance, ASTM D624: 175 pounds per linear inch minimum
 - g. Flame Resistance, ASTM D542: No flame
 - h. Resistance to Heat Aging, Change in Original Properties after 70 hours at 212 F, ASTM D573: Hardness +10 points maximum, Elongation -40 percent maximum, Tensile Strength -15 percent maximum
 - i. Resistance to Oil Aging, Change in Volume after 70 hours Immersion in ASTM No. 33 oil at 212 F, ASTM D471: +80 percent
 - j. Resistance to Ozone, Condition after Exposure to 100 pphm Ozone in Air for 168 hours at 104 F, ASTM D1149: No cracks
 - k. Resistance to Permanent Set, Compression Set after 22 hours at 158 F, ASTM D395: +10 percent maximum
 - l. Resistance to Water, Change in Weight after 7 days Immersion at 158 F, ASTM D471: 2.0% maximum change in mass

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- B. Ballast: Provide the following two types of ballast systems in the areas shown:
1. River Washed Stone: Provide the following:
 - a. Smooth, rounded, river washed stone from 3/4-inch to 1-1/2-inch in diameter applied at the rate of 1,200, 1,500 and 1,800 pounds per square, (depending on location based on FM criteria) spread evenly over the surface without adhesive.
 - b. Provide granite or other stone capable of withstanding exposure without deterioration.
 - c. Comply with FM Publication 1-28 for stone ballast.
 2. Heavy-Duty Roof Walkway Pavers and Pedestal System: Provide the following:
 - a. 2-inches thick by 18-inches wide by 18-inches long; interlocking extruded 8000 pounds per square inch precast concrete pavers weighing 24 pounds per pound square foot.
 - b. Provide water absorption less than 5 percent by weight.
 - c. Density: 166 pounds per cubic foot.
 - d. Provide welded wire reinforcing for all pavers.
 - e. Provide separate pedestal point support drainage system, each pedestal 5-1/2-inches square and 5/8-inches deep with additional thicknesses (multiple stacking) as necessary in order to provide a uniformly leveled non-sloping paver surface. Provide eight support points for each paver.
 - f. Color: 4079-D.
 - g. Provide pressed concrete drain grates matching paver size.
- C. One-Way Breather Vents:
1. Provide one-way breather vents recommended by the manufacturer for single-ply roofing installation.
 2. Coordinate adhesives and sealants for full system responsibility.
 3. Provide black body with gray top for single-ply installation.
- D. Miscellaneous Materials: Provide the following:
1. Splice Cleaner: Cleaning solution for EPDM containing toluene, heptane, carbon black and isopropanol.
 2. Bonding Adhesive: Two-part spray-applied polyurethane foam catalyzed as required by installation temperature range encountered.

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3. In-Seam Sealant: Silicone.
4. Splicing Cement: Butyl adhesive.
5. Lap Sealant: EPDM elastomeric sealant.
6. Protection Mats: Provide polypropylene needle-punched fabric material weighing 5.3 ounces per square yard and recommended by the roofing manufacturer for use beneath all pedestrian plaza pavers and all ballast in all areas.
7. Deck Primer: As recommended by sheet manufacturer.
8. Asphalt: ASTM D312, Type III. Softening Point: 185F-205F
9. Rubber Fastening Strips: As required by roofing manufacturer for fully guaranteed construction.
10. Termination Bars: Continuous 2-inch by 1/4-inch Type 316 stainless steel.
11. Rubber Fastening Strips: As required by roofing manufacturer for fully guaranteed construction.
12. Other miscellaneous and accessory materials required for guaranteed construction.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Shop fabricate all special flashings shown using sheeting specified.
- B. Use manufacturer's standard sheet seaming system for "plastic welding" or lapped joints to create seams of strength equal to sheet strength.
- C. Include edge sealer to cover exposed sheet edges.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Contractor shall examine the substrate and the conditions under which the single-ply roofing system and base flashing Work is to be performed, and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.
- B. Verify adequacy of slope-to-drain, compressive strength, moisture content and other composite roof insulation features important to the successful installation of the single-ply roofing system, flashing and ballast systems before start of work.

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3.02 INSTALLATION

A. General:

1. Follow all applicable installation instructions and recommendations contained in the single-ply roofing system manufacturer's written installation and product manuals and the information contained on approved Shop Drawing submittals. Where Contractor wishes to deviate from written installation and product manuals and approved Shop Drawing submittals all such deviations shall be submitted to Engineer for approval along with single-ply roofing system manufacturer's written agreement and a statement of acceptability for compliance with guaranteed construction.
2. Begin installation only in the presence of the single-ply roofing system manufacturer's technical representative.
3. Cut sheets to the maximum size possible, in order to minimize seams and to accommodate contours of the deck. Do not seam within four feet of roof drains.
4. Clean all splices and lap areas using manufacturer's recommended splice cleaner.
5. Lap sheets and bond joints using the seaming system recommended by the manufacturer.
6. Cover top edges of each sheet at seams with uniform fillet of special sealant.
7. Install one-way breather vents as recommended by the single-ply roofing system manufacturer as shown but not less than one per 1000 square feet.
8. Install all roofing and associated work in a manner that will insure a complete roofing system at the end of each day's work. Do not advance the installation of any one material beyond that which is necessary for proper sequencing of the single-ply roofing system Work.

B. Pre-installation Conference:

1. Prior to the installation of the single-ply roofing system and associated Work, Contractor shall schedule and meet at the site with the roofing installer, the installer of each component of associated work, the installers of deck and composite insulating substrate construction to receive roofing Work, the installers of other work in and around roofing which must follow the roofing Work, including mechanical work, Engineer and other representatives directly concerned with performance of the Work. Review foreseeable methods and procedures related to the single-ply roofing system Work, including but not necessarily limited to, the following:
 - a. Review project requirements, including Drawings, Sections and other Contract Documents.

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- b. Review required submittals, both completed and yet to be completed.
 - c. Review status of substrate including drying, structural loading limitations and similar considerations.
 - d. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - e. Review required inspection, testing, certifying and accounting procedures.
 - f. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
 - g. Review regulations concerning code compliance, FM compliance, environmental protection, health, safety, fire and similar considerations.
 - h. Review procedures needed for protection of roofing during the remainder of the construction period.
2. Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration.
 3. Record any revisions or changes agreed upon, reasons therefor, and parties agreeing or disagreeing with them.
- C. Environmental Conditions:
1. Proceed with roofing and associated work only when weather conditions will permit unrestricted use of materials and quality control, complying with the Section requirements and with the recommendations of the roofing materials manufacturers.
 2. Proceed only when Contractor and his installer are willing to guarantee the Work as required and without additional reservations and restrictions.
 3. Record decisions, conditions and agreements to proceed with the Work when weather conditions might be unfavorable. State the reasons for proceeding, with the names of the persons involved along with the changes, if any, or revisions, requirements or terms of the Contract.
- D. Loose-Laid Ballast System:
1. Clean dry splice areas using manufacturer's recommended splice cleaner. Follow manufacturer's recommendations for cleaning.
 2. Apply splicing cement to both mating surfaces with either a 3 or 4 inch wide 1/2-inch medium nap roller or 1/2-inch thick paint brush. Apply cement

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smoothly and evenly to obtain 100 percent coverage. Do not allow the cement to glob or puddle.

3. While the splicing cement is drying, apply a 5/32-inch diameter bead of in-seam sealant (no less than 1/8 inch and no more than 1/4 inch wide) within 1/2 inch of the inside edge of the bottom sheet.
4. Maintain a continuous bead of in-seam sealant on all membrane and cured flashing splices, especially at splice intersections.
5. Allow the cement to dry until it is tacky but will not string or stick to a dry finger touch and will not move when pushed with a dry finger.
6. Roll the top sheet onto the mating surface. Take care not to stretch or wrinkle the membrane sheet and assemble the seam with hand pressure by wiping toward the splice edge.
7. Immediately roll the splice with a 2-inch wide steel roller, using positive pressure, toward the outer edge of the splice. Do not roll parallel to the splice edge. On a completed splice, the in-seam sealant must remain evident or sensitive to the touch.
8. Wait at least two hours; check the splice edge for dust, dirt or other contaminants. If necessary, clean the splice edge by scrubbing with warm soapy water; rinse with clean water and allow to dry.
9. Clean the dry splice edge, extending at least 1 inch onto the top and bottom membranes, using a clean cloth dampened with splice cleaner and apply a 5/16 inch (minimum 1/4 inch) diameter bead of lap sealant to completely cover the splice edge.
10. Feather the lap sealant using roofing manufacturer's preformed tool so that the high point or the crown of the lap sealant is directly located over the edge of the splice.
11. Bond single-ply roofing system to vertical surfaces at edges of the membrane and at penetrations through the membrane. Contractor shall bond the membrane into rain drainage work. Apply matching adhesive tape where recommended to reinforce the attachment.
12. Install protection mats in a uniform continuous plane beneath all ballast. Extend protection mats a minimum of 2 inches above the anticipated ballast level at perimeter flashings and at penetrations with all edges overlapped at least 6 inches.
13. Apply ballast course in uniform thicknesses, at rate identified on approved Shop Drawings, in each area of the Work, exercising extreme care to minimize possibility of damage to membrane.

E. Heavy-Duty Roof Walkway Pavers and Pedestal System:

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1. Install protection mats in a continuous plane beneath all areas to receive pedestrian pavers.
 2. Extend protection mats a minimum of 2 inches above the anticipated ballast level at the perimeter flashings and around penetrations except for roof drains with all edges overlapped a minimum of 6 inches.
- F. Install paver piers and provide multiple stacking of 1/16 and 1/8 inch shims to achieve a level plane with no noticeable unevenness. Provide eight contact support points for each paver.
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Field Testing
1. Before placing any ballast on single-ply roofing system membrane, and after all elastic sheet and flashing seams have been sealed, conduct in-place water retention tests.
 2. Plug drains and flood roof with 2 inches of water above roof high points. Let water remain in-place for 24 hours. Do not add additional water during the time of the test and schedule testing during a period when precipitation is not predicted. If precipitation occurs during the time of the test, redo test when precipitation is not predicted during the time of the test. Calculate expected evaporation at temperatures, humidity and wind conditions occurring during the time of the tests.
 3. Measure water remaining in place at the high point of roofs. Roof areas which demonstrate loss of water, that cannot be explained by loss due to evaporation, shall be inspected by a Technical Representative of the single-ply roofing system manufacturer and the source of leaks determined and presented to DEP and the Engineer as part of a field report which shall also make recommendations for remedial Work. Where the source of leaks cannot be determined, the single-ply roofing system shall be removed and replaced with new single-ply roofing system at no additional expense to DEP. All material and construction systems damaged by the results of this test shall be replaced with new at no additional expense to DEP.
 4. After remedial repairs have been made and inspected by a representative of the single-ply roofing system manufacturer and judged to be watertight, repeat the water retention test. If, this test shows that the single-ply roofing system is still not retaining water according to expected results, remove the entire single-ply roofing system and replace with new at no additional expense to DEP.
- B. INSPECTION AND ACCEPTANCE
- A. At the end of the construction period, or at a time when the remaining construction work will in no way affect or endanger the single-ply roofing

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system and associated Work, a technical representative of the single-ply roofing system manufacturer shall make a final inspection of the Work and prepare a written report to DEP and Engineer of deterioration, damage or deficiencies found in the Work.

- B. Only the installer shall repair or replace deteriorated or defective Work.
- C. Certify that the completed Work is in accordance with the Sections, and without damage or deterioration (except for normal weathering) at time of Final Acceptance.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Protect single-ply roofing system from damage during the construction period so that it will be undamaged in any way at the time of Final Acceptance by DEP.
 - 1. Provide continuous protection of materials against wetting and moisture absorption.
 - 2. Protect materials against damage by construction traffic.
- B. Protect other Work, and surfaces of membrane, from spillage of single-ply roofing system sealing and bonding materials, and prevent materials from entering and clogging drains and conductors.
- C. Replace Work which is soiled or otherwise damaged by the performance of the single-ply roofing system and associated Work and from improper installation techniques.
- D. Remove broken, cracked and chipped pedestrian plaza pavers and replace with undamaged material.

END OF SECTION

SECTION 07 56 00 – FLUID-APPLIED ROOFING
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PART 1 GENERAL

1.01 SUMMARY

- A. Fluid applied roofing as specified herein shall include, but not be limited to, surface primer, base sheet, weather course, flashings, protection course, and appurtenances.
- B. Fluid applied roofing shall be provided as required on the Drawings and Specifications and as required for a complete installation.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Specification 07 22 16 - Roof Board Insulation
- B. Specification 07 62 00 - Sheet Metal Flashing and Trim
- C. Specification 07 90 00 - Joint Protection

1.04 REFERENCES

- A. NYSBC - New York State Building Code
- B. ASTM C518 - Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus, Standard Test Method for
- C. ASTM C836 - High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course, Standard Specification for
- D. ASTM C947 - Flexural Properties of Thin-Section Glass-Fiber-Reinforced Concrete (Using Simple Beam With Third-Point Loading), Standard Test Method for
- E. ASTM D471 - Rubber Property—Effect of Liquids, Standard Test Method for
- F. ASTM D570 - Greige Woven Glass Fabrics, Standard Test Method for
- G. ASTM D638 - Tensile Properties of Plastics, Standard Test Method for
- H. ASTM D751 - Coated Fabrics, Standard Test Method for
- I. ASTM D1037 - Evaluating Properties of Wood-Base Fiber and Particle Panel Materials, Standard Test Method for
- J. ASTM D1191 - Concrete Joint Sealers, Standard Test Methods for
- K. ASTM D2240 - Rubber Property—Durometer Hardness, Standard Test Method for
- L. ASTM D3273 - Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber, Standard Test Method for
- M. ASTM D4073 - Tensile-Tear Strength of Bituminous Roofing Membranes, Standard Test Method for
- N. ASTM D4258 - Abrading Concrete, Standard Practice for
- O. ASTM D4541 - Pull-Off Strength of Coatings Using Portable Adhesion Testers, Standard Test Method for

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- P. ASTM D5147 - Sampling and Testing Modified Bituminous Sheet Material, Standard Test Methods for
- Q. ASTM D5602 - Static Puncture Resistance of Roofing Membrane Specimens, Standard Test Methods for
- R. ASTM E96 - Water Vapor Transmission of Materials, Standard Test Method for
- S. ASTM E661 - Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads, Standard Test Method for
- T. ASTM E831 - Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis, Standard Test Method for
- U. ASTM F2170 - Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes, Standard Test Method for
- V. NRCA - Roofing and Waterproofing Manual

1.05 DESCRIPTION

- A. The products herein specified are totally pre-engineered products of the listed manufacturers and establish criteria for the approval of substitutions. Products must be part of a pre-engineered, low VOC fully reinforced cold liquid applied 2 component Polymethyl Methacrylate (PMMA) resin waterproofing membrane system, equivalent in function, quality, composition and method of application to be considered for approval as an "Approved Substitute". Substitute materials must meet or exceed all physical performance characteristics of the specified materials. PUMA, or single component primers or resin systems will not be accepted. A minimum 110 g/m2 fleec reinforcement is required.

1.06 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: All fluid applied roofing work shall comply with fire-resistance ratings as shown, and as required by governing authorities having jurisdiction and the New York State Building Code.
- B. Materials and Equipment Compliance:
 - 1. Materials and equipment submitted for DEP's approval by the Contractor shall have met, at the time of their submittal, the certification and material acceptance requirements of the Town of Mount Pleasant and NYS by the Engineer
- C. Mock-up:
 - 1. Mock-up areas shall be used to determine required methods and tools to obtain degree of substrate preparation required by the membrane manufacturer. Conduct tests as required to verify that substrate preparation

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meets specified requirements. Tests shall include, but are not limited to, tensile bond strength and moisture content of substrate.

- a. Prepare and clean a three (3) foot by three (3) foot area of each substrate material type.
- b. Submit findings in writing to Engineer and Membrane Manufacturer.
- c. Mock-up areas shall be maintained for quality control for the entire project.

1.07 SUBMITTALS

A. Samples: Submit for approval the following:

1. Fluid applied air and vapor barrier system applied to a 12-inch by 12-inch by 2-inch thick concrete sample demonstrating specified surface preparation to be used on job mock-up and specified thickness of fluid applied air and vapor barrier. Apply fluid applied roofing to only one-half of the sample board, leaving the other half-visible and showing specified substrate preparation.
2. Samples will be reviewed by Engineer for general appearance and as examples of the types of components to be installed on the job mock-ups. Compliance with other requirements is the responsibility of Contractor.

B. Shop Drawings: Submit for approval the following:

1. Copies of specifications, installation instructions and general recommendations from the fluid applied roofing manufacturer, for each type of fluid applied roofing product.
2. Drawings showing extent of each component of each system used in the Work and all details for the Work referencing system components provided as samples to Engineer. Provide Working Drawings coordinated with cast-in-place concrete, fluid applied roofing system showing all construction, system terminations and other conditions encountered in the Work and manufacturer's approved and recommended details appropriate to waterproof these joints and transitions as required for full fluid applied roofing system performance whether or not specific indication is made on the Contract Drawings to the details of the specified manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Materials shall not be delivered to the project site before the time of installation.
2. Materials shall be delivered in sufficient quantities to allow continuity of the Work.

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B. Storage of Materials:

1. Materials shall be stored in original, undamaged containers with manufacturer's labels and seals intact. Labels shall include the following:
 - a. Name of material.
 - b. Manufacturer's stock number and date of manufacture.
 - c. Material safety data sheet.
2. All materials shall be stored in a dry, enclosed area, out of direct sunlight, off the ground and away from all possible contact with water, ice, or snow.
3. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the project site before being incorporated into construction systems.

C. Handling of Materials:

1. Materials shall be handled carefully in order to avoid damage or breakage.
2. Materials shall not be exposed to detrimental conditions or physical damage. Materials which are so exposed shall be permanently removed from the project site and shall not be incorporated into the Work.
3. Materials shall be handled in such a manner so as to prevent inclusion of foreign materials.
4. Packages or containers shall not be opened until all necessary, preparatory Work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the manufacturer and provide to DEP the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer:

1. Johns Manville Corporation, 717 17th Street, Denver, CO 80217; 800-654-3103; Website: www.jm.com
2. Soprema USA. 310 Quadral Drive, Wadsworth, OH 44281; Tel: 800-356-3521; Tel: 330-334-0066; Website: www.soprema.us.

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3. Fluid Applied Roofing
830 Space Dr. Beavercreek, OH 45434.
4. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Membrane: Two-component, cold fluid-applied reinforced PMMA waterproofing membrane with a 360 degree needle punched non-woven 110 g/m² polyester reinforcing fleece, for a finished dry film membrane thickness of .080 inch nominal per ply.

1. Physical Properties:

Property	Value	Test Method
Thickness(avg) @ 0.31 kg/ft ² coverage rate	≥90 mils	ASTM D751/D5147
Weight (min per 100 ft ² of coverage)	68 lb	
Peak Load (avg) @ 73°F	70 lbf/in	ASTM D5147
Elongation at Peak Load (avg) @ 73°F	≥35%	ASTM D5147
Shore A Hardness (avg)	≥70	ASTM D2240
Water Absorption, Method I (24h @ 73°F)	0.8%	ASTM D570
Water Absorption, Method II (48h @ 122°F)	1.2%	ASTM D570
Low temperature flexibility @ 13°F	PASS	ASTM D5147
Dimensional Stability (max)	0.15%	ASTM D5147
Color	White	
Physical state	Cures to solid	
Min thickness (110 fleece)	90 mils	ASTM D751 or D5147
Tensile strength @ break	> 60 lbs/in	ASTM D5147/D4073
Elongation	> 49%	ASTM D751
Tear resistance	>7 lbs	ASTM D751
Water vapor transmission	0.45 Perms	ASTM E96
Water absorption	< 1.5%	ASTM D471
Static Puncture	≥30	ASTM D5602
Usage time*	15 minutes	
Rainproof after*	30 minutes	
Solid to walk on after*	1 hour	
Overburden may be applied after	3 hours	
Completely hardened after	3 hours	
Solid Content	100 %	

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Solvent content	0%	
Maximum Concentration of Volatile Organic Compounds (VOC's)	250 g/L	NYCEPP
*all times are approximate and depend upon wind, humidity and temperature.		

- B. Membrane Flashings: A composite of the same resin material as field membrane with 110 g/m² fleece reinforcement.
- C. Substrate Primer:
1. Apply appropriate proprietary fast-curing primer on all substrates as required or recommended by the cold fluid-applied PMMA Membrane Manufacturer.
 2. For substrates requiring metal primer, apply single component fast-curing primer with a brush or lambswool roller at the minimum consumption of 0.17 - 0.2 kg/m² or as recommended by the Membrane Manufacturer and allow to cure as required depending upon temperature.
 3. For substrates requiring standard primer, apply two component fast-curing PMMA primer with a lambswool roller at the minimum consumption of 0.037 kg/ft² (0.4 kg/m²) or as recommended by the Membrane Manufacturer and allow to cure for 45 minutes minimum.
- D. Accessories:
1. Application Tools, Accessories, and Cleaners: Supplied and/or approved by membrane manufacturer for product installation.
 2. Solvent-Based Cleaner for Tools and Membrane Tie-Ins: Membrane Manufacturers proprietary cleaner/activator based on Ethyl acetate or acetone.
 3. Water-Based Cleaner for Membrane: Simple Green HD or approved equal.
 4. Topcoat Surfacing and Finish: Membrane Manufacturers proprietary PMMA textured finish topcoat with integrally mixed aggregate providing an aesthetic and slip-resistant topcoat.
 5. Leveling and Patching: Provide Membrane Manufacturers proprietary resin-mortar for leveling, patching and repairs of all substrates as recommended by the Membrane Manufacturer.
 - a. Provide Manufacturers proprietary PMMA Paste or PMMQA resin-mortar for leveling, patching and repairs of all non-traffic bearing horizontal or vertical substrates as recommended by the Membrane Manufacturer.

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- b. Resin-mortar should be placed after priming substrate with Membrane Manufacturers proprietary primer and in lifts no greater than the maximum thicknesses indicated by the Membrane Manufacturer. Trowel into place and allow to harden. If additional lifts will be required, broadcast top surface of the placed resin-mortar with clean dry 0.7 - 1.2 mm quartz silica at approximately 25% coverage while the resin-mortar is wet. Place next lift once the resin-mortar has cured.
- 6. Backer Rod: Expanded, closed-cell polyethylene foam designed for use with cold-applied joint sealant.
- 7. Caulking: Single component, non-sag elastomeric polyurethane sealant meeting ASTM C920, Type S, Grade NS, Class 35 for use in sealing cracks and joints, and making watertight seals where required.
- E. Insulation Cover Board: Insulation cover board shall be installed over the required roof insulation as specified in Section 07 22 10 Roof Board Insulation.
 - 1. Cement Roof Board: High compressive strength, non-combustible, roof underlayment board consisting of aggregated portland cement slurry with polymer-coated glass-fiber mesh, with the following characteristics:
 - a. Board Weight: 2.4 lbs/sq.ft.
 - b. Board Size: 48 x 96 inches
 - c. Board Thickness: 1/2 inch
 - d. Flexural Strength: >750 psi, parallel ASTM C-947
 - e. Compressive Strength: >1000 psi nominal
 - f. Flute Spannability: 12 in. ASTM E-661
 - g. Permeance: 5.84 perms ASTM E-96
 - h. Thermal Conductivity: R-value of 0.39 ASTM C-518
 - i. Coefficient of thermal expansion: 4.5×10^{-6} ASTM E-831
 - j. Linear variation w change in moisture: <0.07% max ASTM D-1037
 - k. Water absorption: <15 % max ASTM C-473
 - l. Mold resistance: 10 ASTM D-3273
 - m. Board Edges: Square
- F. Insulation and Cover Board Securement:
 - 1. Polyurethane Adhesive: single component moisture-cured, or two component reactive-cured polyurethane adhesive. Adhesive application rate shall be in accordance with specified wind uplift rating for system

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application. Roofing adhesive shall be a type approved by membrane and insulation manufacturer.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Source Quality Control:

1. Engage a single manufacturer who shall provide the services of a technical representative who shall assist the Contractor and the Engineer by providing technical opinions on the adequacy of materials, methods of installation and field testing methodology and significance of test results based on Working Drawings approved by Engineer.
2. Provide such services during the time of delivery, storage, handling, installation and testing of all fluid applied roofing components.
3. Provide a manufacturer who will provide complete technical services including preparation and review of Working Drawings, installation methods and proposed detailing for the Work. Where the manufacturer requires additions, or changes to the Contract Drawings and Contract Specifications these shall be made at no additional expense to the City and only as acceptable to Engineer.
4. Fluid applied roofing system shall incorporate only the highest quality materials, environmental features, and methods of construction and installation as recommended by the manufacturer and as acceptable to Engineer.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examination

1. Surface Condition: Before applying fluid applied roofing materials, examine substrate and conditions to ensure substrates are fully cured, smooth, clean, dry, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.
 - a. Verify concrete surfaces are visibly dry, have cured for time period recommended by fluid applied roofing manufacturer, and are free from release agents, curing agents, and other contaminants.
 - b. Verify concrete joints are filled with approved non-shrink grout and struck flush.

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2. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Preparation
1. Project Condition:
 - a. Protection of adjacent areas from system-related contamination shall be the responsibility of the Contractor.
 - b. Do not apply roofing / waterproofing membrane during or with the threat of inclement weather.
 - c. Application of cold fluid-applied reinforced PMMA roofing / waterproofing membrane may proceed while air temperature is between 23°F (-5°C) and 95°F (35°C) providing the substrate is a minimum of 5°F above the dew point.
 - d. When ambient temperatures are at or expected to fall below 23°F (-5°C), or reach 95°F (35°C) or higher, follow Membrane System Manufacturer's recommendations for weather related application procedures.
 - e. Ensure that substrate materials are dry and free of contaminants. DO NOT commence with the application unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable for the application of the materials.
 2. Surface Preparation:
 - a. Preparation shall include in addition to the roof deck but not limited to: roofing support girts, HVAC roof curbs as shown in the Contract Drawings.
 - b. New surfaces to receive fluid applied roofing shall be clean and free of all foreign matter. Concrete surface shall have a wood float or fine broom finish and shall be free of fins, ridges, voids, or entrained air holes.
 - c. Voids, rock pockets, and rough surfaces shall be repaired with approved non-shrink grout, or shall be ground to match the unrepaired areas.
 - d. Seal around all materials being directly fastened to the roof deck prior to fluid applied roofing, this includes weather proofing around all fastened roofing materials and a 2 hour fire rated sealant around all through roof penetrating materials.
 - e. Allow new concrete surfaces to cure a minimum of 28 days and clean free of any waterproofing agents, form release agents, and curing agents that might act as bond breakers. Proceed only when

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maximum moisture content of the substrate as measured with a moisture meter is 16 percent.

- f. All sealant shall be allowed to cure tack free.
- g. Primer shall be applied at all junctures of horizontal and vertical surfaces in strict accordance with the manufacturer's approved instructions, and shall be allowed to dry tack free for a minimum of one hour to a maximum of eight hours. Flashing shall be applied to a minimum height of 8 inches on the vertical surface, and 4 inches on the deck surface. Flashing shall be terminated in accordance with the manufacturer's recommended details.

3.02 INSTALLATION

- A. Install roofing with tools and equipment approved by roofing material manufacturer. Wet film thickness of roofing materials shall be as recommended by roofing material manufacturer to obtain the specified dry film thickness. Check wet film thickness frequently by use of a wet mil thickness gauge. Control application of fluid-applied material by maintaining careful balance at all times between material consumption and area covered.
- B. Finish Leveling, Patching and Crack Preparation:
 - 1. General: Membrane Manufacturers proprietary PMMA Paste and Repair Mortar are the preferred materials for all concrete and masonry substrate finish leveling, crack and wall/deck preparation and patching. PMMA Paste and Repair Mortars provides a fast-set time of approximately 45-minutes and does not require surface grinding. PMMA Paste and Repair Mortars are typically applied after general surface priming.
 - 2. Concrete and Masonry Substrate Leveling & Patching: Substrate conditions are to be evaluated by the Contractor, the Owner, or his designated Representative, and Membrane manufacturer. Perform leveling and patching operations as follows:
 - a. Level uneven surfaces. Spread and plane PMMA Paste or Repair Mortar using trowel to achieve a flat surface.
 - b. Fill cavities PMMA Paste or Resin Mortar.
 - c. Any surface to be leveled or filled must first be primed with an appropriate primer.
- C. Joint and Crack Preparation: Joints, cracks and fractures in the structural deck/substrate shall be prepared as defined below prior to installation of the waterproofing membrane. Note: Joints, cracks, and fractures may telegraph through the waterproofing membrane.
 - 1. Non-Moving Cracks, Joints, and Voids: Determine that crack/joint is nonmoving. Clean out crack/joint by brushing and oil-free compressed air.

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Fill crack/joint with PMMA Paste or Repair Mortar. Large voids may require the installation of backer rod or other backing material prior to application of PMMA Paste or Repair Mortar. Allow for a minimum of 45-minutes cure or as required by Membrane Manufacturer.

2. Moving Cracks: Determine that crack is moving. Clean out crack by brushing and oil-free compressed air. Fill crack with PMMA Paste or Repair Mortar. Allow for a minimum of 45-minutes cure or as required by Membrane Manufacturer. Following full curing of primer, apply reinforced PMMA membrane flashing strip 4 inch (10 cm) wide with bond breaker tape as necessary, recommended or required (resin and fleece) in strict accordance with Membrane manufacturer's written instructions.

D. Insulation and Cover Board Installation:

1. General: Insulation and cover board shall be installed in accordance with the insulation and cover board manufacturer's current published specifications and recommendations for use with adhered roofing.
2. Install Insulation/Cover Board: Install only as much insulation and cover board as can be primed, sealed, and protected before the end of the day's work or before the onset of inclement weather.
3. Fit Insulation/Cover Board: Neatly fit insulation/cover board to all penetrations, projections, and nailers. Insulation shall be loosely butted, with gaps not greater than 1/4". All gaps greater than 1/4" shall be filled with acceptable insulation. Cover board shall be loosely butted, with gaps not greater than 1/4". All gaps greater than 1/8" shall be filled with primer; all gaps greater than 1/4" shall be filled with polyurethane sealant.
4. Strip-In Cover Board Joints: Strip all cover board joints with four inch (4") wide strip of flashing membrane. Under no circumstances shall the membrane be left unsupported over a space greater than 1/4".
5. Stagger Insulation/Cover Board Joints: When installing multiple layers of insulation, all joints between succeeding layers shall be staggered a minimum of 6" in each direction.
6. Polyurethane Adhesive Attachment: Follow insulation/cover board and adhesive manufacturers' recommendations for the appropriate adhesive application rate and application procedure. Under normal application rate, dispense the first bead 3" inside the outside edges of the insulation/cover board to be attached, with sequential beads equidistant. Place the boards onto the roofing adhesive beads. Walk on the boards to spread the roofing adhesive for maximum contact. Periodically walk on the boards until firmly attached. Typical application is a 3/4" bead of roofing adhesive at a rate of one lineal foot per square foot of insulation/cover board to be attached. Note: additional adhesive is required in the corner and perimeter regions of

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the roof. Secure insulation/cover board in accordance with approval requirements.

E. Primer Application:

1. General:

- a. Mix and apply single and two-component PMMA primer in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary materials, as supplied by the membrane manufacturer.
- b. The substrate surface must be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth wipe or a combination of methods.
- c. Do not install primer on any substrate containing newly applied and/or active asphalt, coal-tar pitch, creosote or penta-based materials unless approved in writing by Membrane Manufacturer. Some substrates may require additional preparation before applying primer.

2. Application of Primer:

- a. Roll or brush the primer evenly onto the surface to fully saturate the substrate in one application. Do not allow primer to pond or collect in low areas. Follow manufacturer's recommended application rates to ensure that a thin layer of cured primer remains on the substrate surface.
- b. Apply primer only up to the edge of the membrane flashing terminations. Primer application past the membrane terminations requires surfacing with an approved material.
- c. Allow standard primers to cure for a minimum of 45-minutes before membrane application or as indicated in manufacturer's written instructions. Membrane must be applied to primer only when completely dry and without tack.
- d. The clean and fully cured primer can be coated after a minimum of approximately 30-45 minutes up to a maximum of 6-months. If the surface of the primer becomes dirty or contaminated or left exposed to the elements for more than 12-hours, thoroughly clean the in-place and cured primer with Membrane Manufacturers proprietary Activator/Cleaner. Activator/Cleaner should be allowed a minimum of 20-minutes evaporation time after application, and over-coated within 60-minutes of application. Primer should not be used as temporary waterproofing, unless approved in writing by the Membrane Manufacturer.

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3. Disposal of Primer:
 - a. Cured primer may be disposed of in standard landfills. This is accomplished by thoroughly mixing all components.
 - b. Uncured primer is considered a hazardous material and must be handled as such, in accordance with local, state and federal regulation. Do not through uncured resin away.

- F. Membrane Application:
 1. General:
 - a. Follow application procedures as indicated in manufacturer's written instructions.
 - b. It is recommended to apply the waterproofing membrane immediately following full curing of the primer in order to obtain the best bond between primer and membrane.
 - c. Mix and apply cold fluid-applied reinforced PMMA waterproofing membrane in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary membrane resins and materials, as supplied by the membrane manufacturer.
 - d. The primed substrate surface shall be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth-wipe or a combination.
 - e. Protect all areas where membrane has been installed. Do not work off installed membrane during application of remaining work before one (1) hour of curing. Movement of materials and equipment across installed membrane is not acceptable. If movement is necessary, provide complete protection of affected areas.
 - f. Closely follow the Membrane Manufacturer's recommendation for hot and cold weather application. Monitor surface and ambient temperatures, including the effects of wind chill.
 2. Mixing of Resin:
 - a. Mix PMMA resin component with a spiral agitator until the liquid is a uniform color. Pour PMMA resin to be used into a clean mixing bucket, add an appropriate amount of Membrane Manufacturers proprietary Catalyst Powder and thoroughly mix with clean spiral agitator for 2 to 4-minutes depending on ambient temperature. Mix only that amount of PMMA resin with catalyst powder that can be used in 30 minutes.
 3. Application of Resin/Fleece:

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- a. Apply mixed resin to the prepared surface at the manufacturer's recommended application rate. The resin should be rolled liberally and evenly onto the surface using a broad, even stroke. Cover one working area at a time, between 15 – 20 ft.² (1.4 – 1.9 m²). Using a lambswool roller, apply an even layer of cold fluid-applied resin at the minimum consumption of 0.21 kg/ft² (2.3 kg/m²) or as recommended by the Membrane Manufacturer.
 - b. Roll out Membrane Manufacturers proprietary fleece reinforcement into the wet resin making sure the SMOOTH SIDE IS FACING UP (natural unrolling procedure), avoiding any folds and wrinkles. Removing trapped air, using the lambswool roller. Maintain 2-inches (5 cm) minimum overlap at all side and butt laps of reinforcement and extend flashing a minimum of 4-inches (10 cm) horizontally onto deck.
 - c. Apply an even topcoat of cold fluid-applied resin at the minimum consumption of 0.09 kg/ft² (1.0 kg/m²) or as recommended by the Membrane Manufacturer.
 - d. Allow completed membrane to cure as recommended by the Membrane Manufacturer prior to continuing application or applying loads. Fluid-applied membrane must be rainproof after approximately 60-minutes, and capable of carrying a load, i.e., be walked-on, in approximately 2-hours.
 - e. Approximately 2/3 of the total resin should be applied to the substrate below the fleece reinforcement, and 1/3 of the total resin should be applied over the fleece reinforcement.
 - f. At all fleece seams, allow a 2" (5 cm) overlap for all side joints and a 4" (10 cm) overlap for all end joints.
 - g. At membrane tie-offs, clean in-place membrane with Membrane Manufacturers proprietary Activator/Cleaner Allow solvents to fully evaporate before application of new resin.
4. Disposal of Resin:
- a. Cured resin may be disposed of in standard landfills. This is accomplished by thoroughly mixing all components.
 - b. Uncured resin is considered a hazardous material and must be handled as such, in accordance with local, state and federal regulation. Do not throw uncured resin away.
- G. Flashing Application:
1. General:

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- a. Install flashing system in accordance with the requirements / recommendations of the Membrane manufacturer and as depicted on standard drawings and details. Provide system with base flashing, edge flashing, penetration flashing, counter flashing, and all other flashings required for a complete watertight system.
 - b. Wherever possible, install the flashings before installing the field membrane to minimize foot traffic over newly installed field membrane.
 - c. All membrane flashings shall be installed concurrently with the waterproofing membrane as the job progresses. Temporary flashings are not allowed without prior written approval from the Membrane manufacturer. Should any water penetrate the new waterproofing membrane because of incomplete flashings, the affected area shall be removed and replaced at the contractor's expense.
 - d. Provide a minimum vertical height of 8" for all flashing terminations. Flashing height shall be at least as high as the potential water level that could be reached as a result of a deluging rain and/or poor slope. Do not flash over existing through-wall flashings, weep holes and overflow scuppers.
 - e. All flashings shall be terminated as required by the Membrane Manufacturer.
 - f. A subsequent coat of PMMA resin broadcast with approved kiln-dried quartz aggregate surfacing shall be applied wherever stone, concrete, or masonry elements will be placed directly over the flashing to provide a bonding surface and additional protection for the membrane.
2. Membrane Flashing – General:
- a. Membrane flashings shall be fabricated with primer appropriate for the substrate surface, resin of the same base chemical type as the field membrane, and fleece of the same weight as the field membrane unless specified otherwise. Primer, resin, and fleece mixing and application methods as specified for field membranes are also suitable for membrane flashing. Fleece shall overlap 2” (5 cm) minimum for all side joints and 4-inch (10 cm) overlaps at butt laps, tie-ins and horizontally at all substrates. Fleece shall be cut neatly to fit all flashing conditions without a buildup of multiple fleece layers. Work wet membrane with a brush or roller to eliminate blisters, openings, or lifting at corners, junctions, and transitions.

H. Vent Pipes and Stacks:

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1. Pipes conduits and other items to be flashed must be separated with 1-inch (2.54 cm) minimum clearance or as recommended by Membrane Manufacturer to adequately waterproof each individual penetration.
2. All penetrations must be flashed individually. Two or more items ganged together in a flashing will NOT be permitted.
3. Flash penetrations using cold fluid-applied reinforced membrane or Membrane Manufacturers proprietary flashing matrix as recommended. Flashing shall consist of a reinforced deck skirt/target flashing and reinforced vertical wrap.

I. Drains:

1. Flash roof drains using cold fluid-applied membrane. Flashing shall consist of target flashing extending minimum 12-inches (30 cm) horizontally onto the substrate and extend down into the prepared drain bowl a minimum of 3-inches (7.5 cm).
2. At no time should the cold fluid-applied membrane be installed to restrict or reduce the drain inlet in size.
3. Flashing material shall extend four (4) inches minimum onto drain or scupper flange and into drain/scupper body.

J. Walls, Curbs and Bases:

1. Flash all walls, curbs and base flashings using cold fluid-applied reinforced membrane. Wherever possible extend flashing up and over tops of walls, curbs and bases so the membrane terminates on the opposite vertical face of the building element.
2. Wall, curb and base flashings shall be installed to solid substrate surfaces only. Adhering to gypsum-based panels, cementitious stucco, synthetic stucco, wood or metal siding, and other similar materials is not acceptable.
3. All pins, dowels and other fixation elements shall be flashed separately with a vertical flashing component prior to installing the exposed flashing layer.

3.03 FIELD TESTING / QUALITY CONTROL

A. Flood Test:

1. Membrane shall be allowed to cool, after which drains shall be plugged, and barriers installed to contain flood water.
2. Surface shall be flooded with a 2-inch head of water, and allowed to set for 24 hours. Surface shall be inspected for leaks, and membrane shall be repaired if leaks are found. After making repairs, system shall be retested.

B. Quality Control:

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1. Commencement of Work: Commence work once fluid applied roofing are adequately protected from weather and will remain protected during remainder of construction.
2. Sequencing of Work: Coordinate sequencing of fluid applied roofing work with work of other sections that form portions of building envelope air barrier to ensure that flashings and transition materials can be properly installed and inspected. Roofing systems shall be capped and sealed, or top of walls protected, in such a way as to eliminate the ability of water to saturate the wall or interior space, both before and after, air and vapor barrier system installation. Coordinate installation of fluid applied roofing with the air and vapor barrier trade to ensure compatibility and continuity with the roofing system.
3. Moisture Evaluation:
 - a. Evaluate moisture content of cementitious substrate materials. Contractor shall determine substrate moisture content throughout the work and record with Daily Inspection Reports or other form of reporting acceptable to the Owner or designated Representative, and Membrane Manufacturer.
 - b. Evaluate surface moisture content by means of a Tramex Concrete Moisture Encounter Meter. A surface moisture content of $\leq 6\%$ is required to allow for proper primer penetration into the substrate.
 - c. Bubbling, or pinholes within the primer indicates excessive moisture content within the substrate. Blistering of membrane may result from excessive substrate moisture. Primer application during late afternoon/early evening will reduce vapor pressure within the substrate and may alleviate these conditions.
 - d. Continued bubbling, or pinholes indicates excessive moisture content that requires more substantial measures. Evaluate substrate moisture content by means of relative humidity (RH) probes in accordance with ASTM F2170. Relative moisture content of 75% or greater indicates the need for more extensive substrate priming and sealing. Contact Membrane Manufacturer for recommendations.
 - e. Random tests to determine tensile bond strength of membrane to substrate shall be conducted by the Contractor at the job site using an Elcometer Adhesion Tester Model 106 or similar device, or by the performance of a manual pull test. Contractor shall perform tests at the beginning of the Work, and at intervals as required to assure specified adhesion with a minimum of three (3) tests per 5000 square feet. Smaller areas shall receive a minimum of three (3) tests. Test results shall be submitted to the Owner or his designated Representative and the Membrane Manufacturer. Contractor shall

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immediately notify the Owner or his designated Representative and Membrane Manufacturer in the event bond test results are below specified values.

- 1) Adequate surface preparation will be indicated by tensile bond strength of membrane to substrate greater than or equal to 116 psi (0.8 N/mm²), as determined by use of an adhesion tester.
- 2) Adequate surface preparation will be indicated by 135° peel bond strength of membrane to substrate such that cohesive failure of substrate or membrane occurs before adhesive failure of membrane/substrate interface.
- 3) In the event the bond strengths are less than the minimum specified, additional substrate preparation is required. Repeat testing to verify suitability of substrate preparation.

4. Repairs:

- a. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Adjustment:

1. System components which are dislodged, damaged, expanded, broken, penetrated or crushed by subsequent installation operations or damaged by detrimental weather shall be immediately replaced with undamaged material in compliance with the Specifications and properly protected as specified.
2. The Contractor shall maintain a continuous fluid applied roofing around the building roof and must not allow any gaps in the application.
3. If any areas of the fluid applied roofing are damaged, Contractor shall reapply, repair and retest those areas according to the Contract Documents at no extra cost to the City.

B. Protection:

1. All components of the Work shall be protected from detrimental weather and damage during construction.
2. Fluid applied roofing system shall be protected from all damage until Final Acceptance by the City.

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C. Cleanup:

1. Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.
2. At the completion of the work, clean or replace adjacent work, as may be required, marred by the work of this Section.
3. Remove all materials and debris and leave the site of the work in clean condition.

END OF SECTION

SECTION 07 61 00 – SHEET METAL ROOFING
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PART 1 GENERAL

1.01 SUMMARY

A. This Section describes the general requirements for sheet metal roofing which includes, but is not limited to:

1. A complete system of custom curved and straight, custom finished, stainless steel, standing seam metal roof panels, drainage gutter bars, batten caps, all custom and standard flashings, and substrate boards and sheathing panels, connectors, stainless steel attachment angles, shop-curved adjustable radius hat sections, accessories and miscellaneous components recommended by the sheet metal roofing system manufacturer specified for a complete weather- and watertight and permanent installation complying with all governing codes and the requirements of this Section whether or not shown, and concealed, minimum UL Class 1-90 anchorage system construction. Sheet metal roofing system shall not employ any sealants or other non-metallic detailing methods to achieve weather- and water tightness.
2. This complete system shall also include all fasteners, trim, drip edge, eave and rake flashing, custom and factory-formed transition flashings, expansion joint flashings, panels, panel clips, Thermally Broken Z-Clip supports, trim/flashing, ridge cement board, closures, sealants, fillers, fascia and rain drainage system components including sloping grate drains and gutters.

B. The following index of this Section is presented for convenience:

C. Article	Title	Section Page
PART 1	GENERAL	1
1.01	Summary	1
1.02	Payment	2
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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 07 22 16 - Roofing Board Insulation
- B. Section 07 56 00 - Fluid Applied Roofing
- C. Section 07 62 00 - Sheet Metal Flashing and Trim.
- D. Section 07 90 00 - Joint Protection
- E.

1.04 REFERENCES

A. ASTM:

- 1. B32 - Solder Metal, Standard Specification for
- 2. D523 - Specular Gloss, Standard Test Method For
- 3. E283 - Determining the Rate of Air Leakage

Through Exterior Windows, Curtain Walls and Doors under Specified Pressure Differences across the Specimen, Standard Test Method for

- 4. E331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference, Standard Test Method for

- 5. E1514 - Structural Standing Seam Steel Roof Panel Systems, Standard Specification for

- 6. E1592 - Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference, Standard Test Method, Standard Test Method for

- 7. E1646 - Water Penetration of Exterior Metal Roof Panel System by Uniform Static Air Pressure Difference, Standard Test Method for

- 8. E1680 - Rate of Air Leakage through Exterior Metal Roof Panel Systems, Standard Test Method for

B. Factory Mutual Engineering Corporation:

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1. FM 1-28 - (FM Global), Wind Design [for buildings].
2. FM 1-31 - (FM Global), Panel Roof Systems
- C. American Institute of Steel Construction (AISC)
 1. 360 - Specification for Structural Steel Buildings.
 2. DG 27 - Design Guide 27: Stainless Steel
- D. American Iron and Steel Institute (AISI).
 1. D111 - Design Guide for Cold-Formed Steel Purlin Roof Framing Systems.
 2. S100 - Specification for the Design of Cold-Formed Steel Structural Members, with Supplement 1, dated 2010.
- E. Metal Building Manufacturers Association (MBMA):
 1. Metal Building Systems Manual, with 2010 Supplement.
 2. Metal Roofing Systems Design Manual.
- F. SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Incorporated, Architectural Sheet Metal Manual
- G. UL 580, Tests for Up-lift Resistance of Roof Assemblies, Underwriters Laboratories
- H. Specialty Steel Industry of North America (SSINA):
 1. Stainless Steel Fasteners, Designer Handbook
 2. Specifications for Stainless Steel, Designer Handbook
 3. Standard Practices for Stainless Steel Roofing, Flashing, Copings
- I. AMP/NAAMM AMP 503 - Architectural Metal Products Division of National Association of Architectural Metal Manufacturers, Finishes for Stainless Steel
- J. Aluminum Design Manual, Aluminum Association, ADM1.
- K. 2020 Building Code of New York State (NYSBC)
- L. 2020 Energy Conservation Code of New York State (NYSECC)
- M. International Building Code, 2018 Edition (IBC)

1.05 DESCRIPTION

A. Scheduling:

1. Proceed with the sheet metal roofing and associated work only after curbs, blocking, continuous composite wood/recycled plastic sleepers, vents, drains and projections through the substrate have been installed, and when the substrate construction and framing of openings is completed.

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2. Proceed with and complete the work only when materials, equipment and tradesmen required for the installation of other roofing system components are at the Site and are sufficiently advanced to permit the unencumbered installation of the sheet metal roofing in order to provide a complete roofing system at each work area.
- B. Substitutions
1. Do not change material gage, seam spacing or construction details after Shop Drawing approval by Engineer.
 2. Provide gages of material specified for all work or of heavier gage if calculations based on performance criteria submitted as part of Shop Drawing approval process indicates the need for heavier gage material. All such substitutions shall be at no additional expense to DEP. Where compliance with performance criteria indicates that materials of lesser gage may be adequate, provide specified gage.
- C. Standing Seam Metal Roofing Design Requirements
1. General:
 - a. The standing seam metal roofing shall be made of Type 316 stainless steel, gage to be determined by metal roofing manufacturer through shop drawings based on the Contract Drawings.
 - b. The standing seam metal roofing system shall be designed by the manufacturer as a complete system. Members and connections not indicated on the Drawings shall be the responsibility of the Contractor. All components of the system shall be supplied or specified by the same manufacturer
 2. Design Loads:
 - a. See Contract Drawings for minimum design loads for the design of the sheet metal roofing system. In no instances design loads specified herein shall be less than indicated on the Contract Drawings.
 - b. Thermal Effects:
 - 1) Roof panels shall be free to move in response to the expansion and contraction forces resulting from temperature variation, as specified in the MBMA Metal Roofing Systems Design Manual.
 3. Accessories and their fasteners:
 - a. Accessories and their fasteners shall be capable of resisting the specified design wind uplift forces and shall allow for thermal movement of the roof panel system. Exposed fasteners shall not restrict free movement of the roof panel system resulting from thermal forces, except at designed points of roof panel fixity.

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Any additional/revisions to framing members supporting the standing seam metal roofing system to accommodate the manufacturer/fabricator's design shall be the Contractor's responsibility, and shall be submitted for review and approval by the Engineer. New or revised framing members and their connections shall be designed in accordance with AISC 360 Deflection requirements shall be in accordance with the NYSBC.

1.06 QUALITY ASSURANCE

A. Performance Criteria:

1. All sheet metal roofing work shall be permanently watertight, and not deteriorate in excess of manufacturer's published limitations. To achieve this, the manufacturer shall provide only the highest quality materials, details and installation techniques at no additional expense to the DEP.
 - a. The Contractor shall engage a Standing Seam Metal Roof manufacturer who is knowledgeable in low slope roofing.
 - b. The Contractor shall apply a continuous and approved weather proof caulking on each seam prior to folding.
 - c. The contractor shall fold each seam twice or as per manufactures recommendations for low slope roofing systems.
2. Wind Uplift Resistance: Tested and listed by UL (UL 580 test) for minimum Class 1-90 approval rating on completed sheet metal roofing system. Provide roof panel manufacturer which subscribes to Underwriters Laboratories' "Follow-Up Service" assuring continued product compliance with UL requirements. Provide all clips, purlins, sleepers and fasteners as recommended by the sheet metal panel manufacturer in order to provide a finished sheet metal roofing system meeting minimum UL Class 1-90 wind uplift conditions, in all ways.
3. Metal roof panel systems shall be tested in accordance with ASTM E1592 for negative loading. Capacity for gauge, span or loading other than those tested is permitted to be determined by interpolating between test values only.
4. Provide analysis based on FM 1-28, FM 1-31, Ground Roughness Category D, MRI 100 years, and the NYSBC to determine detailing and fabrication requirements to resist wind uplifts at field, perimeter, ridge and corner conditions. Determine requirements based on strictest criteria.
5. Water Penetration: Metal roof panel systems shall have no water leakage at a pressure differential of 6.24 psf when tested in accordance with ASTM E1646.
6. Air Infiltration: Metal roofing panel systems shall have a maximum air infiltration rate of 0.007 cfm/ft² at a pressure differential of 6.24 psf. When tested in accordance with ASTM E1680.
7. Snow Management System:

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- a. Provide additional panel clips, thermally broken Z-Clip supports, recycle plastic sleepers, snow retention plates, angles and fasteners capable of resisting snow loading.
 - b. Sheet metal roofing manufacturer may anticipate a preliminary estimate of loading parallel to the roof panel on each batten of 5000 pounds with snow management system brackets spaced 36 inches on center at each batten. Coordinate final loading at time of Shop Drawing submission, providing additional snow retention lines as necessary to distribute horizontal sliding loads over the entire plane of the roof. Loading shall not be less than loading specified.
8. Lightning Protection System: Provide attachments and penetrations for lightning protection system shown within the Contract Drawings. Coordinate system to provide penetrations only at batten bars. Provide formed aluminum mounting brackets, finished to match roof panels, welded watertight to lightning rods.
 9. Provide fastener load pullout test results for all fasteners used in the roof assembly.
 10. Comply with specified manufacturer's system performance requirements and submit as part of Shop Drawing review.
 11. Sheet metal roofing manufacturer shall be responsible for providing all flashing and custom flashing detailing in compliance with the Contract Documents and approved Shop Drawings.
 12. Flashing fastening system shall be exposed but shall have caulking applied to provide additional weather proofing and to prevent water/moisture infiltration.
 13. Sheet metal roofing system shall not rely alone upon sealants or non-metallic detailing methods to achieve weather- and watertightness. Weather Proofing and Watertightness shall be done in coordination with the Contract drawings and metal roofing Manufactures spec for low slope roofing systems.
 14. The panels and concealed anchor clips shall be capable of supporting a 300-pound temporary concentrated load at the panel mid-span in the installed condition. The load shall be applied over the entire panel width. The panels shall support this concentrated load without displaying permanent distortions that would affect the weathertightness of the sheet metal roofing system.
- B. Installation Tolerances: Maximum Alignment Variation: 1/4-inch in 40 feet-0 inches.
- C. Installer Qualifications:
1. Engage a single installer skilled, trained and with successful experience in the installation of custom finished, low slope, stainless steel, standing seam,

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sheet metal roofing and with successful experience in the erection of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of work. Submit names and qualifications to Engineer along with the following information on a minimum of three successful projects:

- a. Names and telephone numbers of owners, architects or engineers responsible for projects.
 - b. Approximate contract cost of the sheet metal roofing.
 - c. Amount of area installed.
2. Engage either the sheet metal roofing manufacturer or submit proof to Engineer of acceptability of installer to sheet metal roofing manufacturer. Provide an installer who is pre-qualified by the manufacturer of the sheet metal roofing.
 3. Installers shall wear roofing manufacturer's recommended footwear and hand wear for all work.
 4. Have installed five projects of similar scope and magnitude that have been in service for a minimum of (5) five years with satisfactory performance of the roof system.
- D. Manufacturer's qualifications
1. Manufacturer shall have a minimum of (3) three years experience in manufacturing, low slope metal roofing systems, and shall be accredited under the International Accreditation Service, "Accreditation Criteria for Inspection Programs for Manufacturers of Cold-Formed Steel Structural and Nonstructural Components Not Requiring Welding (AC473)" or "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems (AC472)". Panels specified in this Contract shall be produced in a permanent factory environment with fixed-based roll-forming equipment. A letter from the manufacturer certifying the manufacturer's qualifications shall accompany the product material submittals.
- E. Job Mock-Up:
1. Before proceeding with final purchase of materials and fabrication of sheet metal roofing components, prepare a mock-up of the work including all components shown, indicating the final relationship and configurations of the various parts and components of the work and the workmanship quality which shall be achieved in the work.
 2. Include all items that are part of the sheet metal roofing system including, but not limited to, cement board insulation underlayment, continuous composite wood/recycled plastic sleepers, stainless steel purlins, rigid board insulation, OSB sheet metal roofing substrate, flexible base sheet roof panel underlayment, rosin-sized paper and metal roofing and batten seam construction including an example of eave, ridge and gutter flashing.

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Provide a stepped-down mock-up leaving a 4 foot-0 inches wide section of each system component exposed for Engineer's inspection.

3. Incorporate materials and methods of fabrication and installation which are identical with project requirements. Install mock-up on actual segmented chord metal deck. Accepted job mock-up may be incorporated into the finished work.
 4. Build as many job mock-ups as required to obtain Engineer's acceptance of the work.
 5. Sheet metal roofing work which proceeds without an approved job mock-up shall be stopped, removed and re-installed, without question from Contractor, after job mock-up approval, at no additional expense to the DEP.
- F. Standards: Comply with applicable standards and recommendations of SMACNA, Architectural Sheet Metal Manual, for the fabrication and installation of sheet metal roofing, except to the extent more stringent requirements are specified.
- G. Requirements of Regulatory Agencies:
1. Comply with applicable insurance rating bureau requirements as required by the governing building code, unless more restrictive requirements are specified.
 2. Comply with UL Construction for minimum Class 1-90 wind uplift rating.
 3. SMACNA, Architectural Sheet Metal Manual.
- H. Source Quality Control:
1. Obtain all sheet metal roofing, flashing and accessories from the same manufacturer.
 2. Engage a manufacturer who requires that a Technical Representative or Regional Manager be present at the start of the work and who requires that the completed work be inspected by a Technical Representative of the sheet metal roofing manufacturer.
 3. For custom rolled matt finished roofing, establish color, specular reflectivity uniformity and finish testing criteria in accordance with ASTM D523 for exposed sheet metal roofing components in order to provide consistency of low reflectivity finish specified for roofing.
 4. For exposed rake, eave and fascia flashing and trim provide all faces with a uniform, bright, mill-polished surface obtained by finishing with a 150 - 220 mesh abrasive, following initial grinding with coarser abrasives. The finish shall be characterized by very fine parallel "grit lines" and be within a uniform range established as either a AISI/NiDI 9012 and AMP 503 AISI No. 4 or 5 finish, with final finish established by Sample submission as approved by Engineer.

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1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings for approval by the Engineer. Submittals shall include, but not be limited to:
1. Samples: Submit for approval the following:
 - a. Material finishes in style, color and texture as required.
 - b. Provide each type of roof pan, roof trim, roof flashing, and custom metal roof fabrication, 2 foot - 0 inches long by full-width with custom rolled specular reflectivity controlled uniform matt finish in accordance with ASTM D523 for exposed sheet metal roofing components in order to provide consistency of low reflectivity finish specified and exposed eave, rake and fascia flashing metal complete with custom controlled AMP 503 No. 4 uniform finish.
 - c. A one sample and cut-sheet of each roofing material including but not limited to: cleat, gutter bar, batten cap and UL approved panel clip, thermally broken Z-Clips, cement board underlay, and fastener employed, with statement of intended use.
 - d. Samples will be reviewed by Engineer for color and finish only.
 2. Shop Drawings: Submit for approval the following:
 - a. Copies of manufacturer's specifications, standard and custom large scale detail drawings, including for low slope roofing design.
 - b. Roof plans and installation instructions for sheet metal roofing.
 - c. Isometric drawings of all flashing intersections and transitions with adjacent construction materials.
 - d. Custom flashing transition components and trim and other custom metal fabrications.
 - e. Indicate extent and location of each type of finish for each system component specified.
 - f. Profiles of sheet metal roofing pan units, and the details of forming, jointing, ventilation, gaskets (if any), internal supports, anchorages, trim, batten caps and gutter bars, flashing, and transitions with adjacent flashing.
 - g. Show forming and soldering details of weatherproofing at edges, terminations and penetrations of the sheet metal roofing work.
 - h. Show 1/4 inch to the foot scale layout of entire work locating and dimensioning all sheet metal roofing, flashing and trim.
 - i. Show hold-down clips, adjustable radius hat sections and attachment angle locations.
 - j. Establish pattern of OSB roof sheathing panels on each area of sheet metal roofing and indicate fastener spacing.

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- k. Show all details, indicating all internal components and intersection members, details and special fabrication techniques.
 - l. Completely coordinated Shop Drawings showing the integration of this work with substrate and Roofing Board Insulation, supports and penetrations.
 - m. Indicate continuous recycled plastic sleeper and cement board locations and dimensions beneath sheet metal roofing work.
 - n. Coordinate, show, locate and detail all snow management system and lightning system protection system components.
 - o. Provide drawings detailing all penetrations, fasteners, connections and supports for such systems.
 - p. Provide calculations indicating sheet metal roofing system resistance to horizontal sliding.
 - q. Do not exceed maximum horizontal load resistance of system when locating snow management system snow retention bars.
 - r. Provide performance calculations based on specified wind up-lift resistance standards and governing authorities for all areas of roof including critical high load wind uplift areas along perimeters, ridges and corners.
 - s. Locate additional purlins, sleepers and fasteners positioned to resist localized loadings and as required for snow management system components, built-in gutters and other features required for the work.
3. Calculations:
- a. All calculations noted below shall be submitted and sealed by a licensed Professional Engineer in the State of New York.
 - b. Submit engineering calculations defining loads for all roof areas based on the specified building codes, allowable clip loads, and required number of fasteners to secure the panel clips to the designed substructure as shown on the Contract Drawings.
 - c. Compute uplift loads on clip fasteners with full recognition of prying forces and eccentric clip loading.
 - d. Calculating holding strength of fasteners in accordance with submitted test data provided by Fastener Manufacturer based on length of embedment and properties of materials.
 - e. Submit drainage calculations for valley, gutter, and down sprout design.

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- f. Submit thermal calculations and details of floating clip, flashing attachments, and accessories, indicating the free movement in response to the expansion/contraction effects.
 - 4. Certificates:
 - a. Copy of letter of sheet metal roofing manufacturer's certification designating the roofing installer's current application status.
 - b. Provide copies of material purchase receipts, signed by a certified and licensed Notary Public, verifying that material purchased for the work complies with material designations specified as confirmed by approved Shop Drawings.
 - c. Copy of certificates verifying compliance with ASTM E331 and ASTM E285.
 - 5. Contractor's Review:
 - a. Accompanying approval request, submit to Engineer a written statement signed by Contractor, stating that the Drawings and Sections for sheet metal roofing and flashing have been reviewed with an agent of the sheet metal roofing material manufacturer and that he is in agreement that the selected systems are proper, compatible and that the details shown are not in conflict with the sheet metal roofing manufacturer's roofing and flashing details.
 - b. Show by copy of transmittal form that a copy of the statement has been transmitted to the manufacturer.
 - 6. Statement of Application: Upon completion of the work, submit a notarized statement to Engineer signed by Contractor stating that the work complies with the requirements of these Sections and the installation methods comply with the manufacturer's printed instructions, meets requirements regarding system performance, and were proper and adequate for the condition of installation and use.
 - 7. Submit guarantees as specified.
 - 8. Submit UL "Follow-Up Service" validation procedure.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Delivery of Materials:
 - 1. Deliver sheet metal roofing materials and all accessories dry and undamaged, with manufacturer's protection and original product identifications and packaging intact.
 - 2. Deliver sheet metal roofing materials in bundles with banded, sustainably obtained wood surrounds and end caps intact.
 - 3. Exercise care in unloading, storing and installing metal roofing system to prevent bending, warping, twisting and surface damage.

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4. Any panels or other roofing materials damaged or deformed during delivery shall be returned to the manufacturer and replaced with new materials without defects at no extra charge to the City.

B. Storage of Materials:

1. Store all roofing materials and accessory materials in a manner that will protect them from exposure to sun, standing water and condensation; with good air circulation around each piece.
2. Store all roofing materials and accessory materials above ground in a covered area protected from dirt, damage and weather with one end elevated for drainage.
3. Do not store in contact with wood or concrete or other materials that might cause staining, damage or corrosion.
4. If panels become wet, immediately separate sheets, wipe dry with a clean cloth, and allow to air dry.
5. Any panels or other roofing materials that has damage or deformity caused by the weather due to improper storage and protection shall be returned to the manufacture and replaced with new materials without defects at no extra charge to the City.

C. Handling of Materials:

1. Do not subject roofing materials and accessory materials to bending or stress.
2. Do not damage edges or handle material in a manner that will cause scratches, warps or dents.
3. Remove strippable protective film, immediately preceding panel installation.
4. Any panels or other roofing materials that are damaged or deformed prior to installation, during installation, or after installation, or caused by adjacent Work shall be returned to the manufacturer and replaced with new materials without defects at no extra charge to the City.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used**

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A.** The Contractor shall obtain from the manufacturer and provide to the DEP the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.
- B.** Contractor shall supply a (30) thirty-year manufacturer's warranty against leakage and an approved quality assurance stepped-down job mock-up before proceeding with the Work and all labor, materials, equipment, and incidentals as shown,

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specified, and required to furnish, install, and place into satisfactory service all sheet metal roofing work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. For insulation refer to: Section 07 22 16 - Roofing Board Insulation
- B. For roof membrane refer to: Section 07 56 00 - Fluid Applied Roofing
- C. Thermally Broken Z-Clips: Provide one of the following:
 - 1. SMARTci Roof as manufactured by:
 - a. 959 Industrial Drive, Allegan, MI 49010
 - 2. ARMATHERM™ Z Girt
 - a. 1 Titleist Drive, Acushnet, Massachusetts
 - b. Ph: 844_929_3865
 - c. sales@armatherm.com
 - 3. Or approved equal.
- D. Built-In Gutters, Downspouts and Scupper Drains: Provide one of the following:
 - 1. 9785-U (1540T) as manufactured by:
 - a. Smith Incorporated, Houston, TX.
 - b. Or approved equal.
- E. Fire-Resistive Rigid Cement Board: Provide one of the following:
 - 1. DUROCK Exterior Cement Board as manufactured by:
 - a. United States Gypsum Company/USG Industries, Incorporated, Port Reading, NJ.
 - b. Or approved equal.
- F. Standing Seam Metal Roofing Panels:
 - 1. McElroy Metal, Bossier City, LA; www.mcelroymetal.com
 - 2. MBCI, Houston, TX; www.mbc.com
 - 3. AEP Span, Tacoma, WA; www.aepspan.com
 - 4. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Z-Clips/Girts: Provide a thermally broken Z-Clips/Girts to be fastened directly to concrete deck. Spacing from parapet wall and spacing of Z-Clips/Girts shall be as per Contract Drawings and Manufacturers Specification.

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- B. Cement Board: Provide cement board to be fastened to Z-Clips/Girts under Standing Seam Metal Roofing Panels.
- C. Fluid Applied Roofing: Provide a continuous layer of Fluid Applied Roofing directly on top of the cement board throughout. All Standing Seam Metal Roofing Panels clips shall be fastened to cement board prior to Fluid Applied Roofing application and then have the Fluid Applied Roofing coated on to maintain a continuous water seal throughout the roof. Add scrims where needed prior to application.
- D. Curved and Straight Batten Caps where required: 24 gage Type 316 stainless steel continuous batten caps with pre-punched holes for stainless steel machine screws. Provide independent batten caps. Integrated cap and roof sheets shall not be approved by Engineer.
- E. Standing Seam Metal Roofing Panels:
 - 1. See Contract Drawings for minimum suggested profile and thickness. Contractor shall design and provide profile meeting the requirements outlined in this section.
 - 2. Seam type: Mechanically seamed (double crimped).
 - 3. Texture: Smooth
 - 4. Finish: Type 316 Stainless Steel, 24 gage.
 - 5. Concealed anchor clips shall be the same as those used during the testing of the roof system. Clip bases shall have factory punched or drilled holes for attachment. Clips shall be made from multiple pieces with the allowance for the total thermal movement required within the clip. Fixed clips are permitted when the manufacturer can substantiate that the system can accommodate the thermal cyclic movement under sustained live, snow, or wind loads.
- F. Custom Flashing and Trim:
 - 1. Provide custom curved flashings, flashings and vented flashings where required, and sheet metal contour closure trim components, support spacer strips, sheet cleat strips, cap flashings, base and drip flashings, closure and cleats, custom transition flashings, pan stops and closures, surrounds at openings, soffits, and similar components of the work as indicated or as required for a permanently watertight and complete installation.
 - 2. Provide factory-fabricated trim components.
 - 3. Except as otherwise shown or specified, match the material, gage, and finish of the exterior metal roofing.
 - 4. Provide all concealed fasteners for flashing and trim work.
 - 5. Trim will be installed specifically as displayed in the manufacturer provided shop drawings. Proposed changes must be approved in writing by the metal roof system manufacturer.

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- G. Built-In Gutters, Downspouts and Scupper Drains:
1. Provide 24 gage, Type 316 stainless steel gutters, downspouts, and custom flashings and custom transition flashings, to match roofing materials.
 2. Finish all such rain drainage system components to match sheet metal roofing system.
 3. Scupper Drains: Provide stainless steel 45 degree threaded outlet scupper drains with flush-set grates secured with vandal-proof screws complying with the following:
 - a. Size drains for downspout sizes shown.
 - b. Provide flush grates with 40 square inches of free area.
- H. Snow Management and Lightning Protection Systems:
1. Provide custom system components of Type 316 stainless steel using components which maintain weather- and water tightness of system and which are in compliance with manufacturer's requirements for guaranteed construction and which do not rely upon sealants or non-metallic detailing techniques in order to resist water penetration.
 2. Lightning point penetrations and snow management system supports shall be detailed and coordinated by sheet metal roofing manufacturer to occur at battens only.
 3. Continuous plates, angles and fasteners shall be minimum 3/16-inch stainless steel.
- I. Fire-Resistive Rigid Cement Board Roof Insulation Underlayment:
1. Exterior grade glass fiber cement board, 1/2-inches thick, placed continuously beneath all rigid board Roofing Board Insulation on metal roof decking with mechanical fasteners as required by Factory Mutual.
 2. Provide board which shows no deterioration after 100 freeze/thaw cycles complying with ASTM C666.
- J. Anchors, Clips and Cleats:
1. Fastener Clips: Minimum UL 90 assembly rated clips; 24 gage stainless steel.
 2. Sheet and Pre-punched Cleats: Provide minimum of 2-inch wide of Type 316 stainless steel. Minimum length shall provide a fold of 1/2-inch to be locked into the seam of folded edge of metal flashing with other end folded back over fastener heads.
- K. Adjustable Radius Hat Sections and Attachment Angle Purlins:
1. 16 gage Type 316 stainless steel custom factory-fabricated adjustable radius hat sections and attachment angle purlins, fabricated to the combined requirements of the OSB manufacturer's recommendations for substrate

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edge clearance fastening dimensions and as required to provide sufficient surface area for fasteners and clips required to resist wind uplift for sheet metal roofing.

2. Provide adjustable radius hat sections shop-curved to template tolerances.

L. Miscellaneous Materials:

1. All fasteners used at all locations shall be 1/4-inch diameter stainless steel and of sufficient length to penetrate metal decking, stainless steel purlins and composite wood/recycled plastic sleepers a minimum of 7/8-inch. Self-tapping stainless steel fasteners may be tipped with steel if recommended by the sheet metal roofing manufacturer.
2. Exposed fasteners for batten caps and gutter bar connection shall be 1/4-inch diameter 20 by 1-1/2 stainless steel round head machine screws 24 inches on center maximum.
3. Blind Rivets:
 - a. Blind rivets shall not be exposed in the work. Reinforce, increase gage, provide extrusions or hem and cleat material in order to avoid the use of blind rivets, wherever possible.
 - b. Where acceptable to Engineer and unavoidable as determined by Engineer on approved Shop Drawings and where concealed by finished metal in the finished work, blind rivets may be used. Blind rivets shall not be substituted, during installation at the site, for other fastening methods approved on Shop Drawings by Engineer.
 - c. Where approved for use in finished work by Engineer, blind rivets shall be Type 316 stainless steel.
4. Rosin-Sized Building Paper Slip Sheet: Smooth, unsaturated building paper weighing approximately 5 to 6 pounds per 100 square feet.
5. Solder: 60 percent pig lead and 40 block tin conforming to ASTM B32
6. Flux: Non-corrosive; as recommended by the prefabricated sheet metal roofing manufacturer.

2.03 FACTORY-FORMED METAL ROOFING FABRICATION

A. General: Provide 24 gage roofing panels as follows:

1. Comply with the dimensions, profile limitations, gages and fabrication details of specified sheet metal roofing manufacture unless more stringent requirements are specified herein.
2. Fabricate Work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves and avoidable tool marks, considering the temper and reflectivity of the metal. Provide uniform, neat seams with minimum exposure of solder.

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3. Prefabricate those components of the system at the factory recommended by the manufacturer including, ready for field assembly exterior roof pans, joint cleat, anchor clips, flashing, trim and accessories.
 4. Fabricate components and assemble units to comply with the performance requirements specified for the completed installation of the Work.
 5. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings for rain drainage and other components of sheet metal roofing work to profiles, patterns and drainage arrangements shown, both on the Contract Drawings and by the sources specified, and as required for permanently leakage-proof construction.
 6. Curve panels in the Shop to template tolerances to avoid oil canning of roofing panels.
 7. Do not place horizontal transverse seams at low pitch roof areas.
 8. Fabricate sheet metal roofing and supports as indicated on approved Shop Drawings.
 9. All system components requiring field soldering shall be pretinned at the factory.
 10. Support and Anchorage: Fabricate units with adequate provisions for support and anchorage, of the types needed for the indicated method of installation and loadings specified.
- B. Fabricated Metal Flashing and Trim:
1. Shop-fabricate metal flashing and trim to comply with profiles and sizes shown, and to comply with manufacturer's recommended details in compliance with detailing and fabrication requirements specified as shown on Shop Drawings approved by Engineer.
 2. Prepare components to receive concealed fasteners, anchoring and connection devices. Exposed fasteners and lap joints for joining and anchoring stainless steel flashing and trim shall not be approved by Engineer. Concealed fastening techniques shall be used for fabrication of all stainless steel flashing and trim.
 3. Joints between sections of stainless steel flashing and trim shall be formed using interlocking butt joints with back plate reinforcing using threaded studs welded to the back of the stainless steel flashing and trim and supported from steel members using low-profile stainless steel zee-clips with finger slots and locking keyhole slots for invisible support and assembly of face sheet flashing and trim.
 4. Comply with metal producers' recommendations for tinning, soldering and cleaning flux from metal.
- C. Gutters, fascia, rakes, cap flashing, expansion joints, custom transition flashing and similar flashing shall not rely upon sealants in order to achieve weather- and water

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tightness. Provide metal profiles and configurations which achieve weather- and water tightness while still permitting movement without the use of bitumen, coal tar, EPDM, butyls, urethanes and similar non-metallic detailing approaches.

- D. On all metal counterflashings and cap flashings provide completely shop-fabricated corners and special flashings; soldered to insure watertight joints.
- E. All metal flashings, coping, counterflashing, and similar work in all areas of the building roof shall be formed of the sheet metal specified herein.
- F. Make surfaces free of waves and buckles with lines, arises and angles sharp and true; curves shall be smooth.
- G. Do all cutting, fitting, drilling or other operation in sheet metal required to accommodate work of other trades. Provide all items essential to complete the installation, though not specifically shown or specified, of the same kind, quality, and type as similar items utilized elsewhere in the building.
- H. Comply with SMACNA, and details approved by Engineer at time of Shop Drawing submission, which rely only upon metal profiles and assemblies to achieve weather- and water tightness.

2.04 PREFORMED GUTTER AND DOWNSPOUT FABRICATION

A. General:

- 1. Comply with the dimensions, profile limitations, gages and fabrication details of specified sheet metal roof panel manufacturer.
- 2. Prefabricate all components of the system at the factory, ready for field assembly.
- 3. Fabricate components and assemble units to comply with the performance requirements specified for the completed installation of the work.
- 4. Form and fabricate sheets, seams, strips, cleats, expansion joints, edge treatments, integral flashings for rain drainage Work and other components of preformed gutter and downspout work to profiles, patterns and drainage arrangements shown and as required for permanently leakage-proof construction.
- 5. Provide mechanical double-locked seams for all construction. Provide system using all metal components to achieve water tightness. System shall not rely on sealants, adhesives or membrane flashing to achieve water tightness.

B. Built-In Gutters and Downspouts:

- 1. Provide gutter backs 1/2-inch minimum higher than fronts.
- 2. Provide single gutter lengths to 30 feet-0 inches maximum. Allow for 3/4-inch expansion in 30 feet - 0 inches.
- 3. Gutter expansion joint details and fabrication shall be based on SMACNA Plate No. 6. More stringent requirements and details for integrating

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expansion joints into the sheet metal roofing system shall be as approved by Engineer at time of Shop Drawing submission.

2.05 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.06 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examination

1. The Contractor shall examine the alignment of the substrate before erection of the sheet metal roofing work begins and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the sheet metal roofing work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.
2. Verify to Engineer gage of sheet metal roofing and flashing brought to the Site are the same gages shown on approved Shop Drawings by actual measurement of on-site material in the presence of Engineer.

B. Substrate Preparation

1. Verify that fire-resistant cement board insulation underlayment is in place on sloping metal decks and continuous composite wood/recycled plastic sleepers are properly installed maximum of 2 foot - 0 inches on centers over all areas to receive sheet metal roofing work, and closer as required by special conditions shown on approved Shop Drawings.
2. Coordinate sheet metal roofing work with adjoining work to provide a permanently leak-proof, secure and non-corrosive installation.
3. Do not proceed with the Work until all sheet metal roofing flashing and trim has been coordinated with other Work.
4. Install segmented chord attachment angles parallel with slope of metal roof deck, and equidistant from rakes and perpendicular to continuous composite wood/recycled plastic sleepers, to permit installation of continuous gutter bars directly above adjustable radiuses hat sections. Coordinate segments with deck segments to permit aligned, level and smoothly curved installation of adjustable radiuses hat sections establishing uniform sloped and curving plane for installation of OSB substrate panels. Provide spacing of segmented chord attachment angles in compliance with uniform panel dimensions and batten locations in accordance with the design concept shown and approved Shop Drawings.

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5. Before installing oriented strand board and rigid Roofing Board Insulation install cross-wise attachment angles running perpendicular to segmented chord attachment angles to reduce span of all OSB sheet metal roofing substrate panels to 1 foot - 4 inches maximum.
6. Install rigid Roofing Board Insulation as specified in Section 07 22 16 - Roofing Board Insulation.
7. Install all oriented strand board with the long dimension, the strength axis of the panel, perpendicular to the roof slope, with all edges and ends of panels positioned over adjustable radiused hat sections and with bearing surface dimension as recommended by OSB manufacturer providing required 1/8 inch minimum space at panel to panel ends and edges and in compliance with the OSB manufacturer's written recommendations. Offset ends in adjacent rows of OSB panels to form a 3 foot - 0 inch stepped and staggered pattern.
8. Provide self-tapping screws 6 inches on centers along all panel edges and ends. Space screws 12 inches on center at intermediate cross-wise attachment angles running perpendicular to roof slope.
9. Using stainless steel nails, install two layers of flexible asphalt-coated fiberglass underlayment over OSB panels beginning at bottom of slope and shingling edges of underlayment perpendicular to roof slope. Provide overlap of 3 inches between edges of underlayment, with the upper layer overlap shingled in the direction of water flow for positive water runoff. Provide minimum 6 inch overlaps at ends of rolls.
10. Install rosin-sized roofing paper over flexible asphalt-coated fiberglass underlayment as recommended by sheet metal roofing manufacturer.

3.02 INSTALLATION

A. General:

1. Separate dissimilar metals and isolate work from incompatible substrates by use of underlayment's specified. Comply with manufacturer's recommendations for other forms of protection of the sheet metal roofing system against corrosion.
2. When work abuts or members into adjacent dissimilar metals, the juncture shall be executed in a manner which facilitates drainage.
3. Provide thermal expansion for running trim, flashings, gutters and other items exposed for more than 15 feet - 0 inches continuous length. Maintain a watertight installation at expansion seams. Locate expansion seams at 10 feet - 0 inch intervals, and 2 feet - 0 inch each side of corners and intersections and at high points of flashing and trim work.
4. Fabricate and install the Work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves

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and avoidable tool marks, considering the temper and reflectivity of the metal.

5. Conceal fasteners and expansion provisions in exposed Work, and locate so as to minimize the possibility of leakage. Provide expansion joint systems using only metal components. Install safety flashings below expansion seams. Field-installed expansion joints shall be watertight, as specified, and not rely upon safety flashings as primary water seals.
6. Provide integrally installed cleat-type anchorages for metal flashings and trim and all metal pans, spaced no greater than 12 inches on center and arranged to relieve stresses from building movement, and thermal expansion and contraction.

B. Pre-installation Conference:

1. Prior to the installation of the sheet metal roofing and associated work, Contractor shall schedule and meet at the site with the sheet metal roofing installer, the installer of each component of associated work, the installers of deck or substrate construction to receive roofing work, the installers of other work in and around roofing which must follow the sheet metal roofing work, including mechanical work, Engineer and other representatives directly concerned with performance of the work. Review foreseeable methods and procedures related to the sheet metal roofing work, including but not necessarily limited to, the following:
 - a. Review project requirements, including Drawings, Sections and other Contract Documents.
 - b. Review required submittals, both completed and yet to be completed.
 - c. Review status of substrate including drying, structural loading limitations and similar considerations.
 - d. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - e. Review required inspection, testing, certifying and accounting procedures.
 - f. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
 - g. Review regulations concerning code compliance, environmental protection, health, safety, fire and similar considerations.
 - h. Review procedures needed for protection of roofing during the remainder of the construction period.
2. Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration.

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3. Record any revisions or changes agreed upon, reasons therefor, and parties agreeing or disagreeing with them.

C. Environmental Conditions:

1. Proceed with sheet metal roofing and associated work only when weather conditions will permit unrestricted use of materials and quality control of the work being installed, complying with the Section requirements and with the recommendations of the roofing materials manufacturers.
2. Proceed only when Contractor and his installer are willing to guarantee the work as required and without additional reservations and restrictions.
3. Record decisions, conditions and agreements to proceed with the work when weather conditions might be unfavorable. State the reasons for proceeding, with the names of the persons involved along with the changes, if any, or revisions, requirements or terms of the Contract.

D. Provide batten seams and gutter bars equidistant from rakes, with uniform panel dimensions and in accordance with the design concept shown.

E. Anchor component parts of sheet metal roofing securely in place providing for necessary thermal, structural and wind uplift resistance and movement.

F. Do not exceed fastener spacing recommended by the sheet metal roofing manufacturer.

G. Provide minimum of two fasteners securing gutter bar through OSB panel to stainless steel adjustable radiuses hat sections at 18 inches on center. Pre-drill fastener holes as required.

H. Provide mitered corner assemblies. Avoid having gaps, laps, or rivets at corner intersections.

I. Locate stainless steel purlin sleepers closer together, and with additional fasteners, at critical wind uplift roof areas as determined by manufacturer as part of Shop Drawing submittal and as approved by Engineer.

J. Fasten flashings and accessories 12 inches on center.

K. Do not use exposed fasteners on the exterior panel faces.

L. Drive all fasteners normal to the surface and to a uniform depth.

M. Install all special flashing and trim shapes required to maintain permanent weather tightness.

N. Install units with lines and corners true and accurate in alignment and location.

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

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3.05 ADJUSTING / PROTECTION / CLEANUP

A. Protection

1. Provide continuous protection of materials against damage primarily by storing materials under cover and above ground and away from other construction traffic.
2. Do not allow cutting, welding or grinding of other work to occur by this, or other Contractors, near finished sheet metal roofing work.
3. Do not permit construction period traffic over completed sheet metal roofing work. Only the original installer shall be permitted in the area of sheet metal roofing work and only as required to comply with the work of this Section.

B. Adjusting and Cleanup

1. Set sheet metal roof panels plumb, level, and true to line, without warp or rack.
2. Do not use sheet metal roof panel sheets, trim members, and flashing sheets, in which holes have been made in locations where fasteners are not required. Holes plugged with sealant or solder shall not be considered acceptable repair. Holes plugged with “goof screws” shall not be considered acceptable repair. Remove such work from the Site and replace with new undamaged material.
3. Clean exposed surfaces of sheet metal roofing work of every substance before leaving the Site and immediately (same day) after completion of installation. Comply with cleaning recommendations of the sheet metal roofing manufacturer.
4. Do not erect components which have become scarred, chipped, discolored or otherwise damaged or defaced. Roof panels or flashing which have holes, cuts, gouges, or dents shall be removed from the work. Repairs to correct such panels shall not be approved by Engineer.
5. Do not permit workmen, or others, to step directly on the sheet metal roofing and flashing work or to place or move equipment over the work. Protect surfaces of sheet metal roofing during installation of adjoining work.
6. Remove and replace with new material sheet metal roofing and component parts of the work, including finish, which have been damaged.
7. At the completion of the work, clean or replace adjacent work, as may be required, marred by the work of this Section.
8. Leave sheet metal roofing and flashing perfectly flat, free from dents, burrs, scratches, holes, discolorations or other blemishes.
9. Remove all materials and debris and leave the site of the work in clean condition.

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END OF SECTION

SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the general requirements for sheet metal flashing and trim for a complete water- and weather-tight installation complying with all governing codes and standards.
- B. The Contractor shall provide all labor, materials, equipment and incidentals necessary to perform the work of this Section as shown on the Contract Drawings, specified herein or required otherwise for a complete installation.
- C. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 07 56 00 – Fluid Applied Roofing
- B. Section 07 90 00 – Joint Protection

1.04 REFERENCES

- A. NYSBC – New York State Building Code
- B. ASTM A666 – Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
- C. ASTM B32 – Standard Specification for Solder Metal
- D. FM 1-49 – FM Global Property Loss Prevention Data Sheet, Perimeter Flashing
- E. SMACNA – Sheet Metal and Air Conditioning Contractors National Association, Incorporated, Architectural Sheet Metal Manual

1.05 DESCRIPTION

- A. All sheet metal flashing and trim shall be of 316 stainless steel as per Contract Drawings unless otherwise specified.
- B. Sheet metal flashing and trim to be provided under this Section shall include, but not be limited to, a complete system of flashing and counterflashing at: all roofing penetrations; all exterior wall penetrations; base of Rain-Screen façade, top of Rain-Screen Façade/bottom of copping; at all fenestrations as shown on Contract Drawings; and miscellaneous flashings not supplied under the work of other Sections; miscellaneous accessories, fasteners and incidental system components.
- C. Installation of the systems shall meet the requirements of FM Approval Rating Class 1-90 construction, without relying upon sealants or other non-metallic detailing and fabricating techniques to achieve weather- and water tightness.
- D. Performance Criteria:
 - 1. Sheet metal flashing and trim shall be permanently watertight, and not deteriorate in excess of manufacturers' published limitations.
 - 2. Comply with fabrication details recommended by SMACNA and the sheet metal flashing and trim manufacturers, as approved by Engineer at time of Shop Drawing submission.
 - 3. Provide completely weather- and watertight wall and single-ply roofing metal flashing systems. Contractor shall provide only the highest quality materials and methods of construction and installation as recommended by

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sheet metal flashing and trim manufacturers in compliance with governing authorities and as approved by Engineer at time of Shop Drawing submission.

- E. Sustainable Design Requirements
 - 1. Recycled Content of Steel-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content shall not be less than 25 percent.
 - 2. Low Emitting Materials: All adhesives and sealants used onsite and within the building's weatherproofing system shall meet the VOC content limits for the work as specified in the Contract Documents.
- F. Project-specific system/design requirements will be provided (if necessary) in the Contract in order to update the requirements given herein or to supplement other requirements given in the Contract Drawings.
- G. Scheduling:
 - 1. Deliver materials to the site in sufficient quantities to ensure uninterrupted progress of the Work.
 - 2. Do not proceed with the sheet metal flashing and trim Work until curb and substrate construction, blocking, and other construction to receive the Work is completed.
 - 3. Schedule the installation of sheet metal flashing and trim Work to coincide with the installation of roofing, waterproofing, drains, piping, framing at openings, curbs, and other adjoining and substrate work.
 - 4. Proceed with and complete the work only when materials, equipment and knowledgeable tradesmen required for the installation of sheet metal flashing and trim systems are at the site and are ready to follow and integrate the work of this Section with work requiring the installation of sheet metal flashing and trim.

1.06 QUALITY ASSURANCE

- A. Engage installers skilled, trained and with successful experience in the detailing, fabrication and installation of each type of sheet metal flashing and trim work required who are recognized sheet metal contractors, equipped to perform workmanship in accordance with the Contract Documents and approved Shop Drawings so that there will be undivided responsibility for the performance of each flashing and trim component of the work.

1.07 SUBMITTALS

- A. The Contractor shall submit the following to the Engineer for review and approval:

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1. Installer Qualifications: Submit names and qualifications to Engineer along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owners, architects or engineers, responsible for the projects.
 - b. Approximate contract prices for sheet metal flashing and trim.
 - c. Size of area installed.
 2. Samples:
 - a. Typical examples of sheet metal flashing and trim profiles, 12-inches long with all fasteners, clips, and supports required for the Work. 12-inch by 12-inch sheet of each item specified and 6-inch long pieces of each required system component to be used in the work.
 - b. Each fastener type required marked as to type of material and with their intended purpose in the work.
 3. Shop Drawings:
 - a. Copies of manufacturers' specifications, installation instructions and recommendations for sheet metal flashing and trim requirements.
 - b. Manufacturer's data substantiating that the materials comply with the requirements.
 - c. Detailed Shop Drawings showing all profiles of sheet metal flashing and trim systems to be used in the work, fully dimensioned, located, quantified and presented such that sequence of installation is acceptable to each interfacing material supplier.
 - d. Large scale isometric drawings of all sheet metal and trim intersections and transitions, include all fastener locations and materials, cleats and other miscellaneous accessories necessary to complete the Work as specified.
- B. Sustainable Design Submittals:
1. Environmental Materials Reporting Form (EMRF) Recycled Content. Provide the following information:
 - a. Name of Product and Manufacturer.
 - b. Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
- C. Percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.

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1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver materials in manufacturers' original, unopened and undamaged containers and rolls, with labels intact and legible and with information accurately representing container contents as approved by Engineer at time of Shop Drawing submission.
2. Items delivered in broken, damaged, rusted, or unlabeled condition shall immediately be removed from project site and not offered again for approval by Engineer.

B. Storage of Materials:

1. Store materials in an area protected from all construction traffic not associated with the work of this Section.
2. Store materials off the ground and in same package in which they were shipped, and on platforms protected from dirt and other contamination.
3. Store under cover and in a manner which does not permit water to remain on units.

C. Handling of Materials:

1. Protect all sheet metal flashing and trim work from dents, scratches, warps and bends.
2. Immediately after installation of each system component, remove all strippable protective films.
3. Comply with manufacturer's instructions for handling and installation of the ribbed metal cavity wall flashing materials, except where more stringent requirements are shown or specified.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the manufacturer and provide to DEP the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Sheet Metal Flashing (Stainless Steel):

1. Cheney Flashing Company, Inc.; Cheney Flashing – Trenton, NJ.

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2. PROSOCO; 3741 Greenway Cir, Lawrence, KS 66046
3. York Flashings; 43 Community Drive, Sanford Maine 04073
4. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Stainless Steel Flashings Associated with Rain-Screen/Concrete wall Assembly:
1. Provide a continuous sheet metal flashing at base and top of Rain-Screen cladding.
 2. Provide sheet metal flashing at all fenestration (windows, doors, louvers), where shown in the Contract Drawings.
 3. Provide sheet metal flashing at all exterior wall penetrations, where shown in the Contract Drawings.
 4. Fasten all flashing by screw at interval recommended by the flashing manufacturer.
- B. Stainless Steel Flashings Associated with Parapet wall:
1. Provide a continuous sheet metal flashing at base of parapet wall.
 2. Fasten all flashing by screw at interval recommended by the flashing manufacturer.
 3. Flashing shall be caulked with a weather proof sealant and crimped with end of Standing seam roofing to provide a continuous water tight seal as shown in the Contract Drawings.
- C. Stainless Steel Flashings Associated with Metal Roof Panels (Standing Seam Roofing System):
1. Provide a continuous sheet metal flashing around all through roof penetrations.
 2. Provide a continuous sheet metal flashing at scupper and downspouts, where shown in the Contract Drawings.
 3. Provide a continuous sheet metal flashing at roof drainage, where shown in the Contract Drawings.
 4. Provide sheet stainless steel, Type 316 complying with ASTM A666, with No. 2D dead soft, fully annealed finish, unless required to be harder temper for proper forming and performance for application indicated.
 5. Provide thickness of 0.0156 inch.
 6. Fasten all flashing by screw at interval recommended by the flashing manufacturer.
- D. Miscellaneous Materials:

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1. Solder for Stainless Steel: ASTM B32, Lead-free; 96.5% Sn, 3.45% Cu, 1% Sb, 0.05% Ag used with an acid flux of the type recommended by the stainless steel manufacturer. Use a non-corrosive rosin flux over tinned surfaces.
2. Stainless Welding Rods: Type recommended by stainless steel sheet manufacturer for the type of metal sheets furnished.
3. Nails, Screws and Rivets: Same material as flashing sheet, or as recommended by manufacturer of flashing sheet.
4. Cleats: Same metal and gage as sheet being anchored, 2-inches wide, punched for two anchors.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Fabricated Metal Flashing and Trim: Shop fabricate sheet metal flashing and trim to comply with profiles and sizes shown, and to comply with manufacturer's recommended details. Except as otherwise shown or specified, provide soldered flat-lock seams, and fold back metal to form a hem on the concealed side of exposed edges. Comply with metal producers' recommendations for tinning, soldering and cleaning flux from metal.
- B. On all metal base and counterflashing, and trim provide completely shop-fabricated corners and special flashings; arc welded to insure watertight joints. Grind welds smooth, so as to be indistinguishable from adjacent surfaces

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Examination
 1. The Contractor shall examine the substrate and the conditions under which the sheet metal flashing and trim work is to be performed, and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.
- B. Preparation
 1. Clean the substrate of dust, debris, substances, and interferences detrimental to the Work and prepare substrates as recommended by the sheet metal manufacturer.
 2. The Contractor shall coordinate with all other work prior to installation of all flashing.

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- a. All fluid applied air and vapor barriers are to be applied to the substrate prior to installation of all flashing as shown in the Contract Drawings.
- b. Weather proofing sealant shall be applied to flashing after installation, as shown in the Contract Drawings.
- c. All fluid applied air and vapor barriers are to be applied to the flashing after installation of all flashing and sealant as shown in the Contract Drawings.

3.02 INSTALLATION

A. General:

1. Separate dissimilar metals from substrates and from each other by painting each metal surface in the area of contact with a 15-mil thick application of bituminous coating, as recommended by the manufacturers of the dissimilar metals. Comply with manufacturer's recommendations for other forms of protection of the stainless steel and aluminum against corrosion.
2. Provide thermal expansion for running trim, flashing and other items exposed for more than 15 feet - 0 inch continuous length. Maintain a watertight installation at expansion seams. Locate expansion seams at 15 feet - 0 inch intervals, and 2 feet - 0 inch each side of corners and intersections.
3. Fabricate and install the work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves and avoidable tool marks, considering the temper and reflectivity of the metal. Provide uniform, neat double-locked seams with cleats rolled into the seam and with minimum exposure of solder, welds and sealant. Except as otherwise shown, fold back the sheet metal to form a hem on the concealed side of exposed edges. All exposed edges of all sheet metal flashing shall be hemmed not less than 1/2-inch wide.
4. Conceal fasteners and expansion provisions wherever possible in exposed work, and locate so as to minimize the possibility of leakage. Cover and seal work as required for a watertight installation.
5. Provide cleat-type anchorages for metal flashings and trim wherever practical, arranged to relieve stresses from building movement, and thermal expansion and contraction.
6. On vertical surfaces lap 2-piece flashings a minimum of 4 inches.
7. On sloping surfaces, for slopes of not less than 6 inches in 12 inches, lap unsealed flashings a minimum of 6 inches. For slopes less than 6 inches in 12 inches, use soldered flat-locked seams.

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B. Installation of Stainless Steel Flashing and Trim:

1. Tin the edges of plain stainless steel to be soldered, for a width of 1-1/2 inches, using solder for stainless steel and acid flux. Remove every trace of acid flux residue from the metal promptly after tinning or soldering.
2. Provide welded joints. Provide upturned, 1/2-inch wide hooked flanges, and weld between adjoining sheets; lay seam flat.

3.03 FIELD TESTING / QUALITY CONTROL

A. Field Quality Control for Cavity Wall Flashing

1. Field test ribbed metal cavity wall flashing after installation. After building three courses of concrete unit masonry above area of ribbed cavity wall flashing, tape weep vents closed and fill cavity with water.
2. Water leaking from the wall below the area of the ribbed metal cavity wall flashing shall be evidence that the ribbed metal cavity wall flashing was improperly installed.
3. Remove concrete unit masonry and improperly installed ribbed cavity wall flashing and install new ribbed cavity wall flashing. Repeat this process until the wall does not shown evidence of leakage beneath ribbed cavity wall flashing. All such remedial work shall be at no additional expense to DEP.
4. Remove tape from weep vents and all mortar and other debris from cavity and demonstrate free flow of water from the cavity at conclusion of test

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Provide continuous protection of metal flashing and trim materials against wetting, contamination and other damage primarily by storing materials under cover and above ground and away from all construction traffic.
- B. Do not permit workmen, or others, to step directly on flashing sheets in place, or to place or move equipment over flashing and trim surfaces. Protect surfaces during installation of permanent covering work and adjoining work.
- C. Neutralize excess flux as work progresses with five percent to ten percent washing soda solution and rinse thoroughly.
- D. Clean exposed surfaces of every substance which is visible or might cause corrosion or prevent uniform oxidation of the metal surfaces. Exercise extreme care to remove fluxes and ferrous metal particles, including welding splatter and grinding dust.

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- E. Do not leave metal debris and discarded materials at the site of the work. Clean each site of the work as the work progresses on a daily basis.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

A. Principal items of work under this Section include:

1. Copings
2. Cornices (Vertical and Horizontal)
3. Closures, trim, fasteners, sealants, and accessories for fabricating and installing work under this Section.
4. Roof curbs.
5. Metal Fascia.
6. Gutters and downspouts.
7. Scuppers, Drains, and flashing.

B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. 07 61 00 - Sheet Metal Roofing

1.04 REFERENCES

A. ASTM Standards:

1. ASTM A480 - General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip, Standard Specification for
2. ASTM A240 - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications, Standard Specification for
3. ASTM A666 - Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar, Standard Specification for
4. ASTM D1187 - Test Method for Asphalt-Base Emulsions for use as Protective Coatings for Metal, Standard Specification for
5. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free, Standard Specification for

B. Trade Standards:

1. Sheet Metal and Air Conditioning Contractors National Association "Architectural Sheet Metal Manual" (SMACNA)
2. The American National Standard Institute / Single Ply Roofing Industry "ES-1" (ANSI/SPRI)

1.05 DESCRIPTION

- A. System Design Requirements: Roof Specialties system shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Thermal Expansion and Contraction:

- a. Completed Roof Specialties and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling or reducing performance ability.
- b. The design temperature differential shall meet Contract Document requirements.

2. Uniform Wind Load Capacity:

- a. Installed Roof Specialties system shall withstand negative wind pressures complying with the following criteria.

- 1) Design Code: ANSI/SPRI "ES-1"

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- 2) Safety Factor: 2.0
 - 3) The wind load criteria found on the Contract Drawings.
 - b. The nominal capacity of the system shall be determined based on physical testing in accordance with ANSI/SPRI ES-1. The allowable load carrying capacity shall be calculated by reducing the calculated nominal capacity by the safety factor listed herein.
 3. Metal thicknesses of exposed sheet metal components shall meet the requirements of ANSI/SPRI ES-1 Table 5.
 - B. Accessories and items essential for the completeness of the installation shall be the same kind of material as the item to which applied.
 - C. Sustainable Design Requirements:
 1. Recycled Content of Steel-Sheet Roof Specialties: Postconsumer recycled content plus one-half of pre-consumer recycled content shall not be less than 25 percent.
- 1.06 QUALITY ASSURANCE
- A. The workmanship of sheet metal work, method for forming joints, anchoring, cleating, and provisions for expansion shall conform to the standard details and recommendations of the Copper Development Association and the Architectural Sheet Metal Manual published by SMACNA. Workmanship shall be in accordance with the best trade practice and recommendations and specifications of the Sheet Metal and Air Conditioning Contractors National Association, Incorporated.
 1. Uplift requirements shall follow the requirements for Section 07 61 00, Sheet Metal Roofing, and as required in the Contract Documents.
 2. Wind resistance calculation shall be designed specifically for this project. The Contractor shall calculate and certify that the perimeter roof specialties systems furnished meet the anticipated design pressure as specified in the Detailed Specifications when tested in accordance with SPRI Test Methods RE-2 and RE-3.
 - B. The forming and assembling of sheet metal components shall be performed using methods that will not void any manufacturer's warranty.
 - C. Contractor must obtain all components of the roof specialties system from a single manufacturer. Any secondary products that are required which cannot be supplied by the specified manufacturer must be recommended by the manufacturer and approved by the Engineer.
 - D. Installer Qualifications:
 1. Engage an experienced metal edge system contractor to install edge system who has a minimum of three (3) years' experience specializing in the installation of metal edge systems.

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2. Contractor must be certified by manufacturer specified as a supplier of the metal edge system and obtain written certification from manufacturer that installer is approved for installation of the specified system.

E. Coordination:

1. The Contractor will be obligated to coordinate the work under other Sections to assure perfect match of colors. The Contractor shall submit samples of each approved manufacturer's finishes for approval.

1.07 SUBMITTALS

- A. Contractor shall submit Shop Drawings for approval of the Engineer.

- B. Contractor shall submit samples and shall include, but not be limited to:

1. Samples for Initial Selection:

- a. The Contractor shall submit all items within this section for review and approval of anticipated range for all finishes, colors, and textures.

2. Fabrication Sample:

- a. One 12” sections of vertical and horizontal cornice showing details of the frame structure.
- b. One intersecting vertical-to-horizontal Cornice assembly, made from 12in lengths of full-size components and showing details of the frame structure.

3. Manufacturer’s Literature

- C. Each submittal shall be identified by the Specification Section Number.

- D. Each submittal shall be complete in all respects, incorporating all information and data listed herein and all additional information required for evaluation of the proposed materials compliance with the Contract Documents.

- E. Partial, incomplete or illegible submissions will be returned to the Contractor without review for resubmission.

- F. Shop Drawings shall include, but not be limited to:

1. Calculation of all required site loading as per Contract drawings.
2. Shop Drawings shall be Signed and Sealed by a NYS Licensed Engineer.
3. A Complete drawing set showing sections and dimensions, welding, fastening and proper folds as per contract drawings.
4. Schedules, including sizes, weights, gages of metal and spacing.
5. Details of all attachments.

- G. Design Test Reports:

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1. Submit copies of design test reports for each of the performance testing standards listed in Article 1.05 herein.
 2. Test reports shall be performed by independent, International Accreditation Service, Inc. (IAS) accredited testing laboratory, and shall bear the seal of a licensed and registered professional engineer in New York.
- H. Engineering Calculations:
1. Submit engineering wind pressure calculations specific to this Project.
 2. Calculations shall be prepared and sealed by a NYS Licensed Engineer that is a full-time employee of the system manufacturer.
 3. Calculations shall clearly demonstrate that the system is capable of resisting the calculated design wind pressure(s) after the application of the safety factor specified herein in accordance with the requirements of ANSI/SPRI ES-1 and the building code.
- I. Installer Qualifications:
1. Engage a single installer skilled, trained and with successful experience in the installation of roof specialties systems and with successful experience in the erection of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of work. Submit names and qualifications to the Engineer for approval along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owners, architects or engineers responsible for projects.
 - b. Approximate contract cost of the system.
 - c. Amount of area installed.
- J. Sustainable Design Submittals:
1. Environmental Materials Reporting Form (EMRF) Recycled Content. Provide the following information:
 - a. Name of Product and Manufacturer.
 - b. Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
- K. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Deliver all materials in factory packed unopened cartons and crating bearing the manufacturer's labels.
 - B. Store materials in clean, dry and protected areas in such manner to preclude damage of any nature.

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- C. Handle all materials with proper care to avoid denting, marring, warping or other distortions during delivery, storage and handling.
- D. All materials shall remain untouched and without damage or alterations in anyway until installation.
- E. Any alteration and or damage to the materials shall result in immediate rejection of that item and shall be replaced with another promptly at no extra charge to the DEP.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. The Contractor shall provide any necessary items needed for spare parts, or any special tool and supplies, if required by manufacture.

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the manufacturer and provide to the City the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- 1. Copings Cornices:
 - a. Roofinox America Inc.
200 South Wacker Drive,
Suite 1375
Chicago, IL 60606, United States
Tel.: +1 732 440 8069
E-mail: sales@roofinox.com
Web: www.roofinoxamerica.com
 - b. Riverside Sheet Metal & Contracting Inc.
15 Reardon Road, Medford, Massachusetts, 02155
Phone: (781) 396-0070
Fax: (781) 396-8890
E-mail: rsm@riversidesheetmetal.net
 - c. Spengler Industries
5066 West Amelia Earhart Drive
Salt Lake City, Utah 84116, USA
1-801-462-5264
<http://spenglerindustries.com>
 - d. Metal Tech Global
385 Highway 74, S Suite 300

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Peachtree City, GA 30269
1-770-486-8825
marketing@metaltechglobal.com

- e. Or approved equal
- 2. Roof curbs:
 - a. Custom Solutions Roofs and Metal Products, Cedar Rapids, IA.
 - b. Or approved equal
- 3. Fascia and gravel stops:
 - a. "Type AP" (gravel stops) and "Type SP" (fascia) as manufactured by Architectural Products Company, Hebron, KY
 - b. Or approved equal

2.02 MATERIALS / EQUIPMENT

A. Copings:

- 1. All coping shall be of folded Terne Coated Stainless Steel with Aluminum framing, as noted on the Contract Drawings.
- 2. The Contractor shall calculate and design the copings, in accordance with the Contract Drawings.
- 3. All calculation shall reference site loads as indicated within the Contract Documents.
- 4. Finish on all exposed surfaces of Terne Coated Stainless Steel copings to be Tin matte (un-weathered).
- 5. Sealants for installation of copings shall be of an approved type acceptable to the manufacturers'/ fabricators' of materials herein specified.
- 6. Fastenings shall be stainless steel, sized based on calculations, or as shown in Contract Drawings.
- 7. Aluminum framing and accessories shall be calculated and sized appropriately.
- 8. All bi-metallic separators shall be as per fabricators recommendations.
- 9. Metal Materials
 - a. Aluminum components
 - 1) Alloy and temper recommended by manufacturer and meeting the requirements and standards listed herein for type of use and finish indicated in accordance with:
 - a) Sheet and Plate: ASTM B209 2) Extruded Bars, Rods, Profiles, and Tubes: ASTM B221
 - b) Extruded Structural Pipe and Tubes: ASTM B429

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- c) Structural Profiles: ASTM B308/B308M
- d) Welding Rods and Bare Electrodes: AWS A5.10 / A5.10M
- e) Castings: ASTM B26, ASTM B85, or ASTM B108 as appropriate

B. Cornices (vertical and horizontal):

1. All Cornices both horizontal and vertical shall be of folded Terne Coated Stainless Steel with Aluminum framing, as noted on the Contract Drawings.
2. The Contractor shall calculate and design the Cornices, in accordance with the Contract Drawings.
3. All calculation shall reference site loads as indicated within the Contract Documents.
4. Finish on all exposed surfaces of Terne Coated Stainless Steel Cornices to be Tin matte (un-weathered).
5. Sealants for installation of Cornices shall be of an approved type acceptable to the fabricator of materials herein specified.
6. Fastenings shall be stainless steel, sized based on calculations, or as shown in Contract Drawings.
7. Aluminum framing and accessories shall be calculated and sized appropriately by Contractor.
8. All bi-metallic separators shall be as per fabricators recommendations.

C. Roof curbs:

1. Shall be fabricated of Stainless Steel: 0.028 inch thick with continuous mitered and welded corner seams, integral base plates, factory installed pressure treated wood nailed, and insulated with 1½ inch thick rigid fiberglass insulation. Profile shall be as shown on the Contract Drawings.

D. Gutters:

1. The gutter system shall be of the same material as the roof (07 61 00 - Sheet Metal Roofing), and bent/welded to appropriate shape as per Contract Drawings.
2. Slope shall be as shown on Contract Drawings.
3. All seams shall be welded and or bolted to the roofing systems so that drainage of water shall be unobstructed.
4. Gutters shall be installed to provide for thermal movement, in accord with the SMACNA.

E. Downspouts:

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1. All Downspouts shall be manufactured of 22 ga. type 304-2B stainless steel with a #4 finish.
 2. Provide telescoping joint design for expansion.
 3. Elbows shall be welded construction, and shall match the finish and color of the downspout.
 4. Provide brackets and downspout profiles as indicated on the Contract Drawings.
- F. Scuppers, Drains, and Flashing:
1. Thru wall Scuppers, Drains, and Flashing shall be as shown in Contract Drawings.
 2. All shall be of 316 Stainless steel
 3. All joints shall be welded and or bolted/screwed, and inlet shall be installed as indicated on the Contract Drawings.
- G. Fascia and gravel stop:
1. Shall be fabricated of 22 ga. type 304-2B stainless steel 5005-H34 alloy.
 2. Fascia and gravel stops shall consist of complete assemblies, composed of hold down clips, joint covers, preformed mitered welded covers and other accessories required for a complete installation in accordance with the manufacturer's recommendation.
- H. Manufacturer's Standards: In addition to the standards listed above, the flashing products and their installation shall be in accordance with the manufacturer's published recommendations and specifications.
- 2.03 FABRICATION / ASSEMBLING / FINISHES
- A. All items as described above or within the Contract Drawings shall be unless otherwise indicated by the Contract Drawings, calculated and fabricated based on site loads.
- B. Assembly of the items above shall be per fabricators recommendations to avoided any damage during installation.
- C. Aluminum:
1. Profiles are to be sharp, straight, and free of defects or deformations.
 2. All formed or extruded shapes shall be fabricated prior to finishing.
 3. Joints shall be accurately formed without lipping or offsets in visible surfaces unless designed otherwise. Other joints shall be rigidly secured to prevent all but designed movement, unless designed otherwise.
 4. Accurately fitted joints with ends coped or mitered.
- D. Cutting:

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1. Grinding, cutting, and shaping of metals shall be carried out using tools which will not contaminate them with particles which could stain or corrode them.
2. Steel Components:
 - a. Use of arc cutting and acetylene gas cutting shall be minimized as much as feasible. If required, Contractor shall submit full welding procedures to demonstrate hardness remain within the required limits.
 - b. Mild steel cut or shaped by either flame cutting or Plasma cutting shall be to procedures agreed by the Architect. These procedures shall demonstrate that the surface hardness is less than 270 Hv 10. Random inspection of the steel shall be required to ensure that the hardness level is not exceeded. Alternatively, all cut edges shall be surface dressed to remove hardened material.
 - c. All punched holes shall be undersized by 40 mil and be reamed to the finished size.

E. FABRICATION TOLERANCES:

1. Manufacture cornice and copings so each finished unit complies with half of the tolerances specified in PCI MNL 130.
2. Metal cutting tolerances for framework shall be:
 - a. $\pm 1/16$ in on length of vertical members
 - b. $\pm 1/32$ in on length of horizontal members
 - c. $\pm 1/64$ in on the length and width of metal sheets.
 - d. $\pm 1/32$ in on length of diagonal of metal sheets and not more than $\pm 1/16$ in difference in the length between the two diagonals.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examination:

1. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, system supports, and other conditions affecting performance of the Work.
2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work. Any work needed to correct unsatisfactory conditions need to be submitted to the Engineer for approval prior to the work being done.

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3. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Preparation:

1. Dissimilar metals shall be separated from each other by painting each metal surface in contact with a coating as specified in Specification 09 91 00 – Painting.
2. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.
3. Establish straight, side and crosswise benchmarks.
4. Use proper size and length fastener for strength requirements.
5. All surfaces shall be checked for square and straightness.
6. Measure the wall lengthwise and crosswise to confirm lengths, widths, and clearances of roof specialties system components and verify clearances for thermal movement.

3.02 INSTALLATION

A. General:

1. Unless otherwise specified, all roof specialties shall be installed in accordance with the manufacturer's instructions to provide a complete watertight and weatherproof construction, free from bends and buckles and as shown on the Contract Drawings.
2. Ample provision shall be made for expansion and contraction.
3. Repair or replace all materials that have been damaged during installation.

B. Underlayment:

1. The Contractor shall coordinate all AVB and Liquid Applied Roofing applications, flashing, Insulation and all other items to be installed prior to installation of items listed in this Section.

C. Gutters and Downspouts:

1. Install gutters with a slope as per Contract Drawings.
2. Install support brackets as per Contract Drawings.
3. Do not install brackets directly behind downspouts.
4. Provide sealants and fasteners as recommended by the SMACNA for joining gutter sections.
5. Install inside brackets at 30 inches o.c. alternating with support brackets.
6. Do not fasten gutter in a manner that would restrain thermal movement of the product.
7. Provide expansion joints as recommended.

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8. Install end caps at all end terminations, fasten and seal.
9. Provide stainless steel outlets.
10. Fasteners shall be compatible to the materials being fastened.

D. Copings and Cornices:

1. Install copings true and straight.
2. Fasten as recommended by manufacturer and per Contract Drawings.
3. Seal and flash in accordance to primary roofing manufacturer's recommendations and as per Contract Drawings.
4. Install in manufacturers standard lengths with anchor plates and concealed joint cover at each joint.
5. All screws shall be of stainless steel.
6. Mitered and welded corners shall be used for all changes in direction.

E. Roof Curbs:

1. Center curbs over openings.
2. Anchor as shown in Contract Drawings

F. Leave units ready to receive flashing as shown in Contract Drawings.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect roof specialties system installation, including accessories. Report results in writing.
- B. Remove and replace applications of roof specialties system where inspections indicate that they do not comply with specified requirements.
- C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Check levels and adjust as necessary after roofing and flashing is complete.
- B. Protect materials from damage by other trades. Remove protective coatings at completion of project as directed by the Engineer.

END OF SECTION

SECTION 07 72 46 – ROOF WALKWAYS
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PART 1 GENERAL

1.01 SUMMARY

- A. Work of this Section describes the requirements for Rooftop Walkway System consisting of Non-Slip, Interlocking grating planks with support plates and attachment clamps to mount to a Standing Seam Panel. Guard rail and metal stairs system components shall conform to the requirements specified herein and in the Contract, and shall be located and configured as shown on the Contract Drawings. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install all threaded pipe railing.

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Specification 07 41 13 - Metal Roof Panels

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1.04 REFERENCES

- A. NYSBC - New York State Building Code
- B. NAAMM - National Association of Architectural Metal Manufactures
- C. ASTM A653 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes, Standard Specification for
- D. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, Standard Test Method for
- E. ASTM A792 - Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process, Standard Test Method for
- F. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate, Standard Specification for
- G. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, Standard Test Method for

1.05 DESCRIPTION

- A. Modular walkway system to provide anti-slip, level surface for demarcated route on roof, uniformly distributes pedestrian load; designed for standing seam roofs. Walkway system to include guardrails on both sides in compliance with OSHA 1920.29. Provide components including but not limited to clips, brackets, walkway modules, railings, and accessories with appropriate fasteners as indicated or required to match design indicated on plans and to provide complete installation.
- B. Grating Requirements:
 - 1. All design site loads shall be as per Contract Drawings.
 - 2. The maximum allowable deflection due to dead load plus live load shall not exceed the span divided by 240, but not more than 1/4 inch.
 - 3. Gratings shall be designed in accordance with the design criteria specified herein, and the NAAMM specifications, unless otherwise noted on the Contract Drawings or as required by the NYSBC.
 - 4. Toe guards or plates shall be provided and placed at the following locations:
 - a. At open sides of grating platforms.
 - b. At grating platform locations coinciding with guard rail locations.
 - 5. Toe guards or plates shall comply with OSHA 1910.29(k)(1).
 - 6. Nosing plates shall be provided at the end of all stair grating treads.
- C. Railing Requirements at roof access platform:

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1. Rails and mid-bars shall comply with current OSHA Standards.
 2. Handrail, wall rail and guardrail assemblies and attachments shall withstand a minimum:
 - a. NYSBC 1607.8.1: Linear load of 50 pounds per linear foot.
 - b. NYSBC 1607.8.1.1: Concentrated load of 200 pounds applied in any direction on the top rail.
 3. Infill area of guardrail system capable of withstanding a horizontal concentrated load of 200 pounds applied to one square foot at any point in the system. Load not to act concurrently with loads on top rail of system in determining stress on guardrail.
- D. Where dissimilar metals are in contact between the grating and structural supports as shown on the Contract Drawing, manufacturer shall protect against galvanic corrosion by providing isolation materials between each other.

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings for approval of the Engineer. Submittals shall include, but not be limited, to the following:
- B. Samples:
1. Full size sample, 2 foot - 0 inches long, of assembled pipe railing system at post and rail intersections with all associated components including typical threaded, bolted and cast connections, with mounted toe-boards and sleeve, and handrail complete with mounting brackets all with specified galvanized.
 2. Samples of grating and fastening devices shall be submitted for approval by the Engineer
 3. Samples will be reviewed by Engineer for color, finish, joinery appearance and workmanship only. Compliance with all other requirements is the responsibility of Contractor.
- C. Shop Drawings:
1. Drawings for the fabrication and erection of walkway system including the handrails and guardrails. It shall show plans, elevations, sections, details of components with sizes of members, components and anchorage devices based on specified requirements. Indicate that Shop Drawings have been reviewed by the NYS Professional Engineer preparing, signing and stamping its seal on design calculations and engineering analyses, verifying that the manufacturer's proposed fabrication, installation methods and details adequately translate the results of the design calculations and engineering analyses into the work, before submitting Shop Drawings to Engineer for review.

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2. Include copies of manufacturer's specifications, standard and custom detail drawings and installation instructions and manufacturer's catalog showing complete selection of standard and custom components, auxiliary system components and miscellaneous accessories for selection by Engineer.
3. Profiles of handrails and guardrails system components, and the details of forming, jointing, sections, connection, internal supports, gates, trim, auxiliary system components and accessories. Show details drawn at 1-1/2 inch scale.
4. Calculations for the complete design and engineering analysis of the walkway system, auxiliary system components and anchorages, including calculations showing compliance with performance criteria specified, prepared, signed and stamped with the seal of a registered professional engineer licensed to practice in the State of New York and recognized as an expert in the required work. Maintenance Manuals (O&M Manuals): Upon completion of the installation of the walkway system submit the following:
 - a. Product name and manufacturer.
 - b. Name, address and telephone number of manufacturer and local distributor.
 - c. Detailed procedures for routine maintenance and cleaning, including recommended cleaning materials, application methods and precautions as to use of materials that may be detrimental to finish when improperly applied.

D. Certification: Submit for approval the following:

1. Furnish certification that laboratory loading tests have been performed on the handrail, railing and anchorage systems verifying compliance with performance criteria specified, and that it conforms to all applicable CFR, ANSI and ASTM requirements for loads and deflections and that the data derived from such tests has been used by the registered professional engineer in the design calculations and engineering analyses of the threaded pipe railing and auxiliary system components.
2. Registered professional engineer who prepares, signs and stamps its seal shall provide a written statement confirming responsibility for the design and attesting that the design prepared meets the performance criteria required by the Contract Documents, the requirements of governing authorities having jurisdiction, and conforms to prevailing standards of practice

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver walkway system and all accessories dry and undamaged, with manufacturer's protective finish intact, bearing original, intact factory labels.

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2. Walkway system items that are damaged during delivery or while being unloaded, shall not be stored on Site. Remove such items from Site and replace with new, undamaged material.

B. Storage of Materials:

1. Store walkway system and accessory materials in a dry location and in a manner that will protect finish from exposure to sun and condensation; with good air circulation around each piece and with protection from windblown rain.
2. Store walkway system and accessory materials under tarpaulin covers and in an area protected from dirt, damage, weather and from the construction activities of all Contractors. Do not store outside or allow items to become wet or soiled in any way while on Site.
3. Do not store in contact with concrete, earth or other materials that might cause corrosion, staining, scratching or damage to finish. Do not install system components that become dented, scratched or damaged in any way. Remove such components from Site and replace with new, undamaged material.

C. Handling of Materials:

1. Do not subject walkway system and accessory materials to bending or stress.
2. Do not damage edges or handle material in a manner that will cause scratches, warps or dents.
3. Keep on-site handling to a minimum.
4. Maintain protective covering on walkway system components. System components that are damaged during installation shall be removed from Site and replaced with new, undamaged material.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used**

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the manufacturer and provide to the City the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.**

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Railing:

1. All handrails shall be fabricated using CMT-20 cold rolled high strength steel tubing with a three step exterior coating process consisting of Hot-

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Dipped Uniform Zinc Galvanizing, a Conversion coating and a clear Polymer topcoat. Interiors walls to have corrosion resistant coating.

2. Dimensions - Normal Pipe Size 1.9" O.D. 1 1/2" NPS., 13 gauge (.083 min.)

B. Pipe Fitting:

1. Fittings shall be high tensile Aluminum Magnesium Alloy.

C. Walkway Grating Sections:

1. Grating shall be anti-skid design 12" wide by 2-1/2" high and 10' long. Flange options include male/male or female/male to enable interlocking assemblies of 24" widths increasing in 12" increments. Standard is mill finish G90 galvanized steel in 14 Gauge thickness.

2. Manufactures:

- a. Design Components Inc./METALWALK

115 Walter Way Fayetteville, GA 30214

Phone: (800) 868-9910

Fax: (770) 460-7872 www.rooftopwalkway.com

- b. Metals, Inc.

185 Oakleaf Oval

Oakwood Village, OH 44146

Phone) 800-492-7304 or 440-439-4799

Fax) 440-439-0577

- c. Or approved equal

D. Components and Accessories:

1. Support Plates - 14 gauge Galvanized Steel, pre-punched to accept Square Base Flange for Vertical Post.
2. Splice Channels, Ledger Angles - 18 & 14 gauge Galvanized Steel.
3. Clips, Clamps, Bolts, Nuts and Washers will be Stainless Steel, compatible non-corrosive material or Electro-Plated and size as specified.
4. S-5™ Clamps 6061-T6 Aluminum with Stainless Steel Set Screws, Bolt and Washer.

2.02 MATERIALS / EQUIPMENT

- A. Not Used

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Railing is continuously roll-formed to tubular shape, then welded along its length to form virtually seamless tubing with swaged ends.
- B. Roll form grating in continuous lengths.

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- C. Fabricated supports, splice channels and ledger angles by press brake and punch press.
 - D. Special clips die formed or Cast Aluminum.
 - E. S-5 Clamps 6061-T6 Aluminum with stainless steel set screws, bolt and washer. Non-penetrating attachment on any Standing Seam Metal Roof Systems.
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Verify that metal roof walkway installation will not disrupt other trades. Verify that the substrate is dry, clean, and free of foreign matter.
- B. Verify that panel seaming is complete and panel attachment is sufficient to withstand loads transferred from clamps.
- C. Verify that panel rib spacing and height match what was in the approved shop drawings.
- D. Verify that installation will not impede drainage.
- E. Report and correct defects prior to any installation.

3.02 INSTALLATION

- A. Prior to grating installation, Contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Any inconsistencies between Contract Drawings and supporting structure deemed detrimental to grating placement shall be reported to the Engineer prior to placement.
- B. Install grating sections in accordance with manufacturer's recommendations and shop drawings.
- C. Position grating sections flat and square with ends bearing minimum 2" on supporting structure.
- D. The clearance at the ends or between sections of gratings shall be a maximum of 1/4 inch.
- E. Allow clearance at perpendicular intersection of a maximum 3/8" at the end.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

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3.05 ADJUSTING / PROTECTION / CLEANUP

A. Adjusting:

1. Adjust railings prior to securing in place, to ensure proper matching at butting joints and correct alignment throughout their length. Plumb posts in each direction.

B. Protection:

1. Protect installed products until completion of project.

END OF SECTION

SECTION 07 90 00 – JOINT PROTECTION
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the general requirements for weatherproof and fire protections, caulking and sealant systems for, but are not limited to: openings and joints in building roofs; floors; and walls between concrete-in-place; masonry units; precast concrete; metal roof flashing; and other equipment and structures in order to provide a positive barrier against the passage of air and moisture.
- B. Complete technical services from the approved caulking and sealant manufacturers and on-site technical representation by their Technical Representatives during the time of delivery, storage and installation of the work of this Section and during other work which may affect the work of this Section as specified herein is also included.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Not Used.

1.04 REFERENCES

- A. NYS BC -- New York State Building Code - 2020
- B. ASTM C510 -- Staining and Color Change of Single or Multi component Joint Sealers, Standard Test Method for
- C. ASTM C661 -- Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer, Standard Test Method for
- D. ASTM C793 -- Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants, Standard Test Method for
- E. ASTM C794 -- Adhesion-in-Peel of Elastomeric Joints Sealants, Standard Test Method for
- F. ASTM C920 -- Elastomeric Joint Sealants, Standard Specification for
- G. ASTM C1247 – Durability of Sealants Exposed To Continuous Immersion In Liquids, Standard Test Method for

1.05 DESCRIPTION

- A. System Design Requirements
 - 1. The caulking and sealant systems to be furnished under the work of this Section shall include two-part elastomeric sealants, components, accessories, and miscellaneous materials used for sealing joints in horizontal and vertical planes.
 - 2. The Work shall include but is not limited to:
 - a. All joints between cast-in-place or precast concrete and masonry;
 - b. All precast concrete to precast concrete expansion joints;
 - c. All joints between masonry and metal;
 - d. All control joints in masonry and concrete;
 - e. All isolation joints between equipment and other items; and
 - f. Joints where construction systems are discontinuous or inherently non-watertight.
 - 3. The Work shall be performed at all locations whether or not indicated required to render the building watertight except where a construction system is specifically specified or shown as not relying upon the use of sealants in order to achieve weather- and water tightness.
 - 4. Weather Proofing:
 - a. Where called out on the Contract Drawings, the Contractor shall apply a continuous weather tight sealant around all joints/opening.

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5. Fire Rating:
 - a. Where caulking and sealant systems are applied within a fire rated room, corridor, egress path, and as indicated in the Contract Drawings, those caulking and sealant systems shall maintain the fire rating of the location in which application is being done.
 - b. The contractor shall apply a 2 hour fire rated sealant where called out on the Contract Drawings to maintain an 2 hour fire rated room and wall system, as per NYS BC 2020.

B. Substitutions

1. Do not change products, system components, colors or manufacturers after Shop Drawing and Samples approvals by Engineer.
2. Clearly identify, in a manner which is highlighted to Engineer, all proposed substitutions, modifications, variations, unspecified features and "or equal" products. Provide complete comparative data with specified products at time of Shop Drawing submission.

C. Sustainable Design Requirements

1. Low Emitting Materials: Sealants and sealant primers used on site and within the building's weatherproofing system shall comply with the following limits for VOC content:
 - a. Architectural Sealants: 250 g/L.
 - b. Sealant Primers for Nonporous Substrates: 250 g/L.
 - c. Sealant Primers for Porous Substrates: 775 g/L.

1.06 QUALITY ASSURANCE

1. Engage a single manufacturer who shall provide the services of a Technical Representative who shall assist Contractor and Engineer by providing technical opinions on the adequacy of materials and methods of installation based on Shop Drawings approved by Engineer.
 - a. Provide such services during the time of delivery, storage, handling and installation of all caulking and sealant system components.
 2. Test caulking and sealants for compatibility with the substrates specified for conformance to current industry standards, and recommend remedial procedures as required.
- B. Installer Qualifications:** Engage a single installer skilled, trained and with successful experience in the application of the types of material required and who agrees to employ only tradesmen with specific skill and successful experience in this type of work.
- C. Performance Criteria:** Do not provide exposed caulking and sealant work for metal batten roofing, sheet metal flashing and trim or custom preformed metal siding work in order to render the work watertight. These construction systems shall be detailed, fabricated and provided such that they are inherently watertight without

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the use of additional caulking, sealant, elastomeric compounds, asphaltic compounds or other similar materials.

- D. Compatibility: Before purchase of each specified sealant, investigate its compatibility with the joint surfaces, joint fillers and other materials in the joint system. Provide only materials (manufacturer's recommended variation of the specified materials) which are known to be fully compatible with the actual installation condition, as shown by manufacturer's published data or certification.

1.07 SUBMITTALS

- A. The Contractor shall submit the following to the Engineer for review and approval.

1. Samples:

- a. Actual cured material samples of each type of caulking and sealant specified, 4-inches long, in each of the manufacturer's standard colors.
- b. Samples will be reviewed by Engineer for color and texture only.
- c. Compliance with other requirements is the responsibility of Contractor.

B. Shop Drawings:

1. Copies of manufacturer's specifications, recommendations and installation instructions for each type of sealant, caulking compound and associated miscellaneous material required. Include manufacturer's published data, indicating that each material complies with the requirements and is intended for the applications shown.
2. Test Reports:
 - a. Compatibility tests for substrates, based on adhesion-in-peel standard test procedures and ASTM C920.
 - b. Copies of certified laboratory test reports indicating conformance with the requirements specified.
3. Guarantee:
 - a. Copies of written guarantee agreeing to repair or replace sealants which fail to perform as specified.
4. Sustainable Design Submittals:
 - a. Environmental Materials Reporting Form (EMRF) Recycled Content. Provide the following information:
 - 1) Name of Product and Manufacturer.
 - 2) Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).

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- 3) The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.
 5. VOC Reporting Form.
 - a. For all sealants and sealant primers used on site and within the building's weatherproofing system, provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Delivery of Materials:
1. Deliver materials in caulking and sealant manufacturer's original unopened and undamaged containers, with information accurately representing container contents as approved by Engineer at time of Shop Drawing and Samples submissions.
 2. Include the following information on the label:
 - a. Name of material and supplier.
 - b. Formula or specification number, lot number, color and date of manufactures.
 - c. Mixing instructions, shelf life and curing time when applicable.
 3. Failure to comply with these requirements shall be sufficient cause for rejection of the material in question, by Engineer, and his requiring its removal from the site. Supply new material conforming to the specified requirements at no additional expense to the City.
- B. Storage of Materials:
1. Store materials so as to preclude foreign materials.
 2. Do not store or expose materials to temperature above 90 F or store in direct sunshine.
 3. Do not use materials which are outdated as indicated by shelf life.
 4. Store sealant tape in a manner which will not deform the tape.
 5. In cool or cold weather store containers where temperature approximates 75°F for 16 hours before using.
 6. When high temperatures prevail store mixed sealants in a cool place.
- C. Handling:
1. Handle materials carefully to prevent inclusion of foreign materials.
 2. Do not open containers or mix components until necessary preparatory work and priming has been completed.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used

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1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the manufacturer and provide to the City the manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Exterior and Interior Joints in Vertical Planes: Provide one of the following:
1. Dymeric 240FC as manufactured by Tremco Incorporated, an RPM Company, Beachwood, OH.
 2. Sikaflex-2C NS as manufactured by Sika Corporation, Lindhurst, NJ.
 3. Or approved equal.
- B. Exterior and Interior Joints in Horizontal Planes: Provide one of the following:
1. THC 900/ 901 as manufactured by Tremco Incorporated, an RPM Company, Beachwood, OH.
 2. Sikaflex-2C SL as manufactured by Sika Corporation, Lindhurst, NJ.
 3. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Exterior and Interior Joints in Vertical Planes:
1. Urethane-based, two-component elastomeric sealant complying with the following:
 - a. ASTM C 920 Adhesion-in-Peel, ASTM C 920 and ASTM C794: Minimum 10 lbs/linear inch with no adhesion failure.
 - b. Hardness (Standard Conditions), ASTM C661: 20-25 (Shore A).
 - c. Stain and color change, ASTM C 920 and ASTM C510: No discoloration or stain.
 - d. Accelerated Aging, ASTM C793: No change in sealant characteristics after 250 hours in weather meter.
 - e. Rheological Vertical Displacement at 120 F, ASTM C 920: No sag.
- B. Exterior and Interior Joints in Horizontal Planes:
1. Polyurethane-based, two-component elastomeric sealant complying with the following:
 - a. ASTM C 920 Water Immersion Bond, ASTM C1247: Elongation of 25% with no adhesive failure.
 - b. Hardness (Standard Conditions), ASTM C661: 30-40.

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- c. Stain and Color Change, ASTM C1247 and ASTM C510: No discoloration or stain.
 - d. Accelerated Aging, ASTM C793: No change in sealant characteristics after 250 hours in weather meter.
 - C. Provide colors selected by Engineer from caulking and sealant manufacturer's standard color charts. Engineer will select a maximum of ten colors for the Work. Manufacturers supplying sealants other than those specified above must provide the same colors available from those specified.
 - D. Miscellaneous Materials:
 - 1. Joint Cleaner: Provide the type of joint cleaning compound recommended by the sealant and caulking manufacturer, for the joint surfaces to be cleaned.
 - 2. Joint Primer and Sealer: Provide the type of joint primer and sealer recommended by the caulking and sealant manufacturer, for the joint surfaces to be primed or sealed.
 - 3. Bond Breaker Type: Polyethylene tape or other plastic tape as recommended by the caulking and sealant manufacturer, to be applied to sealant-contact surfaces where bond to the substrate or joint filler must be avoided for proper performance of caulking and sealant. Provide self-adhesive tape wherever applicable.
 - 4. Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non absorptive material as recommended for compatibility with caulking and sealant by the caulking and sealant manufacturer. Provide size and shape of rod which will control the joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.
 - 5. Low Temperature Catalyst: Provide the type recommended by the caulking and sealant manufacturer.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Mixing

- 1. Comply with sealant manufacturer's written instructions for mixing 2-component sealants.
- 2. Thoroughly mix components before use.
- 3. Add entire contents of activator can to base containers. Do not mix partial units.
- 4. Mix contents for a minimum of 5 minutes or as recommended by the sealant manufacturer, until color and consistency are uniform.

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2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examination

1. The Contractor shall examine the joint surfaces, substrates, backing, and anchorage of units forming sealant rabbet, and the conditions under which the caulking and sealant work is to be performed, and notify Engineer in writing of any condition detrimental to the proper and timely completion of the Work and the performance of the sealant systems. Do not proceed with the caulking and sealant work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.

B. Joint Surface Preparation

1. Clean joint surfaces immediately before installation of sealant compound. Remove dirt, insecure coatings, moisture and other substances which would interfere with bonds of sealant compound as recommended by sealant manufacturer's written instructions.
2. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless sealant manufacturer's written instructions indicate that alkalinity does not interfere with sealant bond and performance.
 - a. Etch with 5 percent solution of muriatic acid.
 - b. Neutralize with dilute ammonia solution.
 - c. Rinse thoroughly with water and allow to dry before sealant installation.
3. If necessary, clean porous materials such as concrete and masonry by grinding, abrasive blasting or mechanical abrading. Blow out joints with oil-free compressed air, or by vacuuming joints prior to application of primer or sealant.
4. Roughen joint surfaces on vitreous coated and similar non-porous materials, wherever sealant manufacturer's data indicates lower bond strength than for porous surfaces. Rub with fine abrasive cloth or wool to produce a dull sheen.

3.02 INSTALLATION

- A. Comply with sealant manufacturer's written instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise.

SECTION 07 90 00 – JOINT PROTECTION
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- B. Prime or seal the joint surfaces wherever recommended by the sealant manufacturer. Do not allow prime or sealer to spill or migrate onto adjoining surfaces. Allow primer to dry prior to application of sealants.
- C. Apply masking tape before installation of primer, in continuous strips in alignment with the joint edge to produce sharp, clean interface with adjoining materials. Remove tape immediately after joints have been sealed and tooled as directed.
- D. Do not install sealants without backer rods or bond breaker tape.
- E. Roll the back-up rod stock into the joint to avoid lengthwise stretching. Do not twist, braid, puncture or prime backer-rods.
- F. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of the joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- G. Install sealants to depths as recommended by the sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead.
 - 1. For horizontal joints in sidewalks, pavements and similar locations sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75 percent of joint width, but not more than 5/8-inch deep or less than 3/8-inch deep.
 - 2. For vertical joints subjected to normal movement and sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50 percent of joint width, but not more than 1/2-inch deep or less than 1/4-inch deep.
- A. Project Conditions / Environmental Conditions:
 - 1. Do not proceed with installation of caulking and sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.
 - 2. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength.
 - 3. Wherever joint width is affected by ambient temperature variations, install elastomeric sealants only when temperatures are in the lower third of manufacturer's recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures.
 - 4. When high temperatures prevail avoid mixing sealants in direct sunlight.
- B. Remove excess and spillage of compounds promptly as the Work progresses.

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- C. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Where questions of compatibility of sealants and substrate arise the sealant manufacturer shall test the substrate in question for compatibility with the specified sealant and report his findings, with recommendations, to Engineer. Any required sealant change shall be at no additional expense to the City.
- B. Do not proceed with installation of elastomeric sealants over joint surfaces which have been painted, lacquered, waterproofed or treated with water repellent or other treatment or coating unless a laboratory test for durability (adhesion), in compliance with Paragraph 4.3.9 of ASTM C 920 has successfully demonstrated that sealant bond is not impaired by the coating or treatment. If laboratory test has not been performed, or shows bond interference, remove coating or treatment from joint surfaces before installing sealant.
- C. After nominal cure of exterior joint sealants which are exposed to the weather, test for water leaks. Flood the joint exposure with water directed from a 3/4-inch garden hose, without nozzle, held perpendicular to wall face, 2 feet-0 inch from joint and connected to a water system with 30 pounds per square inch minimum normal water pressure. Move stream of water along joint at an approximate rate of 20 feet per minute.
- D. Test approximately 5 percent of total joint system, in locations which are typical of every joint condition, and which can be inspected easily for leakage on opposite face. Conduct test in the presence of Engineer, who will determine the actual percentage of joints to be tested and the actual period of exposure to water from the hose, based upon the extent of observed leakage, or lack thereof.
- E. Where nature of observed leakage indicates the possibility of inadequate joint bond strength, Engineer may direct that additional testing be performed at a time when joints have been fully cured, followed by natural exposure through both extreme temperatures and returned to the lowest range of temperature in which it is feasible to conduct testing. Perform testing as directed at any time within 24 months of installation date.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Protection: Do not allow caulking and sealants to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces including rough textured materials. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces, by either the primer/sealer or the caulking and sealant materials.
- B. Repair sealant installation at leaks or, if leakage is excessive, replace sealant installation as directed.

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- C. Clean adjacent surfaces of sealant or soiling resulting from the Work. Use solvent or cleaning agent recommended by the sealant manufacturer. Leave all finish work in a neat clean condition.
- D. Protect the sealants during the construction period so that they will be without deterioration, soiling, or damage at the time of the City's Final Acceptance.

END OF SECTION

SECTION 07 90 00 – JOINT PROTECTION
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NO TEXT ON THIS PAGE

SECTION 08 11 19 – STAINLESS STEEL DOORS AND FRAMES
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish and install all doors, frames, transoms, sidelights, and associated equipment shown on the Contract Drawings and specified herein.
- B. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

SECTION 08 11 19 – STAINLESS STEEL DOORS AND FRAMES
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1.03 RELATED SECTIONS

- A. Section 07 90 00 - Joint Protection
- B. Section 08 71 01 - Finish Door Hardware
- C. Section 08 81 03 - Glass, Plastic and Glazing
- D. Section 26 05 91 - Low-Voltage Electric Motors

1.04 REFERENCES

- A. NYSBC - New York State Building Code
- B. HMMA-866 - Hollow Metal Manufacturer's Association, Guide Specifications for Stainless Steel Hollow Metal Doors and Frames
- C. ANSI/SDI A250.8 - Steel Door Institute, Recommended Specification for Standard Steel Doors and Frames.
- D. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- E. NFPA 80 - National Fire Protection Association, Standard For Fire Doors and Other Opening Protectives
- F. NFPA 105 - National Fire Protection Association, Standard For the Installation of Smoke Door Assemblies and Other Opening Protectives
- G. NFPA 252 - National Fire Protection Association, Standard Methods of Fire Tests of Door Assemblies
- H. UL 10B - Underwriters Laboratories, Fire Tests of Door Assemblies
- I. UL 10C - Underwriters Laboratories, Positive Pressure Fire Tests of Door Assemblies

1.05 DESCRIPTION

- A. The Contractor shall be responsible for coordinating all work in this Section with work covered under Section 08 71 01 - Finish Door Hardware.
- B. Sustainable Design Requirements

SECTION 08 11 19 – STAINLESS STEEL DOORS AND FRAMES
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1. Recycled Content of Stainless Steel Doors and Frames: Postconsumer recycled content plus one-half of pre-consumer recycled content shall not be less than 30 percent.
2. Low Emitting Materials: Paints, coatings, sealants, and adhesives used on site and within the building's weatherproofing system shall meet the VOC content limits listed below.

1.06 QUALITY ASSURANCE

- A. Provide stainless steel doors and frames and accessories manufactured by a single firm specializing in the production of this type of Work and complying with specified standards of ANSI, NFPA, SDI and UL.
- B. Materials and Equipment Compliance:
 1. Materials and equipment submitted for DEP's approval by the Contractor shall have met, at the time of their submittal, the certification and material acceptance requirements of the NYC Department of Buildings, unless otherwise required by the Authority Having Jurisdiction over the Work.
 2. All materials provided under this Section shall comply with the Contract Documents.
 3. Comply with all applicable requirements of governing authorities and codes for all work.
- C. Fire rated Assemblies: Wherever fire-resistance classification is shown or scheduled for stainless steel doors and frames (2-hour, 1-1/2-hour, and similar designations), provide fire-rated assemblies investigated and tested as complete assemblies including type of fire door hardware to be used. Identify each fire door, frame and stick system assembly with recognized testing laboratory labels, indicating applicable fire rating of both door, frame and stick assembly.

1.07 SUBMITTALS

- A. Contractor shall submit Shop Drawings for approval by the Engineer. Submittals shall include, but not be limited to the following:
 1. Samples.
 2. Shop Drawings.
- B. Each submittal shall be complete in all respects, incorporating all information and data listed herein and all additional information required for evaluation of the proposed materials compliance with the Contract Documents.
- C. Samples shall include:
 1. Corner sections of frames and trim with specified finishes.
 2. Cut-away corner sections of hollow metal doors showing internal reinforcement specified.

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3. Insulating material.

D. Shop Drawings shall include, but not be limited to:

1. Complete layout and installation drawings and schedules with clearly marked dimensions. Drawings shall indicate details of construction, profiles, gauges, reinforcing and location of all doors and frames.

E. Sustainable Design Submittals:

1. Environmental Materials Reporting Form (EMRF) Recycled Content. Provide the following information:

a. Name of Product and Manufacturer.

b. Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).

c. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.

2. VOC Reporting Form. Provide the following information:

a. For all paints, coatings, sealants and adhesives used on site and within the building's weatherproofing system provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Materials shall not be delivered to the project site before the time of installation.

2. Materials shall be delivered in sufficient quantities to allow continuity of the work.

B. Storage of Materials:

1. Materials shall be stored in original, undamaged packaging with manufacturer's labels and seals intact.

2. All materials shall be stored in a dry, enclosed area, off the ground and away from all possible contact with water, ice or snow.

3. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the site before being incorporated into construction systems.

4. Protection shall be arranged to protect all hardware which may be attached.

C. Handling of Materials:

1. Materials shall be handled carefully in order to avoid damage or breakage.

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2. Materials shall not be exposed to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the site and shall not be incorporated into the work.
3. Packages shall not be opened until all necessary preparatory work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

Product shall be as manufactured by:

- A. Electric Power Door, Hibbing, MN;
- B. Crown Industrial, South San Francisco, CA
- C. PS Industries Incorporated, Grand Forks, ND
- D. Door Component Inc., North Plainfield, NJ;
- E. Medallion Entry Systems, Inc., Indianapolis, IN;
- F. Or an approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Stainless Steel Doors
 1. Sliding Doors, refer to Section 08 34 10 - Sliding Industrial Doors.
 2. Doors shall be of the finest commercial quality No. 16 gauge Type 316 stainless steel, 1-3/4-inch thick, of sizes shown. Doors shall be 120 minute fire rated Seamless Honeycomb Core doors as manufactured by Door Component Inc or approved equal.
 3. Door louvers in fireproof doors shall be Model L as per Medallion Entry Systems, Inc., or approved equal.
 4. Finish of all doors and frames shall be #4 finish.
 5. All doors shall be provided with stainless steel tags, 1/2-inch diameter x 1/16-inch thick, stamped with the door number and black Japan-filled; numbers shall conform to those in the Door Schedule.

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6. Doors shall have a one-piece Kraft honeycomb core securely bonded under heat and pressure to both face sheets. Honeycomb core shall have a 1" hexagonal cell impregnated with phenolic resin. There shall be no seams on the faces or edges of the doors. Vertical edges shall be continuously heliarc welded, full height of the door. Exterior doors shall be capped to prevent moisture penetrating the door.
7. Double doors shall have applied stainless steel astragals, 1/8-inch x 1- 1/2-inch.
8. Heads and jambs of frames shall be matched, mitered, welded and finished to present a smooth surface for finishing. The doors shall be fastened to structure as shown on the Contract documents and manufacturers' requirements. Prepare frames for all hardware at factory from templates furnished. All hardware cutouts shall be reinforced with 1/8-inch plate welded to frame; 3/16-inch plate shall be used for hinge reinforcements.
9. Jambs shall be constructed to be set on the finished floor. Rubber mates shall be shipped attached to lock jambs on single doors and on head members for double doors.
10. Glass for all doors shall be secured with moldings of No. 20 gauge stainless steel fastened with stainless steel counter-sunk oval head machine screws. The moldings shall be assembled as frames with corners welded.
11. All exterior doors shall be fully weather-stripped, as called for under Section 08 71 01 - Finish Door Hardware.
12. Proper concealed reinforcements of sheet or bar steel shall be provided for hardware and for all attached work. Reinforcement for butt side of doors shall be a continuous 3/16-inch stainless steel plate. Lock reinforcement shall be No. 12 gauge stainless steel sheet. Reinforcement for door closures, holders, checks and brackets shall be No. 12 gauge plate of length as required for finish hardware.
13. Reinforce tops and bottoms of door with minimum No. 16 gauge horizontal stainless steel closing channels, as integral part of door construction, welded continuously to the outer sheets. Close top and bottom edges to provide weather seal, using 16-gauge flush-mounted inverted closure channels continuously adhered to face sheets with structural silicone adhesive.
14. Edge profiles shall be provided on both stiles of doors beveled 1/8 inch in 2 inches.

B. Stainless Steel Frames

1. Materials shall be free from defects impairing strength, durability, and/or pressed as required for their respective function. Molded work shall have sharply defined profiles and arises, be clean and sharp. Work shall be of

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proper dimensions to receive work of others. The indicated and specified thicknesses of the metal are minimum.

2. Gauges for steel used in the work shall be as follows:

STEEL WORK		U.S. GAUGE
1	Combination Metal Frames and Trim:	
	a. Exterior Combination Frames & Trim	No. 12
	b. Interior Combination Frames & Trim	No. 16
	c. Interior Combination Frames & Trim for Fire Rated Frames	No. 14
	d. Exterior Scribe Molding	No. 14
	e. Interior Scribe Molding	No. 18
	f. Exterior and Interior Angle Floor Knees, Adjustable Anchors, Slides and Adjustable Anchors	No. 16
	g. Fillers	As Required
2	Hardware Reinforcement:	
	a. Butts, Checks, Overhead Door Holders, Bracking Pulls	3/16" thick
	b. Locking Latches	No. 12
3	Trim	No. 16

C. **Stainless Steel Combination Frames and Trim**

1. Stainless steel combination frames and trim shall be placed at door openings, as shown on the Contract Drawings.
2. Stainless steel combination frames and trim shall be of size and approximate design shown on the Contract Drawings, have integrally molded trim and loose molds according to contours of details, reinforced, and drilled tapped for hardware. The type, as detailed, covers the general run of frames for the work but the forming shall be varied from that shown where indicted by special details or necessitated by other conditions.
3. Miter corners accurately, heliarc weld, and dress exposed joints to render same inconspicuous. Spreaders shall be of an approved type.
4. Frames shall extend to rough concrete slab, bottoms provided with suitable angle clips for securing to jambs. Heads of frames for openings wider than

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3 feet shall be reinforced with angles or channels formed of No. 10 gauge stainless steel spot welded. Where waterproofing occurs, frames shall extend 1 inch below finished floor. Where required to receive labeled ratings, frames shall be fabricated of gauges required and shall be provided with the necessary labels.

- a. Provide stainless steel labels permanently attached to section of frame concealed by closed door.
5. Slots shall be provided at upper sections of vertical members for securing temporary wood blocking to which shall be nailed the braces for holding jambs in place while building walls. All doors frames shall be provided with rubber door silencers, not less than two (2) per jamb.
6. Rubber door silencers shall be shipped attached to lock jamb on single doors and on head members for double doors.
7. Provide holes as approved for fastening wood blocking and trim where such are required by the Drawings.
8. Finish for stainless steel frames shall be No. 4 Finish.

D. Anchors for Stainless Steel Frames

1. Door frames in concrete openings shall be anchored with 4 hex head stainless steel expansion bolts for each jamb and two hex head stainless steel expansion bolts for each head; where steel lintels occur, fasten as per contract drawings and manufacturer's requirements. Removable stops shall be installed to cover the bolt heads, the stops to be fastened with counter sunk oval head screws.
2. Door frames in brick or hollow tile openings shall have adjustable anchors spaced 12 inches from the top and bottom of rough bucks and intermediate anchors shall be spaced not more than 30 inches apart on each side. Anchors shall slide on a No. 14 ga. 6-inch long steel strap securely welded to rough bucks. The leg extending into the wall shall be crimped No. 14 ga. steel at least 8 inches long where possible and 3 inches wide, except that the width shall not exceed the thickness of the masonry, nor shall the edge of the anchor come closer than 1/2 inch to the finished face of a wall.
3. Door frames in gypsum wall board partition walls shall be provided with welded-in steel anchors, which shall be screw-adjusted after the frame is installed, positioning the jambs solidly against wall structure.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. FABRICATION AND WORKMANSHIP

1. All metal work shall be accurately fabricated and neatly assembled so as to be free from dents, tool marks, warpage, buckle or open joints. All lines shall be straight and true to curvatures as required, arises and angles as sharp

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as practical, moldings true to profile, miters formed in true alignment and abutting profiles shall intersect accurately.

2. Molded members and moldings shall be as shown on the Contract Drawings, unless otherwise approved. Stock molding shall be as shown on the Contract Drawings unless otherwise approved. Stock moldings which closely approximate the contours shown on the Contract Drawings will be accepted.
3. All items of template hardware, drilling and tapping shall be located by templates so that accurate alignment will be secured. Templates should be located before manufacturing is commenced.
4. All members shall be accurately fastened together so as to provide rigid construction in the assembled work. Removable members shall be secured with countersunk head tamperproof machine screws not more than 12 inches apart. All connections, except those of removable members shall be welded or interlocked.
5. All exposed face joints between members shall be continuously welded and dressed smooth and flush to be practically invisible.
6. Sinkages, cutouts and concealed reinforcement shall be provided as required for the proper installation and attachment of all hardware.
7. Sinkages shall be provided for butts lock fronts and strikes so that the exposed surfaces of hardware will finish flush with adjacent surfaces.

B. LABELED WORK

1. Door openings to receive fire ratings as indicated on the Contract Drawings shall have frames and doors and equipment of gauges meeting the requirements for the rating noted by the NYSBC or the Engineer. Frames and doors shall bear the necessary label and shall be labeled separately.
2. Each labeled door and frame shall be cut and reinforced to receive the type hardware required.

C. HARDWARE

1. Furnish and apply, in connection with this work, all hardware not requiring special finish such as screws, anchors, braces, bolts, etc., as required to erect this work properly.
2. Finishing hardware will be furnished under Section 08 71 01 Finish Door Hardware. This Contractor shall, however, receive, check, store and apply the finishing hardware insofar as it occurs in connection with work under this Section. Protect door knobs by covering with cloth pads securely wired in place and do not apply escutcheons and other trim until directed to do so, by the Engineer.

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3. Specified manufacturer's supplemental and special reinforcement for hinges, surface applied closers, holders, coordinators, stops and strikes shall be manufacturer's standard but not less than specified and recommended for maximum heavy-duty construction.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 INSTALLATION

- A. All doors and frames specified herein shall be neatly installed in designated locations indicated on the Contract Drawings.
- B. Installation shall be performed in strict accordance with Section 06 20 00 - Finish Carpentry and these Specifications.
- C. Fixed units shall be securely fastened in place and operative units adjusted to work properly.
- D. Combination frames and trim shall be securely anchored in place with jambs filled solidly with mortar.
- E. Do all necessary cutting, drilling and fitting for securing work in position including all necessary cutting, drilling and tapping of the work to accommodate the work of other trades. Drilling and tapping for non-template hardware shall be performed at the site.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Note Used.

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. The Contractor shall provide protection against stains, dirt or damage to the finished installation. The doors shall be adjusted at installation for proper operation. At conclusion of construction, doors shall have any final adjustments made in order to place the doors in perfect operating condition.
- B. Upon completion of the project all finished work of this Section shall be carefully cleaned. Defective finish shall be removed and refinished, and all work left clean and perfect.

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END OF SECTION

SECTION 08 11 19 – STAINLESS STEEL DOORS AND FRAMES
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NO TEXT ON THIS PAGE

SECTION 08 34 10 – SLIDING INDUSTRIAL DOORS
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PART 1 GENERAL

1.01 SUMMARY

A. This Section includes the single sliding industrial doors, wheels, rails, hanging rollers, and all other associated equipment.

1. The Contractor shall furnish and install all Single Sliding Industrial Doors and associated equipment shown on the Contract Drawings and specified herein.

B. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.

C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 07 90 00 - Joint Protection
- B. Section 08 11 19 - Stainless Steel Doors and Frames
- C. Section 08 71 01 - Finish Door Hardware
- D. Section 26 05 91 - Low-Voltage Electric Motors

1.04 REFERENCES

- A. NYSBC - 2020 New York State Building Code
- B. NYSECC - 2020 New York State Energy Conservation Code
- C. HMMA-866 - Hollow Metal Manufacturer's Association, Guide Specifications for Stainless Steel Hollow Metal Doors and Frames
- D. ANSI/SDI A250.8 - Steel Door Institute, Recommended Specification for Standard Steel Doors and Frames.
- E. ASTM A240 - Standard Specification for Chromium Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- F. NFPA 80 - National Fire Protection Association, Standard For Fire Doors and Other Opening Protectives
- G. NFPA 105 - National Fire Protection Association, Standard For the Installation of Smoke Door Assemblies and Other Opening Protectives
- H. NFPA 252 - National Fire Protection Association, Standard Methods of Fire Tests of Door Assemblies

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- I. UL 10B - Underwriters Laboratories, Fire Tests of Door Assemblies
- J. UL 10C - Underwriters Laboratories, Positive Pressure Fire Tests of Door Assemblies

1.05 DESCRIPTION

A. Sustainable Design Requirements

- 1. Recycled Content of Single Sliding Industrial Doors: Postconsumer recycled content plus one-half of pre-consumer recycled content shall not be less than 30 percent.
- 2. Low Emitting Materials: Paints, coatings, sealants, and adhesives used on site and within the building's weatherproofing system shall meet the VOC content limits listed below.

1.06 QUALITY ASSURANCE

A. Provide Single Sliding Industrial Doors and accessories manufactured by a single firm specializing in the production of this type of Work and complying with standards specified herein.

B. Manufacturer Qualifications:

- 1. The approved Manufacturer must demonstrate a minimum of five (5) years successful experience in design and manufacture of similar related closures. The manufacture shall upon request, submit to the DEP supporting evidence including:
 - a. a list of installations;
 - b. project names and descriptions; and
 - c. addresses, owners, and contacts.

C. Minimum Qualifications:

- 1. Manufacturer must demonstrate compliance and certification of a Quality Management System administered by the International Organization for Standardization (ISO). Documentation of current certification status to be provided upon request.

D. Welder Qualifications:

- 1. All Welders shall be Certified in accordance Section 05 05 23. 01 – Welding and with American Welding Society Procedures for materials used within the Single Sliding Industrial Doors.

E. Materials and Equipment Compliance:

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1. Materials and equipment submitted for DEP's approval by the Contractor shall have met, at the time of their submittal, the certification and material acceptance requirements of the Town of Mount Pleasant, and all relevant New York State Regulatory Agencies, unless otherwise required by the Authority Having Jurisdiction over the Work.
2. All materials provided under this Section shall comply with the Contract Documents.
3. Comply with all applicable requirements of governing authorities and codes for all work.

1.07 SUBMITTALS

A. Product Data:

1. The Contractor shall submit Manufacturer's data sheets on each product related to this section, to be used within, on, and around the Single Sliding Industrial Doors, and shall including but is in no way limited to:
 - a. Instructions/recommendations for shipping, storing, handling.
 - b. Instructions/recommendations for pre-installation preparations.
 - c. Installation instructions of the Single Sliding Industrial Doors.

B. Shop Drawings:

1. Contractor shall submit Shop Drawings, based on the Contract Drawings for approval by the Engineer. Submittals shall include, but not be limited to the following:
 - a. Layouts, profiles, and product components, including anchorage, hardware, and material finishes, gauges, reinforcing and location of all doors, dimensional plans, material specifications related to this Section, elevations, sections, and relevant detailing including of mounting and connections, welding information, operating systems, and schedules.
 - b. After erection of the main structure, the Contractor shall provide the Manufacturer with more accurate field measurements and mounting structure prior to commencement of shop drawings.

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- c. Shop drawings shall also include, all relevant electrical work, diagrams, power needs, and all relevant information for the door operating devices.

C. Calculations:

- 1. All calculations shall be submitted with the Shop Drawings for review and approval by the Engineer, and shall include but in no way be limited to:
 - a. Calculations, showing the door and its supports can withstand all the material and site loads.
 - b. Deflection, design doors as a system supported by the door structural support components, see Contract Drawings.
- 2. All Calculations shall be done by a New York State Licensed Engineer. Each sheet of calculations shall be stamped and signed by the engineer providing the calculations.

D. Each submittal shall be complete in all respects, incorporating all information and data listed herein and all additional information required for evaluation of the proposed materials compliance with the Contract Documents.

E. Sliding Door Operator/Motor:

- 1. Manufacturer's catalog cuts technical information.
- 2. Dimensional drawings showing the gate operator with controller for Sliding Doors.
- 3. One-Line Diagrams: Submit one-line drawings indicating location of all hardware.
- 4. Submit wiring diagrams detailing power, signal, and control systems, differentiating between manufacturers installed wiring and field installed wiring, and between components provided by the manufacturer and those provided by others.
- 5. Bill of Materials
- 6. Installation instructions: Submit two (2) copies of manufacturer's installation instructions for this specific project.
- 7. Test reports:
 - a. Submit affidavits from the manufacturer demonstrating that the gate mechanism has been tested to 200,000 cycles without breakdown.

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8. Each operator shall bear a label indicating that the operator mechanism has been tested for full power and pressure of all hydraulic components, full stress tests of all mechanical components and electrical tests of all overload devices.

F. Samples shall include:

1. All proposed hardware to be installed in, on and around the Single Sliding Industrial Doors, along with their Manufacturer cut sheets.
2. 12"x12" section of the proposed door material.
3. Insulating material.

G. Sustainable Design Submittals:

1. Environmental Materials Reporting Form (EMRF) Recycled Content. Provide the following information:
 - a. Name of Product and Manufacturer.
 - b. Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
 - c. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.
2. VOC Reporting Form. Provide the following information:
 - a. For all coatings, sealants, and adhesives used on site and within the building's weatherproofing system provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.

H. Close out submittals:

1. The Contractor shall submit for review and approval the Manufacturer's instructions/recommendations for operation and maintenance of the installed Sliding Doors and all materials/items installed with it.
2. The manufacturer's instructions/recommendations shall also include cleaning methods to ensure proper retention of material finishes.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

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1. Materials shall not be delivered to the project site before the time of installation.
 2. Materials shall be delivered in sufficient quantities to allow continuity of the work.
 3. All materials shall be shipped to the site in a way that is secured and all measures are taken to prevent any damage to materials.
 4. Any materials damaged, while in transit to the site, shall be sent back to the manufacture for repair or replacement and returned to the site without damage at no extra charge to the DEP.
- B. Storage of Materials:
1. All materials shall be stored in original, undamaged packaging with manufacturer's labels and seals intact.
 2. All materials shall be stored in a dry, enclosed area, off the ground and away from all possible contact with water, ice, or snow.
 3. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the site before being incorporated into construction systems.
 4. Protection shall be arranged to protect all hardware which may be attached.
 5. Any materials that are damaged while being stored on site shall be returned to the manufactory for repair or replacement at no extra charge to the DEP.
- C. Handling of Materials:
1. Materials shall be handled carefully in order to avoid damage or breakage.
 2. Materials shall not be exposed to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the site and shall not be incorporated into the work.
 3. Packages shall not be opened until all necessary preparatory work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.
 4. Any damage occurring to materials up to the time of complete installation shall be repaired or replaced by Contractor at no extra charge to the DEP.

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1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. All spare parts shall be included with the delivery of all Sliding Door materials.

B. The manufacturer shall include all necessary spare parts for maintaining the operational needs of the sliding door.

C. The Contractor shall instruct the manufacturer to submit alongside the spare part materials, a schedule of all spare parts and their appropriate usage for the Sliding Door.

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. The Contractor shall obtain from the Manufacturer and provide to DEP the Manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

Product shall be as manufactured by:

- A. Electric Power Door, Hibbing, MN;
- B. Crown Industrial, South San Francisco, CA
- C. PS Industries Incorporated, Grand Forks, ND
- D. Door Component Inc., North Plainfield, NJ;
- E. Medallion Entry Systems, Inc., Indianapolis, IN;
- F. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Sliding Door Product Details:

1. Door Sections:

- a. Thickness of Sections shall be as indicated in the Contract Documents and shall be made of Type 316 stainless steel with an #4 finish, fabricated with a welded internal frame, sheeted on the interior and exterior, gage to be as described herein and welded in place. Insulate voids between internal door framing and door sheeting, full depth of cavity.

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- b. Where shown in Contract Drawings, manufacturer shall provide structural framed opening to receive personnel single swing doors that are to be incorporated within the Sliding Doors. Personnel single swing doors shall follow Section 08 11 19 - Stainless Steel Doors and Frames.
 - 1) Door Frame to be manufactured of the same material type and finish as door panel. Frame to include jambs and header jamb for field location and installation on structure. Jamb members to be designed and fabricated with appropriate material as required for the loading.
 - 2) Hardware for personnel door shall comply with Section 08 71 01 - Finish Door Hardware.
 - c. Steel should be sized in accordance with Manufacturer shop drawings and strength listed in reference documents. All steel to be welded in accordance with manufacturer provisions and sized to meet design demanded outlined in Contract Documents. The internal structure shall be structural tubes, plates, and formed shapes of the above material type.
2. Track/Rail:
- a. Track shall be designed by the manufacturer based on the design of the doors shown in the Contract Documents, furnished in one piece (as practical), with integral mounting brackets. Vertical track support shall be furnished at each jamb. Clearance pack-outs shall be integral to track and vertical track supports, providing a nominal 2” clearance between door face and wall mounting surface. Sliding industrial door center door stop(s) attached to the underside of the tracks.
3. Top Trolley Assembly:
- a. A minimum of ¾” vertical travel adjustment shall be available for leveling of door panel. Top guide rollers to be sized appropriately to weight and size of door panel, but at minimum shall be 4” diameter, with roller bearings and grease fittings. Rollers to have non-corrosive treads machined to match track and shall provide both vertical load support and lateral load control from either side of door without binding.

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4. Bottom Guide Roller Assembly:
 - a. Bottom guide roller to be non-corrosive and provide dual lateral load control of door while concealed within door bottom. Roller-mount to be integral to vertical track supports and shall not require floor anchors. Bottom guide roller to be non-corrosive and shall not require lubrication. Bottom guide roller to be sized appropriately to weight and size of door panel.
5. Handles:
 - a. Provide two (2) 12” bow handles per door panel. Handles shall be placed on both sides of the door panel, and shall be made of Type 316 stainless steel with #4 finish.
6. Safety Device:
 - a. Doors to have factory installed “Knuckle Saver Safety Stop” (KSSS) device with operating lever mounted within door panel. Intermediate stopping location to be factory located.
 - b. Monorail doors and operated doors do not have KSSS. See general drawing for KSSS.
7. Weather seals:
 - a. Seals at head, trail jamb, and sill to be nylon filament brush in a mill finish aluminum retainer. Head seal to be factory located. Trail jamb and sill seal to be field located. Seal at stop jamb to be compressible neoprene bulb seal in a compression retainer attached to the vertical track member at stop jamb.
 - b. Weather seals to be compressible rubber type or brush, typically Neoprene and Nylon Brush Seal unless otherwise noted, and to be field replaceable.
 - 1) Sliding industrial Door have a center bulb on the leading edge of both panels.
 - c. All exterior doors shall be fully weather-stripped, as called for under Section 08 71 01 - Finish Door Hardware.
8. Door Support Structure:
 - a. The Contractor shall refer to the Contract Drawings for all related materials regarding the Sliding Door Support frame/structure.

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B. Sliding Door Operator/Motor:

1. The operators for the Sliding Doors shall be designed and fabricated to withstand movement of the appropriate loads of the Sliding Door, by the manufacture of the Sliding Doors.
2. The Sliding Door Operators shall be installed inside the door and secured to the interior frame system.
3. The Sliding Door Operator shall also have an emergency manual override built into it.
4. The manufacturer shall provide a lockable access panel to allow for maintenance of the operator and to allow for emergency manual override.
5. Controls: Smart Touch Controller Board with 70+ of configurable settings. Smart Touch keypad and display or a PC using Smart Touch Analyze and Retrieve Tool (START) software, containing:
 - a. Microprocessor –based
 - b. 21 field configurable inputs
 - c. 3 field configurable user relay outputs
 - d. RS-232, RS-485
 - e. Date, and time stamped fault logs, errors, and security alerts
 - f. PC interface provided for configuration and quick troubleshooting using Smart Touch Analyze and Retrieve Tool
 - g. Patented Anti-Tailgate mode
 - h. Power surge/lightning strike protection
6. External Sensors:
 - a. Photo Eye Systems:
 - 1) The Sliding Doors shall conform to the latest revisions of both UL and ASTM Standards. The Sliding Door edge sensors shall be installed on the leading and trailing edges of the gate so that if the gate comes into contact with a solid object the gate will stop and reverse. Four (4) through beam photo eyes shall be installed to protect the open and close directions of gate travel. The locations of the beam photo eyes from the gate and the roadway surface

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shall be installed as per manufacturer's recommendations and the Contract Drawings. The through beam photo eyes shall be infrared photocell, which includes transmitter and receiver. The through beam photo eyes shall be enclosed in a powder coated steel hoods NEMA 4X housing.

- b. Pressure Plates:
 - 1) Pressure plate shall be installed at both the fully open and fully close of the edge of the Sliding Door.
- c. Manufacturer:
 - 1) The through beam photo eyes shall be manufactured by EMX Industries, Inc., Model IRB-25(HD-PT-SP),
 - 2) or approved equal.
- d. Additional Accessories:
 - 1) Lock and Key for operator access panel.
 - 2) Weather-stripped drive rail slot in chassis, and snow wiper blades for drive rail.
 - 3) Provide a gate access control panel with Open/Close/Stop push button for each gate to be installed inside the guard booth.
- e.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. FABRICATION AND WORKMANSHIP

- 1. All metal work shall be accurately fabricated and neatly assembled so as to be free from dents, tool marks, warpage, buckle or open joints. All lines shall be straight and true to curvatures as required, arises and angles as sharp as practical, moldings true to profile, miter formed in true alignment and abutting profiles shall intersect accurately.
- 2. All members shall be accurately fastened together so as to provide rigid construction in the assembled work. Removable members shall be secured with countersunk head tamperproof machine screws not more than 12 inches apart. All connections, except those of removable members shall be welded or interlocked.

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3. All exposed face joints between members shall be continuously welded and dressed smooth and flush to be practically invisible.
4. Sinkages, cutouts and concealed reinforcement shall be provided as required for the proper installation and attachment of all hardware.
5. The manufacturer shall fit and factory assemble items in largest practical sections, for shipment to site. Upon receiving shipment of door section, the Contractor shall inspect and reassemble the sections for installation.
6. The manufacturer shall fabricate items with all joints tightly fitted and secured.
7. The manufacturer shall supply components required for anchorage of fabrications based on design loading. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

B. LABELED WORK

1. Door openings to receive fire ratings as indicated on the Contract Drawings shall have frames and doors and equipment of gauges meeting the requirements for the rating noted by the OTCR, unless otherwise required by the Authority Having Jurisdiction over the Work. Frames and doors shall bear the necessary label and shall be labeled separately.
2. Each labeled door and frame shall be cut and reinforced to receive the type hardware required.

C. HARDWARE

1. Furnish and apply, in connection with this work, all hardware as required to erect this work properly.
2. Finishing hardware will be furnished under Section 08 71 01 Finish Door Hardware. The Contractor shall, however, receive, check, store and apply the finishing hardware insofar as it occurs in connection with work under this Section. Protect door knobs by covering with cloth pads securely wired in place and do not apply escutcheons and other trim until directed to do so, by the Engineer.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. The door shall not be installed until mounting substrates have been properly prepared and all members for the door support structure are properly installed.

B. Its shall be the Contractor's responsibility to coordinate all Work associated with this section with all other adjacent work to ensure area of door installation is properly prepared.

C. The Contractor shall inspect all opening for compliance with manufacturer requirements. Verify open conditions are within required tolerances.

3.02 INSTALLATION

A. The Contractor shall install the Sliding Doors in accordance with manufacturer's installation instructions, Shop Drawings, shipping, handling, and storage instructions, and product carton instructions for installation.

B. Door Support Structure and rail systems shall be installed level, square, plumb, and rigid.

C. The Contractor shall ensure that all Manufacture's required Tolerances are met and in accordance with the Manufactures installation instructions and Approved Shop Drawings.

D. The Contractor shall verify that all required anchorage is in accordance with the Manufacturer's installation instructions and applicable data sheets.

E. The Contractor shall inspect all weather seals for damage, wear, and adhesion. Any weather seals that show any sort of damage/adhesion problems as described here in shall be replace immediately.

F. Fixed units shall be securely fastened in place and operative units adjusted to work properly.

G. Do all necessary cutting, drilling and fitting for securing work in position including all necessary cutting, drilling and tapping of the work to accommodate the work of other trades. Drilling and tapping for non-template hardware shall be performed at the site.

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3.03 FIELD TESTING / QUALITY CONTROL

A. The Contractor and Installer shall operate and field verified all products including the sealing surfaces to assure that they maintain contact at the correct sealing points.

B. The Contractor and Installer shall verify that all rollers and latching assemblies operate freely and correctly.

C. The Sliding Industrial Door and all associated hardware/software shall be tested until all issues if any are rectified.

D. All hardware/software installed shall work in tandem with each other for proper movement of the door.

3.04 STARTUP / DEMONSTRATION

A. The Sliding door shall be fully tested and operational at startup.

3.05 ADJUSTING / PROTECTION / CLEANUP

A. The Contractor shall provide protection against stains, dirt or damage to the finished installation. The doors shall be adjusted at installation for proper operation. At conclusion of construction, doors shall have any final adjustments made in order to place the doors in perfect operating condition.

B. Upon completion of the project all finished work of this Section shall be carefully cleaned. Defective finish shall be removed and refinished, and all work left clean and perfect.

END OF SECTION

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NO TEXT ON THIS PAGE

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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish, install, and place into satisfactory service all high-performance, thermal-barrier, custom stainless steel window and frames, and auxiliary system components, of the performance grade specified.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 08 81 03 - Glass, Plastic and Glazing

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1.04 REFERENCES

- A. NYSBC - 2020 New York State Building Code
- B. NYSECC - 2020 New York State Energy Conservation Code
- C. ASTM A240 - Stainless Steel Plates, Sheets and Strips, Standard Specification for
- D. ASTM B117 - Operating Salt Spray (Fog) Apparatus, Standard Practice For
- E. ASTM B584 - Copper Alloy Sand Castings for General Application, Standard Specification for
- F. ASTM D395 - Rubber Property-Compression Set, Standard Test Methods for
- G. ASTM D522 - Mandrel Bend Test of Attached Organic Coatings, Standard Test Methods for
- H. ASTM D523 - Specular Gloss, Standard Test Method for
- I. ASTM D573 - Rubber - Deterioration in an Air Oven, Standard Test Method for
- J. ASTM D968 - Abrasion Resistance of Organic Coatings by Falling Abrasive, Standard Test Method for
- K. ASTM D1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes, Standard Test Method for
- L. ASTM D2244 - Calculation of Color Tolerances and Color Differences From Instrumentally Measured Color Coordinates, Standard Practice for
- M. ASTM D2247 - Testing Water Resistance of Coatings in 100% Relative Humidity, Standard Practice for
- N. ASTM D3363 - Film Hardness by Pencil Test, Standard Test Method for
- O. ASTM D4213 - Scrub Resistance of Paints by Abrasion Weight Loss, Standard Test Method for
- P. ASTM E283 - Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen, Standard Test Method for

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- Q. ASTM E329 - Agencies Engaged in Construction Inspection, Testing Or Special Inspection, Standard Specification for
 - R. ASTM E330 - Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference, Standard Test Method for
 - S. ASTM E331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference, Standard Test Method for
 - T. SWI - Steel Window Institute
 - U. American Architectural Manufacturers Association and the Window and Door Manufacturers Association, AAMA/NWWDA, 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors
 - V. American Architectural Manufacturers Association, AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Glass Doors
 - W. American Architectural Manufacturers Association, AAMA 800 - Voluntary Specifications Test Methods for Sealants
 - X. American Architectural Manufacturers Association, AAMA 910 - Voluntary 'Life Cycle'/Specifications and Test Methods for Architectural Grade Windows and Sliding Glass Doors
 - Y. American Architectural Manufacturers Association, AAMA 1503.1 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections
 - Z. American Society of Civil Engineers, ASCE 7 - Minimum Design Loads for Buildings and Other Structures
 - AA. Steel Structures Painting Council, SSPC Paint 12 - Paint Specification No. 12: Cold-Applied Asphalt Mastic (Extra Thick Film)
 - BB. Federal Specification, FS RR-W-365: Wire Fabric (Insect Screening)
- 1.05 DESCRIPTION
- A. This Section describes exterior, high-performance, minimum 3-1/4-inch frame depth, factory-fabricated and windows with integral structural polyurethane thermal-breaks and true divided muntins complying with the requirements of AAMA/NWWDA 101/I.S. 2 - Architectural Performance Class and Section 4 - Optional Performance Grades, all with Architectural Class I anodized finish or with a complete selection of factory-applied, four coat, custom and premium exotic color, custom blended full strength polyvinylidene fluoride finishes and colors with extended life topcoat, as selected in the Contract; all designed, detailed and

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fabricated as required to resist specified loadings, and resistance to air and water penetration specified and in accordance with the requirements of governing authorities having jurisdiction; associated high-performance operating hardware, auxiliary system items, accessories, fasteners and similar items for completely functioning systems.

- B. Design Requirements
1. Comply with applicable standards and recommendations by AAMA, and ASCE, except to the extent more stringent requirements are specified or required by governing authorities having jurisdiction at the Site.
- C. Modifications: Stainless Steel Window and frame requirements shown are intended to establish basic dimensions of units, modules, profiles, mullion depths, sight lines, support locations of members and the visual design intention. Within these limitations Contractor shall be responsible for the structural adequacy, weather resistance, thermal and condensation resistance, and the detailing and fabrication of all Stainless Steel Window and frame system, including anchorage, and to make whatever modifications of, and additions to, the details as may be required to fulfill the minimum performance requirements of AAMA Optional Performance Grade and the requirements of non-mandatory Appendixes specified, at no additional expense to the City. Maintain the visual design concept as shown, including member sizes, profiles, support locations and alignment of components.
- D. Performance Criteria:
1. General:
 - a. The design wind load pressures for Stainless Steel Windows and frames shall be determined in accordance with analytical procedures established by ASCE 7 and shall take into consideration the load magnification effect caused by gusts in resonance with along-wind vibrations of flexible building and other structures. Professional engineer who prepares, signs, stamps its seal on Shop Drawings submitted to Engineer shall take into consideration the need for wind-tunnel tests in order to include the effects of across-wind loading, vortex shedding or instability due to galloping or flutter of Project locations where channeling effects or buffeting in the wake of upwind obstructions warrant special consideration, or for those buildings or structures having unusual geometric shapes or response characteristics.
 - b. On Projects where the professional engineer believes such conditions may exist, provide Engineer and the City with recommendations for further testing required to establish the design criteria for Stainless Steel Windows and frames. Identify all costs

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associated with such testing. Do not proceed with testing until given written approval by the City.

- c. After carefully reading system performance criteria and other requirements of the Section, professional engineer to whom design of the aluminum window and frame system is delegated shall make all requests for clarification of requirements that may be necessary in writing, to Engineer.
2. Loading Analysis Criteria:
- a. Wind Loads: For wind loads see site parameters in the Contract Drawings.
 - b. Seismic Loads: Provide Stainless Steel Window and frame system, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of the NYSBC or ASCE 7, whichever are more stringent.
 - c. Dead Loads: Provide Stainless Steel Window and frame system components that do not deflect an amount that will reduce glazing bite below 75 percent of required glazing bite dimension when carrying full dead load. Provide minimum of 1/8 inch clearance between members and top of fixed panels, glazing, or other fixed part immediately below. Provide a minimum of 1/16 inch clearance between members and operable windows and doors.
 - d. Live Loads: Provide Stainless Steel Window and frame system, including anchorage that accommodates supporting structure's deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation.
 - e. Deflection of Framing Members, ASTM E330: Maximum deflection of $L/175$ at center of single span when subjected to both positive and negative applicable design pressures, with no permanent deformation or damage of any main frame, sash, panel or sash member in excess of 0.2 percent of the span when the load is removed.
 - 1) Maximum deflection of framing members shall also follow the maximum allowable deflections as stated in the AISC, ACI, and AISI based on backing and the manufacture's limits.
 - f. Provide complete loading analysis performance calculations and Shop Drawings for all Stainless Steel window and frame system

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components prepared, signed and stamped with the seal of a licensed professional engineer, licensed to practice in the State of New York.

3. Water and Air Infiltration Tests: A 5 foot-10 inch by 3 foot-1 inch window with a 4 foot-10 inch by 2 foot-10 inch minimum vent size shall comply with the following:
 - a. Static Test Pressure Water Penetration Testing, ASTM E331 and AAMA 910: After the AAMA 910 life cycle test, no evidence of uncontrolled water penetration to the interior of the building through the Stainless-Steel Windows and frames when subjected to a static air pressure difference of 12 pounds per square foot.
 - b. Air Infiltration Testing, ASTM E283: After the AAMA 910 life cycle test, maximum air infiltration of 0.08 cubic feet per minute per square foot, when subjected to a static air pressure difference of 6.24 pounds per square foot.
4. Provide design, detailing and fabrication based on the most stringent combination of standards, testing and engineering analysis specified.
5. Thermal Movements: Stainless Steel Window and frame system, including anchorage, shall withstand thermal expansion and contraction movements of system and supporting elements resulting from not less than an ambient temperature change of 120 degrees F, which may cause a surface curtain wall material temperature change of 180 degrees F. Limit the deflection as for wind pressure loading. Thermal movements shall not cause permanent deformation, cracking, opening of joints, undue stress on fasteners, or other effects detrimental to weathering performance.
6. The design of the Stainless Steel Window and frame system, including anchorage, as shown and specified is intended to prevent excessive condensation on the indoor faces of the work, with the heating and ventilating system in operation, and under the following conditions. Provide Stainless Steel Window and frame system design, detailing and fabrication in compliance with AAMA 1503.1 that achieves and maintains this design intention:
 - a. Outdoor: Ambient temperature 0 degrees F; 15 mph wind.
 - b. Indoor: Ambient temperature of 75 degrees F; relative humidity of 25 percent.
 - c. Excessive condensation is defined as visible water.
 - d. Condensation Resistance Factor: 58 minimum for frame.

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7. Provide internal drainage to lead all infiltrated water to the exterior through weep slots.
 8. Testing: Wherever manufacturer's standard window units comply with the requirements and have been tested in accordance with the specified tests, provide certification by the manufacturer of compliance with such tests; otherwise, perform the required tests through a AAMA accredited and recognized testing laboratory or agency and provide certified test results.
 9. Energy Conservation:
 - a. All Stainless-Steel Window Frames shall be thermally broken and glass/glazing shall be insulated and shall comply with the NYSECC U-Factors appropriate for this region.
- E. Scheduling and Coordination:
1. Review installation procedures under other Sections and coordinate them with the work specified herein.
 2. Notify other Contractors in advance of installation to provide them with sufficient time for the installation and coordination of interrelated items that are included in their Contracts and that must be installed in conjunction with the work included in this Section.
 3. Schedule the arrival of Stainless-Steel Window and frame components and accessories to minimize the time they are stored at the Site before installation.
 4. Do not proceed with the installation of Stainless Steel Window and frame system until Contractor can provide finished work complying with all requirements of the Sections.
 5. Where Stainless Steel Window and frame systems require the building-in of plates, inserts and other items, furnish required inserts to avoid delay in the work of other trades. Provide setting drawings, templates, and directions for installation of plates, inserts and anchors, required by the work of this Section but installed under other Sections.
 6. Coordinate with other work by furnishing Shop Drawings, inserts and similar items at the appropriate times for proper sequencing of construction without delays.
- F. Field Measurements:
1. Verify dimensions in areas of installation before fabrication and indicate dimensions on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delay.

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2. Coordinate supports, adjacent construction, and equipment locations to ensure actual dimensions correspond to dimensions established for Stainless Steel Window and frame system work.

1.06 QUALITY ASSURANCE

A. Installer Qualifications:

1. Engage a single installer skilled, trained and with successful experience in the installation of Stainless Steel Window and frame systems and with specific skill and successful experience in the erection of the types of units and components required; and who agrees to employ only tradesmen with specific skill and successful experience in this type of work. Submit names and qualification to Engineer along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owner, architects, or engineers responsible for projects.
 - b. Approximate contract cost of the Stainless Steel Window and frame system.
 - c. Size of area installed.
2. Provide Stainless Steel finish applicators experienced in the handling and application of the finish coatings specified, acceptable to the coating or aluminum manufacturer.

B. Professional Engineer:

1. Engage a registered professional engineer licensed in the State of New York and experienced in providing engineering services of the kind indicated.
2. Responsibilities include, but are not necessarily limited to, the following:
 - a. Carefully reviewing system performance and design criteria stated in the Contract Documents.
 - b. Preparing written requests for clarification or interpretation of performance or design criteria for submittal to Engineer by Contractor.
 - c. Preparing, or supervising the preparation of design calculations, and reviewing and approving related Shop Drawings prepared by the Stainless Steel Window and frame system manufacturer prior to submission to Engineer; testing plan development, and test-result interpretations; and providing comprehensive engineering analyses verifying compliance of the system with the requirements of the Contract Documents.

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- d. Signing and sealing all calculations and engineering analyses.
 - e. Certifying that:
 - 1) It has performed the design of the system in accordance with the performance and design criteria stated in the Contract Documents, and
 - 2) The said design conforms to all applicable local, state and federal codes, rules and regulations and to the prevailing standards of practice.
- C. Erection Tolerances:
- 1. Limit variations from plumb, level or dimensioned angle to the following:
 - a. 1/8-inch maximum deviation in 10 foot vertical or angular run, and in 20 foot horizontal runs.
 - b. 1/4-inch maximum deviation in 40 foot runs, all directions.
 - 2. Limit variations from theoretical member locations shown, based on established floor lines and column lines, including variations from plumb and level, to the following:
 - a. 3/8-inch total maximum deviation for members at all locations.
 - b. 1/8-inch maximum change in deviation for members for 10 foot runs, all directions.
 - 3. Limit offsets in end-to-end and edge-to-edge alignments of adjoining and consecutive members, which form planes, continuous runs and profiles, to the following:
 - a. 1/16-inch maximum offset in flush alignment, including members which are to be 1/2-inch or less out-of-flush, and including members which are separated 2-inches or less by a reveal or protrusion in the plane of the aluminum windows and frames.
 - b. 1/8-inch maximum offset in alignments which are to be out-of-flush by more than 1/2-inch or separated by a reveal or protrusion of more than 2- inch width.
- D. Testing Agency Qualifications: To qualify for approval, an independent testing agency shall demonstrate to Engineer's satisfaction, based on evaluation of criteria submitted by testing agency, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the work in accordance with ASTM E329 and AAMA qualifications.
- E. Mock-Up:

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1. Before proceeding with final purchase of materials and fabrication of Stainless Steel Window and frame components, prepare a mock-up at the Project Site, including all components shown on Shop Drawings approved by Engineer, indicating the final relationship and configurations of the various parts and components and the quality of workmanship that shall be achieved in the work.
2. Build mock-up full height and width of opening, in a location selected by Engineer, and part of an area to receive the work of this Section.
3. Include all items that are part of the Stainless Steel Window and frame system including anchorages, insulating glass and dry-seal joint system.
4. Incorporate materials and methods of fabrication and installation that are identical with Project requirements. Accepted mock-up may be incorporated into the finished work.
5. Build as many mock-ups as required to obtain Engineer's acceptance. Disassemble rejected mock-ups and remove all components from Site. Do not incorporate rejected mock-up components into the work.
6. Stainless Steel Window and frame installation that proceeds without an approved mock-up shall be stopped, and a mock-up prepared for Engineer's approval.

1.07 SUBMITTALS

- A. Contractor shall submit Shop Drawings for approval by the Engineer. Submittals shall include, but not be limited to:
 1. Samples: Submit for approval the following:
 - a. Each required finish shall be hot rolled steel.
 - b. Establish samples of the required finish, for Engineer's acceptance, prior to fabrication. Engineer reserves the right to reject material finishes with objectionable variations from the established samples.
 - c. Each component and cut-away corner of each window complete with finish and operating hardware, 2 foot-0 inches long by 2 foot - 0 inches wide, minimum, before Engineer's visit to manufacturer's facility for approval of actual window and frame systems to be incorporated into this Project.
 - d. Engineer reserves the right to require samples demonstrating design, detailing and fabrication techniques and workmanship for each system auxiliary component and accessory, before fabrication proceeds.

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- e. One of each type fastener employed, with statement of intended use.
 - f. Samples will be reviewed by Engineer for color, finish and workmanship only. Compliance with all other requirements is the responsibility of Contractor.
2. Shop Drawings: Submit for approval the following:
- a. Window location chart and schedules of typical window and frame elevations showing all configurations of operators, sash and muntins, custom panning and other cladding and flashing, fully dimensioned and coordinated with actual measurements obtained at the Project Site and required operating hardware and other auxiliary system components and accessories. Indicate clearly, and in a manner that is highlighted to Engineer, all deviations from the Contract Documents.
 - b. Details of each window and frame system detailing conditions at openings, details of construction, location and installation requirements of operating hardware and reinforcements, and details of joints, connections and every typical composite member. Show all window and frame reinforcements including welds, plate lengths, locations and gauges for each component of operating hardware and internal reinforcement. Indicate metal thicknesses; types of fasteners and support locations; and erection tolerances.
 - c. Copies of manufacturer's specifications, roughing-in diagrams, technical data and installation instructions for each window and frame system. Transmit copy of each instruction to the installer. Provide setting drawings, templates, instructions and directions for installation, operating instructions and maintenance data.
3. Operation and Maintenance Manual (O&M Manual): Upon completion of the work, furnish copies of detailed maintenance manual including the following information:
- a. Product name and number.
 - b. Name, address and telephone number of manufacturer and local distributor.
 - c. Detailed procedures for routine maintenance and cleaning.
 - d. Detailed procedures for light repairs such as dents, scratches and staining.
 - e. Design calculations verifying compliance with performance criteria specified, acceptable to governing authorities having jurisdiction,

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prepared, signed and stamped with the seal of a registered professional engineer, as specified.

4. Certificates: Submit for approval the following:
 - a. Copies of material purchase receipts indicating types of materials purchased and incorporated into this Project, signed by a certified and licensed Notary Public, verifying that material purchased for the work complies with material designations specified as confirmed by approved Shop Drawings.
 - b. Registered professional engineer who prepares, signs and stamps its seal shall provide a written statement confirming responsibility for the design and attest that the work prepared meets the Sections and the requirements of governing authorities having jurisdiction, and conforms to the prevailing standards of practice for the type of work specified.
 - c. Design calculation, signed and sealed by a Professional Engineer registered in the state of New York.
5. Test Reports: Submit for approval the following:
 - a. Air Infiltration Test - ASTM E283-04 - Maximum air infiltration 0.37 CFM/FT of crack length with a pressure differential of 6.24 PSF (50 MPH)
 - b. Water Penetration Test - ASTM E331-00 - No water penetration for 15 minutes when the window is subjected to a rate of flow of 5 Gal./Hr./Sq. Ft. with a pressure differential of 2.86 PSF.
6. Warranties: Submit for review:
 - a. Copies of written warranties agreeing to replace window and frame system components that fail to perform as specified.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver Stainless Steel Window and frame system materials, components and accessories dry and undamaged, with manufacturer's protective wrapping intact.
2. Deliver Stainless Steel Window and frame system components in clearly and legibly labeled with AAMA designations and in undamaged cartons to provide protection during transit and storage.

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3. Inspect Stainless Steel Window and frame system components upon delivery for damage. Remove and replace all damaged items.

B. Storage of Materials:

1. Do not store Stainless Steel Window and frame system components in contact with concrete or other materials that might cause corrosion or staining.
2. Store Stainless Steel Window and frame component under cover and in an area protected from the weather and with good air circulation around each piece. Avoid the use of non-vented plastic or canvas shelters which could create a humidity chamber. Immediately remove wrapping if it becomes wet.
3. Provide a 1/4 inch space between Stainless Steel Window and frame system components in order to promote air circulation.

C. Handling of Materials:

1. Do not subject Stainless Steel Window and frame components to bending or stress.
2. Do not damage edges or handle material in a manner that will cause scratches, warps or dents.
3. Handle material using appropriate handwear and tools that do not damage finish of items to remain exposed.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used**

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. General Warranty:** The special warranties specified in this Article shall not deprive the City of other rights or remedies the City may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under the Contract Documents.

B. Warranty:

1. Provide a Manufacturer's warranty, signed by the manufacturer and naming the benefit to the City of New York, for a period of ten (10) years from the date of Substantial Completion.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Windows:

1. Armortex
5926 Corridor Parkway
Schertz, Tx 78154
info@armortex.com
1-800-880-8306 or 1-210-661-8306
2. Weiland Doors
806 West South Airport Road
Norfolk, NE 68701
Phone: 402-454-2106
Email: info@weilanddoors.com
3. Thermally Broken Steel USA
PO Box 570, 12 Halls Rd., Old Lyme, 06371
860-339-5922
4. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Sheets:

1. Provide stainless steel sheet closures, auxiliary components and accessories, or as recommended by the Stainless Steel Window and frame manufacturer to comply with the requirements of performance, fabrication, application of finish and control of color for finishes.
2. Provide thicknesses as follows:
 - a. Principal Formed Sheet Members: 0.125-inches minimum thickness.
3. Provide sheet free of defects impairing strength, durability, color or finish.

B. Fasteners: Epoxy adhesives or non-magnetic stainless steel, guaranteed by the manufacturer to be non-corrosive and compatible with the Stainless Steel Window members, trim, hardware, anchors, and other components of the window units.

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1. Do not use exposed fasteners, except where unavoidable for the application of operating hardware. Match the finish of the metal surrounding fastener, unless otherwise specified.
 2. All metals that are dissimilar to that of the Stainless-Steel Window frames shall have isolators between them.
 3. Length, diameter, strength, and type of fastener shall be specified by the Stainless-Steel Window and Frame System Manufacture.
- C. Thermal Separators: Integral, structural polyurethane.
- D. Glass and Glazing Accessories: As specified in Section 08 81 03 – Glass, Plastic and Glazing.
- E. Wire Fabric Insect Screen and Frames: Provide insect screen and frames for each operable sash.
1. Provide 18 by 16 mesh of 0.009-inch diameter stainless steel wire, complying with FS RR-W-365, Type VI, mounted with polyvinylchloride splines into 5/16-inch by 1-1/2-inch by 0.050-inch extruded tubular aluminum frames with finish to match window in color and performance; corners mitered, gusset reinforced and crimped.
 2. Provide insect screens that mount into exterior or interior extruded tracks using two stainless steel leaf springs.
 3. Where windows swing outward, and insect screens are mounted on interior, provide sliding wickets framed as for fixed insect screens and trimmed for a tight fit and durability during operation.
- F. Weather-stripping: Provide double rows of manufacturer's replaceable EPDM stripping complying with ASTM D2000, secured in extruded aluminum ports at all vent perimeters.
- G. Brackets, Gussets, Reinforcements and Splice Clips:
1. Provide steel brackets and reinforcements wherever possible. Where steel units are required for higher strength or other unavoidable necessity, hot-dip galvanize the pieces after fabrication, with 2.0 ounces zinc coating, complying with Section 05 05 13.01 - Galvanizing.
 2. Where fasteners screw anchor into steel less than 0.125-inches thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads or provide standard, noncorrosive, pressed-in, spline grommet nuts.
- H. Auxiliary Components and Accessories:

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1. Provide surfaces finished to match aluminum windows and frames in color and performance; concealed fasteners; all required weather seals; designed for unrestricted expansion and contraction.
2. Provide complete selection of exterior wrap-around custom panning accessories; two-piece head and jamb receptors; sills and sub-sills with thermal-breaks, anchors and end dams; two-piece interior snap trim and clips; interior glazing adapters, expanders, receptors, stools and other trim necessary for a complete installation, as determined by Engineer.
3. Provide intermediate, thermally broken, expansion-type, vertical and horizontal integral mullions (stack; offset stack; and three-piece) and mullion covers in configurations and types as required for combinations of windows and sizes of window areas shown.

I. Bituminous Paint: Cold applied asphalt mastic complying with SSPC-Paint 12, compounded for 30-mil thickness per coat.

J. Expansion Anchor Devices: Expansion Anchor Devices shall be as recommended by the stainless-steel window and frame system manufacturer, where needed.

K. Window Operation

1. General:
 - a. Projected Windows: Swing-in or swing-out as shown, side-hinged vent sash and fixed window combinations as shown, provide operable sash with two balance-support arms, pivots with friction shoes and two cam handle operators; top mount cam handles if required for pole operation.
2. Operating Hardware:
 - a. Strike and Cam: White bronze, UNS C86200 cast white manganese bronze complying with ASTM B584.
 - b. Concealed Stainless Steel Hinges: Heavy-duty four-bar hinges with non-magnetic stainless steel balance arms. Provide sliding pivots with nylon friction-adjustable shoe in a stainless-steel track.
3. Limit Opening Device: Provide stainless steel adjustable hold-open limit arm with release key for all project-out operable windows.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. General: Provide specified manufacturer's standard fabrication and accessories, except to the extent more stringent requirements are specified. Include complete system for assembly of components and anchorage of window units. Include all components of glass and factory-applied glazing system.

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- B. Sizes and Profiles: The required sizes for window units and the profile requirements are shown on the Contract Drawings. The details shown are based upon standard details by one manufacturer. It is intended that similar details by other manufacturers will be acceptable, provided they comply with the size requirements, performance requirements and with minimum/maximum profile requirements shown and specified.
 - C. Frame and Vent: All members shall be double tubular; corners mitered, double-gusset reinforced, factory-sealed with sealant complying with AAMA 800 and crimped.
 - D. Water Control: Provide pressure equalization gasket on vent interior; vent and frame weeps, foam baffles, and exterior hoods to allow water to drain by gravity and resist wind-blown rain.
 - E. Provide field-mounted drip caps on vent exteriors above frame sill.
 - F. Operating Hardware:
 - 1. Cut, reinforce, drill and tap frames and windows as required to receive operating hardware. Comply with manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.
 - 2. Design, detail and fabricate reinforcement for maximum heavy-duty use, consisted with required guarantee period and performance criteria specified.
 - G. Provide extruded aluminum true-divided muntins, and custom panning shapes as shown and specified.
 - H. Steel Window and Frame Coatings
 - 1. General:
 - a. After fabrication of the aluminum windows and frames, prepare surfaces for finishing in accordance with recommendations of the aluminum producer and the finisher or processor.
 - b. Finish all components of each assembly simultaneously so as to attain complete uniformity of color.
 - c. Sequence the finishing and processing of materials in a predetermined bay-by-bay, floor-by-floor, wall-by-wall plan, which will minimize color and texture differences between adjacent components.
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
- A. Provide engineering design calculations and details prepared, signed and stamped with the seal of a registered professional engineer licensed to practice in the State of New York.

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- B. Engineer reserves the right, in consultation with the City, to visit the stainless-steel window and frame system manufacturer’s facilities and determine if the proposed manufacturer’s facilities are acceptable. Contractor shall include as part of the work arranging, and all costs for, three visits by four representatives of the City and Engineer to visit the manufacturer’s facilities for the purpose of approving manufacturer’s fabricating techniques and completed steel window and frame systems components proposed for installation as part of the work of this Project, unless additional visits are required to determine compliance with Contract requirements.
- C. Where required by Engineer in order to verify types of metal used in the Work, provide metallurgy laboratory analysis of system component materials.
- D. Obtain all Stainless-Steel Window and Frame System components, operating hardware, custom panning, flashing and accessories from the same manufacturer.
- E. Engage a manufacturer who requires that a technical representative be present at the time of mock-up preparation, and start of installation and who requires that the completed work be inspected by a technical representative of the steel window and frame manufacturer.
- F. Factory and Site Quality Control Procedures: Provide schedules, details, isometrics or explanatory sketches cross-referenced to Shop Drawings as required to ensure that both fabrication and installation are in accordance with the Contract Documents. Factory quality control procedures shall include, but not necessarily be limited to, the following:
 - 1. Finishing Fabrication: Procedures and controls for tolerances, joinery, sleeves, reinforcement gussets and finishes.
 - 2. Finish and Match: Procedures required for the match of exposed surfaces.
 - 3. Assembly and Pre-assembled Units: Welds, fasteners, glass, sealants, gaskets and separators.
 - 4. Sealing and Pre-assembled Units: As required by the sealant manufacturer. Include sealant documentation as part of Shop Drawing submissions.
 - 5. Material Handling: Procedures, care, protection, shipping, storage and other requirements to insure safe arrival and handling of materials.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Contractor shall examine the alignment of substrates and the sequence of work before erection of the custom aluminum window and frame systems work begins

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and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the custom steel window and frame systems work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.

- B. Custom steel window and frame systems work shall not be installed when there is no assurance of adequate, long term protection by Contractor.

3.02 INSTALLATION

- A. All windows shall be installed by factory-trained erectors in strict accordance with installation data provided by approved Shop Drawing submittal, and the specified requirements.
- B. Do not install component parts that are observed to be defective in any way, including warped, bowed, dented, abraded and broken members, and including damaged glass.
- C. Do not cut, or trim, component parts during erection, in a manner that would damage the finish, decrease the strength, or result in a visual imperfection or a failure in performance of the custom steel window and frame systems. Return component parts which require alteration to the shop for refabrication, if possible, or for replacement with new parts.
- D. Install component parts level, plumb, true to line and with uniform joints and reveals. Provide required support secured to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers. Use erection equipment that will not mar or stain finished surfaces, and will not damage the component parts.
- E. Apply a bituminous coating of approximately 30-mil dry film thickness, or other permanent dielectric separator, on concealed contact surfaces of dissimilar materials before installation, wherever there is the possibility of corrosive or electrolytic action.
- F. Apply sealant in accordance with manufacturer's written recommendations at joints, wipe off excess and leave exposed sealant surface clean and smooth.
- G. Anchor components parts securely in place as shown, by bolting, or other permanent mechanical attachment system, which will comply with performance requirements and permit movements which are intended or necessary.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Test installed units in conformance with AAMA 502 for air and water infiltration with the window manufacturer and the City present.
- B. Select test units as directed by the Engineer and use an AAMA-accredited laboratory provided by Contractor.

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3.04 STARTUP / DEMONSTRATION

 A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

 A. Protection

1. Advise Contractor of protective treatment and other precautions required through the remainder of the construction period, to ensure that window units will be without damage or deterioration, other than normal weathering at time of Final Acceptance.
2. Contractor shall advise Engineer, in writing, of protection and surveillance requirements that Contractor shall provide at no additional expense to the City, to insure that steel windows and frame system will be without damage or deterioration at the time of Final Acceptance by the City.
3. Where protective coating has been supplied, remove coating completely immediately before installation and when construction activities no longer require its retention.
4. Provide continuous protection of materials against damage primarily by storing materials under cover and above ground and away from other construction traffic.
5. Do not install Stainless-Steel Window and Frames until all work that could damage Stainless-Steel Window and Frame System has been completed.
6. Provide temporary closures until construction sequencing allows installation of aluminum window and frame systems at a time when the systems will not be subject to construction damages of any kind.

 B. Adjustment

1. All windows shall be adjusted for smooth operation and weathertight closure providing a tight fit at contact points and at weather-stripping after installation is complete and readjusted when necessary, prior to Substantial Completion.
2. At the completion of the work, restore adjacent work, marred by the work of this Section, to an undamaged and clean condition.

END OF SECTION

**SECTION 08 71 01 – FINISH DOOR HARDWARE
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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment and incidentals necessary to perform the Work of this Section as shown, specified or required otherwise for a complete job.
- B. Finish hardware is defined to include all items known commercially as finish hardware, as required for swing doors, except special types of unique and non-matching hardware specified in the same Section as the door and door frame.
- C. Types of finish hardware work required include, but are not necessarily limited to, the following:
 - 1. Heavy-duty pivot hinges
 - 2. Electric Power Transfer
 - 3. Electrified Mortise Lock Sets
 - 4. Mortise Locksets
 - 5. Electrified Vertical Rod Panic Exit Devices
 - 6. Panic exit devices
 - 7. Heavy-duty floor-mounted concealed door closers
 - 8. Overhead surface-mounted door closers
 - 9. Extra-heavy-duty overhead holders and stops
 - 10. Magnetic Monitor Switch
 - 11. Acoustic Stripping and Seals
 - 12. Thresholds
 - 13. Silencers
 - 14. Floor stops
 - 15. Electronic security devices
 - 16. Miscellaneous items
- D. The Contractor shall implement practices and procedures to meet the Project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- E. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 08 11 19 - Stainless Steel Doors and Frames
- B. Section 08 34 10 - Sliding Industrial Doors
- C. Section 28 10 00 - Access Control and Alarm Monitoring

1.04 REFERENCES

- A. NYSBC - 2020 New York State Building Code
- B. Doors and Hardware Institute
 - 1. Recommended Locations for Architectural Hardware for Standard Steel Doors & Frames;
 - 2. Recommended Locations for Builders' for Custom Steel Doors & Frames
- C. South Coast Air Quality Management District (SCAQMD)
 - 1. Rule 1113 -- Architectural Coatings
 - 2. Rule 1168 -- Adhesives and Sealants

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- D. Green Seal (GS)
 - 1. GS-11 -- Green Seal Standard for Paints and Coatings.
 - 2. GC-03 -- Green Seal Environmental Criteria for Anti-Corrosive Paints.
 - E. ASTM C920 -- Standard Specification for Elastomeric Joint Sealants
- 1.05 DESCRIPTION
- A. Where the finish, shape, size or function of a member receiving finish hardware is such as to prevent the use of or make unsuitable the types specified, furnish similar types having as nearly as practicable the same operation.
 - B. If finish hardware for any location is not specified, provide finish hardware equal in design and quality to adjacent finish hardware for comparable openings.
 - C. Furnish finish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements, as necessary for proper installation and function.
 - D. Unless otherwise specified, comply with the technical guidance of Door and Hardware Institute (DHI), for locating hardware on standard or customized steel doors and frames, as applicable.
 - E. Provide stainless steel finish hardware or matching finish hardware as specified for all doors and frames.
 - F. Sustainable Design Requirements
 - 1. VOC Content: Products applied on Site and within the building's weatherproofing system shall comply with VOC limits of authorities having jurisdiction and the following VOC limits of when calculated according to SCAQMD Rule 1113 and Rule 1168, Green Seal Standard GS-11, Green Seal Criteria GC-03:
 - a. Architectural Sealants: 250 g/L
 - b. Sealant Primers for Nonporous Substrates: 250 g/L
 - c. Sealant Primers for Porous Substrates: 775 g/L
 - d. Multipurpose Construction Adhesives: 70 g/L
 - e. Flat Paints and Coatings: VOC not more than 50 g/L
 - f. Non flat Paints and Coatings: VOC not more than 150 g/L
 - g. Primers, Sealers, and Undercoaters: VOC not more than 200 g/L
 - h. Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 - G. Coordination:
 - 1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the finish hardware.

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2. Coordinate the Work of other Sections in order to provide clearances and accurate positioning of recessed or cast-in-place items required by this Section.
 - a. The Contractor shall coordinate with all other Work being done within this Contract to allow for manufacturer-required opening tolerances within the precast panels to allow for proper fitting of door frame in order to properly place all hinges, door stops, door closers, thresholds, and all another relevant door hardware to be installed on the frame.

1.06 QUALITY ASSURANCE

- A. Supplier Qualifications: The finish hardware supplier shall have in his employ a member of the DHI as a certified Architectural Hardware Consultant who shall be responsible for checking, supervising and preparing written Field Report for complete finish hardware installation and with on-site presence during the time of installation and adjustment of the Work.
- B. Requirements of Regulatory Agencies: Comply with the applicable requirements of governing authorities and codes for the types of finish hardware specified.
- C. Source Quality Control: Obtain all similar products and accessories from the same manufacturer.
- D. Substitutions
 1. Clearly identify, in a manner which is highlighted to the Engineer, all proposed substitutions, modifications, variations, unspecified features and "or approved equal" products. Provide complete comparative data, comparing "or approved equal" with specified products, at time of Shop Drawings submission.
- E. Do not make substitutions after the Engineer's approval of final finish hardware schedule and sample at time of Shop Drawing submission.

1.07 SUBMITTALS

- A. Contractor shall submit the following to the Engineer for review and approval:
 1. Actual unit of each finish hardware item specified incorporating all standard and special features and finishes specified, demonstrated and identified by supplier's representative to the Engineer. Samples shall be presented at time of Shop Drawing submittal as the Engineer will not review or approve Shop Drawings without concurrent sample submissions.
 2. The Engineer's review will be for general quality and features of units, compliance with all other requirements is the exclusive responsibility of the Contractor.
 3. Approved samples may be incorporated into the finish hardware work.
- B. Shop Drawings:

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1. Copies of manufacturer's data for each item of finish hardware. Include whatever information may be necessary to show compliance with requirements, and include instructions for installations and for maintenance of operating parts and exposed finishes. Wherever needed, furnish templates to fabricators of other work which is to receive finish hardware.
 2. Copies of the finish hardware schedule. Include a separate key schedule, showing clearly how City's final instructions on keying of locks have been fulfilled. Finish hardware schedules are intended for coordination of the Work. Review and acceptance by the Engineer does not relieve the Contractor of his exclusive responsibility to fulfill the requirements as shown and specified.
 3. Based on the finish hardware requirements specified, organize the final finish hardware schedule into "hardware sets," indicating complete designation of every item required for each door or opening. Furnish initial draft of schedule at the earliest possible date, in order to facilitate the fabrication of other work (such as stainless steel frames) which may be critical in the Project construction schedule. Furnish final draft of schedule after samples, manufacturer's data sheets, coordination with Shop Drawings for other work, delivery schedules and similar information have been complete and accepted.
 4. Copies of manufacturers' specifications and installation instructions for required materials and components which are not included in other submittal specified in other Sections of this Specifications. Coordinate the requirements of this Section with other submittal and coordinate the submittal of other data in other Sections with the Sections' submittal.
 5. Maintenance Manual: Upon completion of the Work, furnish copies of detailed maintenance manuals, including the following information:
 - a. Product name and manufacturer.
 - b. Name, address and telephone number of manufacturer and local distributor.
 - c. Detailed procedure for routine maintenance and cleaning.
 - d. Detailed procedures for repairs such as dents, scratches and staining.
 - e. Parts identification manual and maintenance manuals for each piece of finish hardware.
- C. Cylinders and Keying System:
1. Provide a great grandmaster keying system.
 2. Equip all locks with manufacturer's special 6-pin tumbler cylinder, with construction master key feature, which permits voiding of construction keys without cylinder removal.

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- 3. Comply with Engineer's instructions for master keying and, except as otherwise specified, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
 - 4. Key Material: Provide keys of nickel silver only.
 - 5. Key Quantity: Furnish 3 keys for each lock and 5 keys for each master and grandmaster system. Provide one extra key blank for each lock.
 - D. Test Reports: Submit for approval certified laboratory test reports for required performance tests.
 - E. Sustainable Design Submittals:
 - 1. VOC Reporting Form. Provide the following information:
 - F. Finish hardware schedule
 - G. For all paints, coatings, sealants and adhesives used on Site and within the building's weatherproofing system provide the VOC content in grams/liter (g/L) less water and other exempt compounds, if applicable.
 - H. Written field report on condition of each item of finish hardware actually present on each door at the Project Site with each item referenced to the approved Shop Drawings. Final approval or final payment shall not be provided to Contractor until field report has been submitted to and approved by the Engineer.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Delivery of Materials:
 - 1. Deliver finish hardware sufficiently in advance of its setting for proper inspection.
 - 2. Pack each piece of finish hardware separately, complete with screws, keying, instructions and templates, tagged to correspond with the approved finish hardware schedule.
 - 3. Deliver individually packaged finish hardware items at the proper time to the proper locations for installation.
 - B. Storage of Materials:
 - 1. Provide secure lock-up for finish hardware stored at the Project site, but not yet installed.
 - 2. Store finish hardware in manufacturers' original packages.
 - C. Handling of Materials: Control the handling and installation of finish hardware items which are not immediately replaceable, so that the completion of the Work will not be delayed by finish hardware losses, both before and after installation.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used

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1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Heavy Duty Pivot Hinges:

1. H147 Bottom Pivot, H180 Top Pivot and M190 Heavy-Duty Intermediate Pivots as manufactured by:
 - a. Rixson, a subsidiary of Yale Security, Incorporated, Monroe, NC.
 - b. Or approved equal.

- B. Electric Power Transfer:

1. EPT-10 Electric Power Transfer as manufactured by Von Duprin or EPT-2 for magnetic monitor switches, Indianapolis, IN.
2. Or approved equal.

- C. Electric Mortise Lock Sets

1. DOOR STRIKE / REQUEST TO EXIT

- a. Night latch: A key must be able to unlock/open the door both during normal operation and in the event of a power failure.
- b. Request to Exit: Turning the handle from inside the building must provide a request to exit signal to be processed by the Access Control System.
- c. Electric latch retraction: The latch must be able to be opened with an electrical signal from the Access Control System on a valid card read.

2. Mfg. / Model No.: Von Duprin ELRX 99 NL,

3. Or approved equal.

- D. Mortise Lock Sets

1. Heavy-Duty Mortise Lock Set, Newport N9M (ANSI No. 14), by Corbin Russwin, an ASSA ABLOY Group Company.
2. Or an approved equal.

- E. Electrical Vertical Rod Panic Exit Device

1. Electric panic device EL 9848L SS RX (signal switch and request to exit) Lever Set 03 by Von Duprin, Indianapolis, IN, with (latches top and bottom) with MS750 24 VAC, 3 amp transformer.

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- 2. Or approved equal.
- F. Panic Exit Devices
 - 1. ED5200A 3-Hour Fire Listed Surface Rim Exit Device, Finish BHMA 630 (ANSI A156.3, Type 1, Grade 1) by Corbin Russwin, an ASSA ABLOY Group Company.
 - 2. Or approved equal.
- G. Vertical Rod Panic Exit Devices
 - 1. ED5400A 3-Hour Fire Listed Surface Vertical Rod Exit Device, Finish BHMA 630 (ANSI A156.3, Type 2, Grade 1) by Corbin Russwin, an ASSA ABLOY Group Company.
 - 2. Or approved equal.
- H. Heavy Duty Floor Mounted Door Closer
 - 1. SC H27CWF by Rixson, a Subsidiary of Yale Security, Inc., an ASSA ABLOY Group Company, Monroe, NC.
 - 2. Or approved equal.
- I. Overhead Surface-Mounted Door Closer
 - 1. DC8000 Parallel Arm Mounting Heavy-Duty Non-Hold Open Arm with Stop (DC8210 Series), by Corbin Russwin, an ASSA ABLOY Group Company.
 - 2. Or approved equal.
- J. Extra Heavy-Duty Overhead Holders and Stops
 - 1. 904H – US32D Extra Heavy-Duty Surface-Mounted Overhead Door Holder/Stop as manufactured by Glynn-Johnson Part of Worldwide Ingersoll-Rand, Dublin, Ireland
 - 2. Or approved equal.
- K. Flash Bolts and Automatic Flush Bolts (forged/wrought brass parts)
 - 1. FB458 Manual Flush Bolts, US26D finish, as manufactured by Ives, Part of Worldwide Ingersoll-Rand, Dublin, Ireland.
 - 2. Or approved equal.
- L. Flush Bolts and Automatic Flush Bolts (cast bronze parts)
 - 1. FB31P Automatic Flush Bolts, US32D finish, by Ives, Part of Worldwide Ingersoll-Rand, Dublin, Ireland.
 - 2. Or approved equal.
- M. Coordinators
 - 1. COR52-US26D by Ives, Part of Worldwide Ingersoll-Rand, Dublin, Ireland.

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- 2. Or approved equal.
- N. Astragals
 - 1. 357C by Pemko Manufacturing Company, Memphis, TN.
 - 2. Or approved equal.
- O. Dust-Proof Strikes
 - 1. DP1 and DP2 as manufactured by Ives, Part of Worldwide Ingersoll-Rand, Dublin, Ireland.
 - 2. Or approved equal.
- P. Magnetic Monitor Switch
 - 1. RX (exit device) or LX (latch-bolt) magnetic monitor switch with PT 750 24 VAC transformer by Von Duprin, Indianapolis, IN.
 - 2. Or approved equal.
- Q. Weather-stripping (bumper type)
 - 1. No. 170AA by Zero International, Inc., Bronx, NY.
 - 2. Or approved equal.
- R. Acoustic Seals
 - 1. 3708AA (Head and Jambs), 368AA (Semi-Mortised Automatic Door Bottom), and 564A (Threshold) by Zero International, Inc, Bronx, NY.
 - 2. Or approved equal.
- S. Thresholds
 - 1. 655A (interior saddles) by Zero International, Inc., 800 (doors with floor closers), Type 3 Offset by Rixson, a Subsidiary of Yale Security, Inc., an ASSA ABLOY Group Company, Monroe, NC.
 - 2. Or approved equal.
- T. Offset Thresholds
 - 1. 566A (interior doors) by Zero International, Inc., No. 700 (with floor closers) thresholds by Rixson, A Subsidiary of Yale Security, Inc., an ASSA ABLOY Group Company, Monroe, NC. Provide Offset Threshold of similar design as required.
 - 2. Or approved equal.
- U. Silencers
 - 1. SR 64 by Ives, Part of Worldwide Ingersoll-Rand, Dublin, Ireland.
 - 2. Or approved equal.
- V. Stops
 - 1. FS13, US26D finish, by Ives, Part of Worldwide Ingersoll-Rand.

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2. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Requirements for All Products

1. Hand of Door: Contract Drawings show the swing or hand of each door leaf (left, right, reverse bevel, etc.). Furnish each item of finish hardware for proper installation and operation of the door swing as shown.
2. Manufacturer's Nameplate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates).
3. Base Metals: Produce finish hardware units of the basic metal and forming method specified, using the manufacturer's standard metal alloy, composition, temper and hardness. Do not substitute materials or forming methods for those specified.
4. Fasteners: Manufacture finish hardware to conform to published templates, generally prepared for machine screw installation. Do not provide finish hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
5. Furnish screws for installation, with each finish hardware item. Provide Phillips flat-head screws except as otherwise specified. Finish exposed (exposed under any condition) screws to match the hardware finish or, if exposed in surfaces on other work, to match the finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
6. Provide fasteners which are compatible with both the unit fastened and the substrate, and which will not cause corrosion or deterioration of finish hardware, base material or fastener.
7. Provide concealed fasteners for finish hardware units which are not exposed when the door is closed, except to the extent no standard manufacturer units of the type specified are available with concealed fasteners. Do not use through bolts for installation when the bolt head or the nut on the opposite face is exposed in other work under any condition, except where it is not possible to adequately reinforce the Work and use machine screws or concealed fasteners of another standard type of satisfactorily avoid the use of through bolts.
8. Tools for Maintenance: Furnish a complete set of specialized tools as needed for City's continued adjustment, maintenance, removal and replacement of finish hardware.

B. Heavy-Duty Pivot Hinges

1. Templates and Screws: Provide only template-produced units.

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2. Base Metal: Fabricate hinges from forged bronze with US 26D Satin Chrome finish.
 3. Number of Hinges: Provide three hinges on each door leaf of less than 60-inches height; provide one additional hinge for next 30-inches of door height; provide two additional hinges for each 30-inches or fraction thereof for doors above 90-inches tall.
 4. Hinge Size: Except as otherwise specified or as required to comply with UL and NFPA, provide hinges of the following sizes:
 - a. Exterior and Interior Doors, maximum 48-inches wide: Top and bottom pivots; intermediate pivots based on number of hinges as specified; minimum of one intermediate pivot required on all doors.
 5. Types of Hinges: Provide all doors with offset hung, bottom, top and intermediate units with hardened steel pivot pins treated to prevent rusting or binding, permanently seated in an oil impregnated sintered bronze bearing lubricated for the life of the door and capable of supporting a minimum door weight of 800 pounds and recommended by the manufacturer for use on heavy-duty high traffic doors subject to extreme abuse. Provide single acting, mortised mounted units sized for a maximum door width of 4 foot-0 inches. Top pivot shall have a sloped top surface.
- C. Electric Power Transfer
1. Provide this accessory at all locations where electrified hardware is provided through door leaves.
- D. Electrified Mortise Locks Sets
1. Strikes: Provide manufacturer's standard wrought box strike, for each location and use shown. Provide stainless steel curved lip strikes, unless otherwise recommended by manufacturer, finish to match lock or latch set trim. Device to be UL certified to respond by solenoid operation to lock or unlock and contain a request to exit function microswitch interconnected with interior knob.
 2. Lock Throw: Provide minimum of 1-inch anti-friction latch bolt and 1-inch dead bolt throw wherever available on manufacturer's functions specified.
 3. Materials: Provide the following materials:
 - a. Latch Bolt: Stainless steel.
 - b. Dead Bolt: Stainless steel.
 - c. Case: Stainless steel.
 - d. Hub: Nickel steel.
 - e. Scalp: Stainless steel.
 - f. Escutcheon: 8-1/2-inches by 1-3/4-inches stainless steel; US 32D; Satin Stainless Steel.

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4. Backset: Provide minimum backset of 2-3/4-inches.
 5. Finish: US32D Satin Stainless Steel.
- E. Mortise Locks Sets
1. Strikes: Provide manufacturer's standard wrought box strike, for each location and use shown. Provide stainless steel curved lip strikes, unless otherwise recommended by manufacturer, finish to match lock or latch set trim.
 2. Lock Throw: Provide minimum of 1-inch anti-friction latch bolt and 1-inch dead bolt throw wherever available on manufacturer's functions specified.
 3. Materials: Provide the following materials:
 - a. Latch Bolt: Stainless steel.
 - b. Dead Bolt: Stainless steel.
 - c. Case: Stainless steel.
 - d. Hub: Nickel steel.
 - e. Scalp: Stainless steel.
 - f. Escutcheon: 8-1/2-inches by 1-3/4-inches stainless steel; US 32D; Satin Stainless Steel.
 4. Backset: Provide minimum backset of 2-3/4-inches.
 5. Finish: Us32d Satin Stainless Steel.
- F. Electrified Vertical Rod Panic Exit Devices
1. Strikes: Provide manufacturer's standard wrought stainless steel jamb-mounted top latch bolt and bottom latch bolt for each location and use shown. Device to be UL certified to respond by solenoid operation to lock or unlock and contain a request to exit function micro-switch interconnected with exit accessory.
 2. Exit Doors: Where required by governing regulations or where shown or scheduled, provide panic exit devices of the type required. Provide units for 1-3/4-inch thick doors.
 3. Lock Throws: Provide minimum of 3/4-inch latch bolt throws.
 4. Provide surface-applied two-point latching exit devices as specified.
 5. Provide the following materials:
 - a. Latch Bolt: Stainless steel.
 - b. Case: Stainless steel.
 - c. Cylinders: Brass.
 - d. Front: Stainless steel.
 - e. Chassis: Brass.

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- f. Crossbar: Oval, seamless, knurled crossbar with interlocking expansion collets and roll pins; satin stainless steel; 0.062-inches minimum thickness with steel reinforcing tube.
 - 6. Backset: Provide minimum backset of 2-3/4-inches.
 - 7. Finish: US 32D Stainless Steel.
 - 8. Function: ANSI No. 4: entrance by trim when latch bolt is retracted by key or set in a retracted position by key; no thumbpiece.
- G. Vertical Rod Panic Exit Devices
- 1. Strikes: Provide manufacturer's standard wrought stainless steel jamb-mounted top latch bolt and bottom latch bolt for each location and use shown.
 - 2. Exit Doors: Where required by governing regulations or where shown or scheduled, provide panic exit devices of the type required. Provide units for 1-3/4-inch thick doors.
 - 3. Lock Throws: Provide minimum of 3/4-inch latch bolt throws.
 - 4. Provide surface-applied two-point latching exit devices as specified.
 - 5. Provide the following materials:
 - a. Latch Bolt: Stainless steel.
 - b. Case: Stainless steel.
 - c. Cylinders: Brass.
 - d. Front: Stainless steel.
 - e. Chassis: Brass.
 - f. Crossbar: Oval, seamless, knurled crossbar with interlocking expansion collets and roll pins; satin stainless steel; 0.062-inches minimum thickness with steel reinforcing tube.
 - g. Backset: Provide minimum backset of 2-3/4-inches.
 - h. Finish: US 32D Stainless Steel.
 - i. Function: ANSI No. 4: entrance by trim when latch bolt is retracted by key or set in a retracted position by key; no thumbpiece.
- H. Floor Mounted Heavy-Duty Door Closers
- 1. Provide heavy-duty single-acting floor mounted door closers for all doors, and as recommended by the manufacturer for controlling doors weighing up to 800 pounds in high traffic and high abuse situations. Provide recessed floor mounted door closers for all doors.
 - 2. Size of Units: 6-1/2-inches wide by 13-1/4-inches long by 4-inches deep.

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3. Provide dress plates and other finished hardware components of satin chrome finish.
4. Provide low temperature hydraulic fluid for all units. Seal units using an adhesive backed rubber gasket.
5. Provide extended spindle as required to accommodate detailing shown.
6. Provide 3/4-inch offset heavy-duty arm coordinated with pivot hinge manufacturer's recommendations for heavy-duty pivot hinges.
7. Provide special cement case anchoring angles mounted on both sides of cast-iron cement case. Provide manufacturer's floor installation template and former kit.
8. Provide heavy-duty units fire-rated and complying with all required governing standards.
9. Provide the following materials and features in addition to others specified herein:
 - a. Provide both floor plate and threshold installation as required.
 - b. Provide floor plate with US26D finish.
 - c. Bottom arm with anti-friction bearing.
 - d. Closing speed adjustment valve and separate latch speed adjustment valve.

I. Overhead Surface-Mounted Door Closers

1. Provide all doors, unless specially scheduled or specified as being provided with floor mounted or concealed overhead closers, with surface-mounted overhead door closers. Provide both active and inactive door leafs with closers.
2. Size of Units: Except as otherwise specified, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather, and anticipated frequency of use.
3. Where parallel arms are specified, and for closers on exterior doors, provide closer unit one size larger than recommended for use with standard arms.
4. Use parallel arm arrangement for doors that would otherwise have the door closer appearing in finished corridors or entries.
5. Comply with UL, Building Materials Directory, and List of Inspected Fire Protection Equipment and Materials, and NFPA No. 80 for doors requiring door closers. Modify closers specified as required.
6. Provide hold open feature for all non-fire rated doors unless otherwise specified.
7. Provide corner bracket mounting on exterior doors. Select all arms to clear weatherstripping, and overhead door holders.

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8. Provide long arm to allow door to swing 180 degrees where long arm will eliminate floor mounted stops.
 9. Provide closers with spring power adjustment feature capable of increasing spring power 15 percent minimum in all closer sizes.
 10. Provide individual regulating valves for closing and latching speeds, and separate adjustable backcheck valve.
 11. Provide delayed closing action feature on all door closers. Position valve at top of closure.
 12. Provide the following materials and features in addition to others specified herein:
 - a. Full Metal Cover: Aluminum.
 - b. Case: Cast iron.
 - c. Arms: Plated to match full metal covers.
 - d. Other Parts: Steel.
 - e. Extreme temperature fluid.
 - f. Security torx machine screws.
 - g. Ten year warranty.
 - h. Provide manufacturer's optional corrosion protection.
 13. Finishes: S26D Satin Chrome. Color coordinate all arms and other accessories.
 14. Highly Corrosive Atmospheres: Provide all closers with specified manufacturers.
- J. Extra Heavy-Duty Overhead Holders and Stops
1. Provide surface-mounted extra heavy-duty overhead holders and stops on all leafs of all doors with hold open feature.
 2. Material: Provide the following materials:
 - a. Arm: Stainless steel; 1/4-inch thick.
 - b. All Other Parts: Stainless steel.
 3. Coordinate placement of extra heavy-duty overhead holder and stop with weatherstripping for non-interference.
 4. Design and reinforce connections of extra heavy-duty holder and tops where they are fasteners to other materials, to resist a superimposed load of 30 pounds per square foot acting on the plane of the doors. Mount to door using a minimum of four countersunk mounting holes with four 3/8-inch diameter stainless steel sex bolts.

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5. Provide all manufacturer recommended door reinforcements and coordinate the furnishing of hardware templates required for the installation of the units.
 6. Finish: US 32D stainless steel, satin finish.
- K. Flush Bolts and Automatic Flush Bolts
1. Provide flush bolts on the inactive leaf of all pairs of doors, unless otherwise specified.
 2. Provide flush bolts at the top and bottom of door.
 3. Materials: Provide the following materials:
 - a. Flush Bolt Levers: Forged Brass.
 - b. Flush Bolt Plate: Forge Brass.
 - c. Flush Bolt Guide and Strike: Wrought Brass.
 - d. Flush Bolt Rods: 1/2-inch round rods, bronze, 12-inch minimum length.
 4. Provide extension flush bolts with 3/4 inch throws and with top bolt not over 6 foot-0 inches above finished floor. Provide bottom flush bolt 12-inches long.
 5. Where required by governing authorities provide cast bronze automatic flush bolts bearing the UL label.
- L. Coordinators
1. Provide coordinator device on all pairs of doors required or specified to have automatic flush bolts, or panic exit devices. Comply with UL, List of Inspected Fired Protection Equipment and Material, and NFPA No. 80 requirements.
 2. Provide manufacturer's standard carry bar and strike on all pairs of doors equipped with coordinator.
 3. Materials: Bronze.
 4. Finish: US 32D Satin Stainless Steel.
- M. Astragals
1. Provide metal astragal bar, not less than 1/8-inch by 2-inches, for exposed flathead screw mounting on active leaf of all pairs of doors.
 2. Provide astragal of extruded aluminum with clear anodized finish.
- N. Dust-Proof Strikes
1. Provide brass dust-proof strikes which incorporate a slotted plunger raised to flush position by spring tension for all flush bolts.

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2. Provide 5/8-inch inside diameter dust-proof strikes; threshold mounted and surface mounted.
 3. Finish: US 26D Satin Chrome.
- O. Magnetic Monitor Switch
1. Provide stainless steel magnetic monitor switch which incorporates a magnet set into the door leaf head and an actuator set into the corresponding position in the frame which will electronically monitor the door leaf position.
 2. Provide magnetic monitor switch; flush (full mortized) mounted into frame and door leaf head.
 3. Finish: US 4.
- P. Weatherstripping And Acoustic Seals
1. Provide perimeter weatherstripping at all exterior doors. Provide acoustic stripping and seals for interior doors where scheduled.
 2. Continuity of Stripping: Except as otherwise specified, it is required that the stripping at each opening be continuous and without unnecessary interruptions at door corners and hardware.
 3. Replaceable Seal Strips: It is required that the resilient or flexible seal strip of every unit be easily replaceable and readily available from stocks maintained by the manufacturer.
 4. Provide bumper-type weatherstripping at jambs and head, including a resilient insert and metal retainer strip, surface-applied of the following metal, finish and resilient bumper material:
 - a. Housing: Extruded aluminum with clear anodized finish; 0.062-inch minimum thickness of main walls and flanges.
 - b. Dimensions: 1-1/2 inches by 15/16-inches; stop-mounted.
 - c. Seals: Closed-cell extruded sponge neoprene.
 5. Provide heavy-duty automatic acoustic drop-seal sound-stripping door-bottom unit with threshold of manufacturer's standard design, with operating seal bar of the following material, retained in an extruded metal bar, and capable of operating to close a 1-inch gap (from door bottom to floor or threshold). House mechanism and operating bar in the following metal housing, for mounting on doors as follows:
 - a. Housing: Extruded aluminum, 0.062-inch thick, with clear anodized finish on exposed surfaces.
 - b. Seal: Closed-cell sponge neoprene.
 - c. Mounting: Semi-mortise. Mount on stop-face of doors, except mount on bing-face of swing-in exterior doors.

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Q. Thresholds

1. Thresholds for all exterior doors shall be supplied by custom entry door system manufacturer. All interior doors shall be provided with thresholds.
2. Metal: Extruded aluminum; custom satin brushed aluminum; US 26 finish.
3. Surface Pattern: Fluted tread, manufacturer's standard.
4. Provide countersunk stainless steel screws and expansion shields.
5. Width: 5-inches wide and of length sufficient to span full width of rough openings; coped and scribed neatly at and around door frames.
6. Construction:
 - a. Single-piece, complying with manufacturer's recommendations.
7. Profile: Provide manufacturer's unit which conforms to the minimum size and profile requirements specified.
8. Coordinate thresholds for full compatibility with recessed floor mounted closers.
9. Thickness: 1/2 inch minimum.

R. Offset Thresholds

1. Thresholds for custom entry door system doors shall be supplied by custom entry door system manufacturer. All doors shall be provided with thresholds of the types specified herein.
2. Metal: Extruded aluminum; custom satin brushed aluminum; US 26 finish.
3. Surface Pattern: Fluted tread, manufacturer's standard.
4. Provide countersunk stainless steel screws and expansion shields.
5. Width: 7-3/4 inches and 8-3/4-inches wide and of length sufficient to span full width of rough openings; coped and scribed neatly at and around door frames.
6. Construction:
 - a. Single-piece, complying with manufacturer's recommendations.
 - b. When threshold abuts a wall at the ends, provide straight ends substituted for mitered returns.
7. Profile: Provide manufacturer's unit which conforms to the minimum size and profile requirement specified.
8. Coordinate thresholds for full compatibility with recessed floor mounted closers and with 1/2-inch thick polyacrylate terrazzo at all locations of step down conditions.
9. Thickness: 1/2-inch minimum.

S. Silencers

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1. Provide silencers for all door frames.
2. Provide pneumatic design that once installed, forms an air pocket to reduce noise.
3. Provide minimum of three per strike side of door jambs.

T. Stops

1. Stops shall be semi-automatic cast bronze extra heavy-duty floor mounted door holder, one per leaf.
2. Activation of holder accomplished by flipping engagement tongue forward. Release by firmly pushing door.

U. Sealants

1. Provide butyl rubber sealant complying with ASTM C920 for use with thresholds.
2. Adhesives, sealants, and primers, shall comply with VOC limits established by City standards or other local restrictions, as applicable.

V. Hardware Finishes

1. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible. Reduce difference in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of finish hardware exposed at the same door or opening. In general, match all items to the manufacturer's standard finish for the latch set for color and texture.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Examination

1. The Contractor, installer and architectural hardware consultant shall examine the substrate to receive finish hardware, and ascertain the conditions under which the work will be performed, and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the finish hardware Work until unsatisfactory conditions have been corrected in a manner acceptable to the Engineer.

B. Preparation

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1. Templates: Furnish finish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of finish hardware. Upon request, check the Shop Drawings of such other work, to confirm that adequate provisions are made for the proper installation of the finish hardware.

3.02 INSTALLATION

- A. Mount finish hardware units at heights recommended in "Recommended Locations for Builders' Hardware" by National Builders Hardware Association, except as otherwise specified or required to comply with governing regulations.
- B. Install each finish hardware item in compliance with the manufacturer's instructions and recommendations.
- C. Set units level, plumb and true to line and locations. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Cut and fit threshold and floor covers to profile of door frames, and recessed floor mounted closers with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.
- F. Screw thresholds to substrate with No. 10 or larger stainless steel screws of the proper type for permanent anchorage.
- G. Set thresholds in a bead of butyl rubber sealant to completely fill concealed voids and exclude moisture from every source. Do not plug drainage holes or block weeps. Remove excess sealant before sealant cures to a firm set.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Provide a written field report, prepared by installer's architectural hardware consultant, identifying actual condition, location, manufacturer, and product designation for each item of finish hardware actually present on each door at the Site, including whether finish hardware is adjusted and operating properly. Compare actual units present with each item referenced to the approved Shop Drawings and Contract requirements.
- B. Installer's architectural finish hardware consultant shall provide opinions to, and assist the Engineer in determining, acceptability of installation as Work proceeds. All comments and discussions, conversations and meetings with the Engineer shall be included in written field report for submission to the Engineer for review and approval at completion of finish hardware installation.
- C. As part of written field report to be submitted to the Engineer for approval, recommend remedial actions for work not in compliance with the Sections. No payment for remedial action shall be made until remedial recommendations and actions have been approved by the Engineer and incorporated into the Work.

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3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Provide a Final Report on the actual finish hardware present on each door of the Work. Compare this field Report to approved Shop Drawings submittal and present to the Engineer with remedial recommendations. No payment for remedial action shall be made until remedial recommendations have been approved by the Engineer and implemented by the Contractor.
- B. Adjust and check each operating item of finish hardware and each door to ensure proper operation or function of every unit. Lubricate moving parts with the type lubrication recommended by manufacturer (graphite-type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application.
- C. Final Adjustment: Where finish hardware installation is made more than one month prior to Final Acceptance or occupancy of a space or area, return to the Work during the week prior to Final Acceptance or occupancy, and make a final check and adjustment of all finish hardware items in such space or area. Clean and relubricate operating items as necessary to restore proper function and finish of finish hardware and doors. Adjust door control devices to compensate for final operating of heating and ventilating equipment.
- D. Provide each manufacturer’s authorized technical representative to instruct and train the City's personnel in proper adjustment and maintenance of finish hardware during the final adjustment of finish hardware.
- E. Finish hardware which is blemished or defective will be rejected even though it was set in place before defects were discovered. Remove and replace with new finish hardware. Repair all resultant damage to other work.
- F. Continued Maintenance Service: Approximately 6 months after the acceptance of finish hardware in each area, the installer, accompanied by the representative of the latch and lock manufacturer, shall return to the Project and readjust every item of hardware to restore proper function of doors and finish hardware. Consult with and instruct City's personnel in recommended additions to the maintenance procedure. Clean and lubricate operational items wherever required. Replace finish hardware items which have deteriorated or failed due to faulty design, materials or installation of finish hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the finish hardware.

3.06 SCHEDULES

- A. Hardware (HDW) Sets:
 - 1. HDW Set No. 1 (Interior/Exterior Single Swinging Doors)
 - a. Heavy-Duty Pivot Hinges
 - b. Mortice Locksets

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- c. Panic Exit device
 - d. Overhead Surface Mounted Door Closer
 - e. Threshold
 - f. Acoustic Seals
 - g. Weather-Stripping
 - h. Astragals
 - i. Stops
 - j. Security Devices (See 28 10 00 - Access Control and Alarm Monitoring)
2. HDW Set No. 2 (Exterior Double Swinging Doors)
- a. Heavy-Duty Pivot Hinges
 - b. Mortice Locksets
 - c. Vertical Rod - Panic Exit device
 - d. Overhead Surface Mounted Door Closer
 - e. Threshold
 - f. Acoustic Seals
 - g. Weather-Stripping
 - h. Astragals
 - i. Stops
 - j. Coordinators
 - k. Security Devices (See 28 10 00 - Access Control and Alarm Monitoring)
3. HDW Set No. 3 (Sliding Louver Panel Door)
- a. Mortice Locksets
 - b. Security Devices (See 28 10 00 - Access Control and Alarm Monitoring)
4. HDW Set No. 4 (Sliding Industrial Doors)
- a. HDW (See Section 08 34 10 -Sliding Industrial Doors)
 - b. Security Devices (See 28 10 00 - Access Control and Alarm Monitoring)

END OF SECTION

**SECTION 08 81 03 –GLASS, PLASTIC AND GLAZING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Furnishing all labor, materials, equipment, and appliances required for the complete execution of work as shown on the Contract Drawings and specified herein.
- B. Principal items of work include:
 - 1. Float glass
 - 2. Insulated glass
 - 3. Bird Safe Glass
 - 4. UV protective glass
 - 5. Clear plate wire glass
 - 6. Glazing clips, tapes, gaskets and compound
 - 7. Setting glass and glazing
 - 8. Laminated Safety Glass
- C. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 07 90 00-- Joint Protection

1.04 REFERENCES

- A. NYCBC -- New York City Building Code
- B. CPSC 16 CFR 1201 -- Federal Safety Standard for Architectural Glazing Materials
- C. ANSI Z97.1 -- Performance Specifications and Methods of Test For Safety Glazing Material Used in Buildings
- D. GANA Glazing Manual -- Glass Association of North America, Glazing Manual
- E. IGMA TM-4000-02(07) – Insulating Glass Manufacturing Quality Procedure Manual.
- F. ASTM C1036 -- Standard Specification for Flat Glass
- G. UL 9 -- Standard for Fire Tests of Window Assemblies
- H. NFPA 252 -- National Fire Protection Association, Standard Method of Fire Tests for Door Assemblies
- I. NFPA 257 -- National Fire Protection Association, Standard Method of Fire Tests for Window and Glass Block Assemblies
- J. ASTM C509 -- Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material
- K. ASTM E119 -- Standard Test Methods for Fire Tests of Building Construction and Materials

SECTION 08 81 03 –GLASS, PLASTIC AND GLAZING
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1.05 DESCRIPTION

SYSTEM DESIGN REQUIREMENTS

A. Glass Sizes and Types

1. Each light of glass shall bear the manufacturer's label, showing kind, thickness and quality and the label shall not be removed until the work has been inspected and approved by the Engineer.
2. All glass shall be the best quality of its respective kind, free from integral or surface defects and shall not be clouded, cracked or broken.

B. Sustainable Design Requirements

1. Recycled Content of Glass: Postconsumer recycled content plus one-half of pre-consumer recycled content shall not be less than 10 percent.
2. Low Emitting Materials: Sealants and adhesives used on site and within the building's weatherproofing system shall meet the VOC content limits listed below or in the detail specifications.
 - a. Architectural Sealants: 250 g/L.
 - b. Sealant Primers for Nonporous Substrates: 250 g/L.
 - c. Sealant Primers for Porous Substrates: 775 g/L.
 - d. Multipurpose Construction Adhesives: 70 g/L
 - e. Structural Glazing Adhesive: 100 g/L.

C. Fire Rating

1. Where Glass, Plastic and Glazing systems are used within a fire rated room, corridor, egress path, and as indicated in the Contract Drawings, those Glass, Plastic and Glazing systems shall maintain the minimum fire rating of the location in which they are placed.

PROJECT CONDITIONS

- A. Perform glazing when ambient temperature is above 40°F.
- B. Perform glazing on dry surfaces only.

1.06 QUALITY ASSURANCE

- A. In addition to complying with pertinent codes, regulations, and safety standards, comply with the recommendations contained in the "Manual of Glazing" of the Flat Glass Marketing Association.
- B. Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the referenced standards and the requirements of the Contract Documents, and who shall personally direct all installations performed under this Section.

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- C. Coordinate with the various glass, door and window manufacturers to ascertain the proper type of glazing compounds to be used so that all design criteria are met and so that the required manufacturers' guarantees are not invalidated.
- D. IGCC Certification- Insulating Glass Certification Program: Provide insulating glass units complying with requirements indicated which are permanently marked with certification label.
- E. Glass thickness specified shall be considered as minimum values and that thicker glass or wider insulating spaces, or both, may be required by door and window manufacturers in order to produce a product, which meets the thermal requirements specified in other Sections. Secure and coordinate all requirements from each manufacturer prior to ordering or installing such items.
- F. All glass shall be factory labeled on each pane and shall contain, as a minimum, grade, type and quality of glass and trademark. Glass without factory labels shall be considered unacceptable. After inspection and approval by Engineer, remove labels from all glass.
- G. Check openings to verify that frames are plumb and true, square and secure. Clean surfaces to be sealed; perform work under satisfactory weather conditions; provide shelter and proper temperature.
- H. Take field dimensions for cutting glass and fabricating units.
- I. All glass sizes shall be determined by measuring the frames to receive the glass at the site and/or from guaranteed dimensions provided by the frame supplier. Glass sizes shall comply with the manufacturer's specified tolerances for each type of glass including cutting tolerance, minimum edge clearance, minimum face clearance, and cover on glass.

1.07 SUBMITTALS

- A. Contractor shall submit the following to the Engineer for review and approval, in accordance with the procedures and requirements set forth in Section 01 33 00 – Submittal Procedures.
 - 1. Samples
 - 2. Shop Drawings
- B. Samples shall include:
 - 1. Two 12" square pieces of each type of glass specified.
 - 2. One bead, approximately 1/4 inch wide x 3 inches long of sealant, indicating color and set of cured material.
- C. Shop Drawings shall include but not be limited to:
 - 1. Complete layout and installation drawings and schedules with clearly marked dimensions.
 - 2. Manufacturer's descriptive data of glass and glazing materials.
 - 3. Recommended installation instructions.

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4. Manufacturer's certification that the materials meet specification requirements.
- D. Sustainable Design Submittals:
 1. Environmental Materials Reporting Form (EMRF) Recycled Content. Provide the following information:
 - a. Name of Product and Manufacturer.
 - b. Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
 - c. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.
 - d. Indicate the location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. For assemblies, include the percentage by weight that is considered regional.
 2. VOC Reporting Form. Provide the following information:
 - a. For all sealants and adhesives used on site and within the building's weatherproofing system provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Delivered materials shall match to approved samples in every respect. Deliver materials in the manufacturer's original unopened labeled containers, clearly marked with their name and brand. Transport large panes of glass in vertical position with spacers to prevent contact between panes and edges.
- B. Store glass in a dry, well-ventilated location at a constant temperature, maintained above dew point. Handling shall be kept to a minimum and all glass shall be protected from soiling, condensation or moisture of any kind.
- C. Glass delivered to the job site with manufacturer's markings, or when markings are applied at the job, use either neutral or slightly acidic adhesive. In no case shall marking materials or adhesives be alkaline. Any staining of glass by alkaline material will be cause for rejection.
- D. The edges of all tempered and insulating glass shall be protected from damage and edges shall not be modified in any way after the glass leaves the factory. Nipping of any glass to reduce size shall not be permitted.
- E. All glass shall be delivered with manufacturer's labels showing type, thickness and quality of material (and UL label as required). These labels shall not be removed until the glass is set and final approval has been secured.
- F. Any glass that has been damaged or discolored in any way, during delivery, while stored on site, during installation, or by adjacent work, may be rejected by DEP and shall be replaced by the Contractor at no extra charge to the City.

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1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. The Contractor shall obtain from the Manufacturer and provide to DEP the Manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. The products accepted as manufactured by:
 - a. Glass:
 - 1) PPG Industries, One PPG Place Pittsburgh, PA.
 - 2) Libby - Owens – Ford, Toledo, OH.
 - 3) Cardinal IG, Eden Prairie, MN.
 - 4) Viracon, Inc., Owatonna, MN.
 - 5) Guardian, Inc., Webster, MA.
 - 6) Or approved equal.
 - b. Bird Protective Glass:
 - 1) Super Neutral 68 by Guradian Glass
2300 Harmon Road, Auburn Hills, Michigan 48326
1-866-GuardSG (482-7374)
 - 2) Viraspan
800 Park Drive, Owatonna MN 55060
1-800-533-2080
 - 3) Or approved equal

2.02 MATERIALS / EQUIPMENT

GENERAL

- A. Unless otherwise specified, all glass shall conform to FS DD-G-451c. ASTM C1036 All product references are Viracon trade names. All substitutions shall perform equal to or better than products specified.
- B. Insulating glass (unit type 1) shall be one and five-eighths (1-5/8) inches thick hermetically sealed units consisting of an outer light of 9/16 inch heat strengthened laminated panels with "VH11-50 E Coating System" and an inner light of 9/16 inch thick heat strengthened laminated clear glass, each separated by 1/2 inch entrapped, dehydrated air, edges dual sealed and silicone second sealed. Each panel to have 0.060 clear polyisobutylene (PVB) inner layer.

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1. Transmittance:
 - a. Visible Light: 45%
 - b. Solar Energy: 23%
 - c. Ultraviolet: <1%
 - 1) (Ultraviolet defined as 300 to 380 nanometers (nm))
 2. Reflectance:
 - a. Visible Light-Exterior: 16%
 - b. Visible Light-Interior: 13%
 - c. Solar Energy: 21%
 3. ASHRAE U-Value:
 - a. Winter Nighttime: 0.45 Btu (hr. x sq. ft. x °F)
 - b. Summer Daytime: 0.52 Btu (hr. x sq. ft. x °F)
 4. Shading Coefficient: 0.39
 5. Solar Factor (SHGC): 0.33
 6. Relative Heat Gain: 85 Btu/hr x sqft
- C. Insulated Glass with Obscure Translucent PVB unit (type 2). Same as type 1 except inboard lite to be 9/16 laminated glass with obscure PVB inner layer.
1. Transmittance:
 - a. Visible Light: 45%
 - b. Solar Energy: 23%
 - c. Ultraviolet: <1%
 - 1) (Ultraviolet defined as 300 to 380 nanometers (nm))
 2. Reflectance:
 - a. Visible Light - Exterior: 16%
 - b. Visible Light - Interior: 13%
 - c. Solar Energy: 21%
 3. ASHRAE U-Value:
 - a. Winter Nighttime: 0.46 Btu (hr. x sq. ft. x °F)
 - b. Summer Daytime: 0.56 Btu (hr. x sq. ft. x °F)
 4. Shading Coefficient: 0.39
 5. Solar Factor (SHGC): 0.33
 6. Relative Heat Gain: 85 Btu/hr x sq ft

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- D. Insulated Glass Unit (type 3): one and five-eighths (1-5/8) inches thick. Outboard lite: Viracon 9/16 laminated VH 11-50 both lites heat strengthened with BE1028 interlayer. Silkscreen 1/8 lines 1/4 o/c with V912 white frit on No. 2 surface. 1/2 airspace. Inboard lite 9/16 clear laminated heat strengthened with .060 clear PVB.
1. Transmittance:
 - a. Visible Light: 28%
 - b. Solar Energy: 14%
 - c. Ultraviolet: <1%
 - 1) (Ultraviolet defined as 300 to 380 nanometers (nm))
 2. Reflectance:
 - a. Visible Light - Exterior: 25%
 - b. Visible Light - Interior: 24%
 - c. Solar Energy: 22%
 3. ASHRAE U-Value:
 - a. Winter Nighttime: 0.45 Btu (hr. x sq. ft. x °F)
 - b. Summer Daytime: 0.53 Btu (hr. x sq. ft. x °F)
 4. Shading Coefficient: 0.29
 5. Solar Factor (SHGC): 0.25
 6. Relative Heat Gain: 65 Btu/hr. x sq. ft.
- E. Insulated Spandrel Glass unit (type 4). Same outboard lite as type 2 unit. 1/2 airspace. Inboard lite: 1/4 clear heat strengthened with V 948 frit applied to No. 6 surface of insulated glass unit.
1. ASHRAE U-Value:
 - a. Winter Nighttime: 0.46 Btu (hr. x sq. ft. x °F)
 - b. Summer Daytime: 0.57 Btu (hr. x sq. ft. x °F)
- F. Laminated glass: shall be laminated safety glass, 1/4-inch minimum thickness, and interior exposure standard clear laminated glass or approved equal. For use in: interior locations as indicated on the Contract Drawings.
- G. Wire Glass - Clear window glass with 3/4-inch square mesh welded wire reinforcing imbedded in glass. Clear plate wire glass shall be 1/4 inch thick similar and equal to "Smooth Wire" as manufactured by Guardian, Inc., and shall be used for: Vision panels in doors, or as indicated on the Contract Drawings.
- H. Tempered Figured/Patterned Glass: Kind FT, Condition A, Type II, Class I, Quality q8, Finish fl of pattern and class indicated.

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- I. Fire Rated Glazing System - ASTM E119 UL to be located as indicated on the Contract Drawings of a minimum of 1/4-inch thickness, indicated in fire rated assemblies in doors, sidelights or windows unless noted otherwise as manufactured by SAFTI (Safety and Fire Technology, Inc.) Listed as follows:
 - 1. SuperLite II 90 28/28 glazing wall and door system UL Design #U518. Maximum vision area 28 square feet, 90 minute fire rate assembly. Sponsors: SAFTI and O’Keeffe/GPX.
 - 2. SuperLite II-45 Door, window or sidelight ASTM E163 and E152 UL Design #R14212 Sponsors SAFTI and CECO.
 - 3. SuperLite II 60 28 glazing wall system with GPX frame. ASTM E119 UL Design #U518. Sponsors SAFTI and O’Keeffe/GPX.
- J. Clear Heat-Strengthened Float Glass: Kind HS, Condition A, Type I, Class 1, and Quality q3.
- K. Clear Float Glass - Type I, Class 1, and Quality g3.
- L. Bird Friendly Glass – Super Neutral 68 by Guardian SunGuard or approved equal:
 - 1. Transmittance 68%
 - 2. Visible Light 11% (in), 12% (out)
 - 3. U-value 0.29
 - 4. Solar Heat Gain 0.38
 - 5. Light to Solar Gain 1.80

GLAZING MATERIALS

- A. Use a resilient, non-hardening glazing compound, capable of withstanding the climatic conditions at the Project site, such as silicone or polysulfide sealants.
- B. Secure recommendations from window and glass manufacturers as to the proper type of glazing compound, which should be used so as not to delaminate glass, stain materials, or otherwise create defects in the work.
 - 1. Make exposed surfaces smooth, even and uniform in appearance. Slope glazing compound to readily shed water.
 - 2. Glazing compound for glazing metal sash, doors, etc., shall meet the requirements of ASTM E119 respectively for physical qualities and shall be as manufactured by:
 - a. H.B. Fred Kuhls, Brooklyn, NY.
 - b. Tremco Manufacturing Co., Beachwood, OH.
 - c. Pecora Paint Co., Harleysville, PA.
 - d. Gibbs and Hohman, Munster, IN.
 - e. Or approved equal.

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3. Preformed vision strips and tape shall be used in conjunction with setting all glass in exterior windows and shall be similar and equal to Tremco vision strips and "Tremco 440" Tape as manufactured by:
 - a. Tremco Manufacturing Co., Beachwood, OH.
 - b. Or approved equal.
- C. Tapes and vision strips shall be as selected from the manufacturer's standard products.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 INSTALLATION

- A. Sheet glass shall be cut and set with waves running horizontally.
- B. All measurements and size for the work shall be obtained and verified by the Contractor who shall be responsible for the correct and accurate fitting of all his work.
- C. All glass shall be set in such manner as to avoid possibility of breakage.
- D. Rabbets shall be thoroughly cleaned and shall have been prime coated before glass is set.
- E. Glass shall be well bedded and back glazed and all surplus compound and markings shall be carefully removed from doors, sash, and adjoining work, while still fresh. Compound shall be finished in true, even lines, neatly and smooth faced. All glass shall be set in strict accordance with the manufacturer's printed directions.
- F. All glass when set and glazed shall be free from rattle and all exterior glazing shall be executed in such a manner that the work will be watertight. Insulating glass shall be set in compliance with the manufacturer's instructions.
- G. Glazing molds shall be removed and replaced in their correct locations in such a manner as not to mar molding or the screws securing same.
- H. All glazing shall be done at the building after the work into which glass is to be set has been installed. All openings shall be properly marked after being installed, to show that the openings have been glazed.

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3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Before and after installation, all work shall be properly protected against damage.
- B. On completion and prior to turning the project over to DEP, all metal work and glass shall be cleaned and left in perfect condition. Glass shall be washed outside and inside.
- C. Make required adjustments.
- D. Thoroughly clean all glass and mirrors just before final acceptance by DEP, or sooner if authorized by Engineer.
- E. Remove excess glazing compound and foreign materials.
- F. Replace broken or defective glass and hardened, uneven, defective, or otherwise non-complying glazing compound.

END OF SECTION

SECTION 08 81 03 –GLASS, PLASTIC AND GLAZING
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NO TEXT ON THIS PAGE

SECTION 08 91 20 – FIXED LOUVERS
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all labor, materials, equipment and appliances required for the complete execution of the Work as shown on the Contract Drawings, specified in the Contract, and as specified herein.
- B. The extent of louver work is shown on the Contract Drawings and includes the following:
 - 1. Individual louver openings where indicated.
 - 2. Blank-off metal panels where required.
 - 3. Bird screen or insect screen as required.
 - 4. Angles and fastenings.
- C. Remove sections of louvers where indicated on the Drawings.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 07 90 00 - Joint Protection

1.04 REFERENCES

- A. NYSBC - 2020 New York State Building Code
- B. NYSECC - 2020 New York State Energy Conservation Code
- C. AMCA 500 - Air Movement Control Association (AMCA) Louvers, Dampers, and Shutters, Standard Test Method for For Aluminum Louvers:
- D. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate, Standard Specification for
- E. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes, Standard Specification for
- F. AA - The Aluminum Association Incorporated, Aluminum Standards and Data For stainless steel louvers:
- G. ASTM A276 - Stainless Steel Bars and Shapes, Standard Specification for.
- H. ASTM A320 - Alloy Steel Bolting Materials for Low Temperature Service, Specification for.
- I. ASTM A666 - Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate and Flat Bar, Standard Specification for.
- J. ASTM F593 - Stainless Steel Bolts, Hex Cap Screws and Studs, Standard Specification for.
- K. ASTM F594 - Stainless Steel Nuts, Standard Specification for.
- L. ANSI/ASSE A1264.1 - Safety Requirements for Workplace Walking/Working Surfaces and Their Access; Workplace, Floor, Wall, and Roof Openings; Stairs and Guardrail/Handrail Systems.
- M. AWS A5.12 - Tungsten and Tungsten Alloy Electrodes for Arch Welding and Cutting.
- N. 29 CFR 1910.23 - Guarding Floor and Wall Openings and Holes.

SECTION 08 91 20 – FIXED LOUVERS
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1.05 DESCRIPTION

- A. Structural Performance: Design, engineer, fabricate and install metal louvers to withstand the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames and supports, noise or metal fatigue caused by louver blade rattle or flutter; and permanent damage to fasteners and anchors.
 - 1. For Wind Loads and Internal Pressures reference Contract Drawings and calculations.
 - 2. Normal thermal movement is defined as that resulting from the following maximum change (range) in ambient temperature. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
 - a. Temperature Change (Range): 100 deg. f (55.5 deg. C)
- B. Air-Performance, Water-Penetration and Air-Leakage Ratings: Provide louvers complying with performance requirements indicated as demonstrated by testing manufacturer's stock units of height and width indicated according to Air Movement and Control Association (AMCA) Standard 500.

1.06 QUALITY ASSURANCE

- A. Codes and Standards: Refer to above section.

1.07 SUBMITTALS

- A. The following shall be submitted for review and approval by the Engineer.
 - 1. Cut Sheets:
 - a. Each louver type, including all relevant information.
 - 2. Samples:
 - a. A 12"x12" sample of all louver type as shown in the Contract Drawings for review and approval, including proposed finishes as specified herein.
 - 3. Shop Drawings:
 - a. Plans, Elevations, Details, including but not limited to:
 - 1) Callouts of materials/finishes
 - 2) Connections to wall
 - 3) Connections to Duct
 - 4) Flashing as shown

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:

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1. Deliver louvers and all accessories dry and undamaged, with manufacturer's protection and original product identifications and packaging intact.
2. Exercise care in unloading, storing, and installing louvers to prevent bending, warping, twisting and surface damage.
3. Any damaged or deformity, caused by improper delivery methods, to the louvers or other related materials, shall be returned to the manufacture and replaced with new materials without defects at no extra charge to the City.

B. Storage of Materials:

1. Store all louvers and accessory materials in a manner that will protect them from exposure to sun, standing water and condensation; with good air circulation around each piece.
2. Store all louvers and accessory materials above ground in a covered area protected from dirt, damage, and weather with one end elevated for drainage.
3. Do not store in contact with wood or concrete or other materials that might cause staining, damage, or corrosion.
4. If louvers become wet, immediately separate them, wipe dry with a clean cloth, and allow to air dry.
5. Any louvers or other related materials that has damage or deformity caused by the weather due to improper storage and protection shall be returned to the manufacture and replaced with new materials without defects at no extra charge to the City.

C. Handling of Materials:

1. Do not subject louvers and accessory materials to bending or stress.
2. Do not damage edges or handle material in a manner that will cause scratches, warps, or dents.
3. Remove strippable protective film, immediately preceding louver installation.
4. Any louvers or other related materials that has damage or deformity pre installation, during installation, post installation, or caused by adjacent work shall be returned to the manufacture and replaced with new materials without defects at no extra charge to the City.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

SECTION 08 91 20 – FIXED LOUVERS
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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The Airolite Co, Schofield, WI.
- B. Penn Ventilator Co., Inc., Birmingham, AL.
- C. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Double Drainable Fixed Louver:

1. Individual louver shall be Airflo Industrial Model No. FDD-6-SS; fixed 45 degree, 6 inch deep dual drainable storm proof blade of the following characteristics:
 - a. Frames and blades shall be stainless steel 316 alloy .064" thick.
 - b. Fasteners: Of same basic metal and alloy as fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.
 - 1) Use types, gages and lengths to suit unit installation conditions.
 - 2) Use Philips flat-head machine screws for exposed fasteners unless otherwise indicated.
 - c. Anchors and inserts of type, size and material required for type of loading and installation indicated. Use non-ferrous metal or hot-dip galvanized anchors and inserts for exterior installation and elsewhere as required for corrosion resistance.
 - d. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).
2. Manufacturer to submit test data on 4 feet x 4 feet louver units. Test data shall show the following results at 1100 fpm free area velocity.

Minimum Area	Free	Maximum Pressure Drop	MAXIMUM WATER PENETRATION
7.32 sq. ft.		0.24 in	0.005 oz.
0.678 m		6.10 mm	1.53 g

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Finish
All exposed stainless-steel components shall be a #4 satin finish.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 INSTALLATION

- A. Anchor louver frames as shown in Contract Drawings.
- B. Mount bird screens of all louvers unless indicated otherwise on inside face with clips, machine screw into frames. Screws shall be stainless steel.
- C. Verify size, location and placement of continuous louvers and individual louver units prior to fabrication wherever possible. Coordinate field measurement and shop assembly to minimize field adjustment. It is important to recognize that both fabrication and installation be done by the same company in order to achieve the quality required.
- D. Locate and place louver unit's plumb, level and in proper alignment.
- E. Use concealed anchorages where possible. Provide neoprene washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.
- F. Form closely fitted joints with exposed connections accurately located and secured.
- G. Provide perimeter reveals and openings of uniform width for sealants and joint fillers as indicated.
- H. Repair finishes damaged by cutting, welding, soldering, and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations and refinish entire unit or provide new units.
- I. Install concealed gaskets, flashings, joint fillers and insulation as louver installation progresses where required to make louver joints weather-tight. Comply with Section 07 90 00 – Joint Protection for sealants applied during installation of louver.
- J. Protect louvers and vents from damage of any kind during construction period including use of temporary protective coverings where needed and approved by louver manufacturer. Remove protective covering at time of Substantial Completion.
- K. Restore louvers and vents damaged during installation and construction period so that no evidence remains of correction work. If results of restoration are unsuccessful, remove damaged units and replace with new units.
- L. Do all cutting and fitting required for the installation in a neat manner.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

SECTION 08 91 20 – FIXED LOUVERS
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3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Upon completion remove any and all protective coatings, and clean off all parts of the work in accordance with Contract Documents.
- B. Any adjacent material damaged during installation of louver shall be fixed or replaced at no extra charge to the City.

END OF SECTION

SECTION 08 91 20 – FIXED LOUVERS
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NO TEXT ON THIS PAGE

SECTION 09 22 01 – FURRING AND LATHING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Metal furring and lathing as specified herein include wall framing, bulkhead framing, ceiling framing, furred space framing, metal lathing, and all accessories and appurtenances.
- B. Metal furring and lathing shall be provided as indicated on the Contract Drawings, specified herein and in the Contract, or as required otherwise for a complete installation.
- C. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 05 05 13.01 - Galvanizing
- B. Section 07 90 00 - Joint Protection

1.04 REFERENCES

- A. ASTM C841 - Standard Specification for Installation of Interior Lathing and Furring
- B. ASTM C847 - Standard Specification for Metal Lath
- C. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Board or Metal Plaster Bases to wood studs or steel studs
- D. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to receive interior and exterior Portland Cement-Based Plaster
- E. GA-600-09 - Gypsum Association Fire Resistance Design Manual
- F. ML/SFA 540 - (Metal Lath/Steel Framing Association, Division of National Association of Architectural Metal Manufacturers) Lightweight Steel Framing Systems Manual
- G. ML/SFA 920 - Guide Specifications for Metal Lath and Furring
- H. U.L. - Fire Resistance Directory and Building Material Directory
- I. NYSBC - 2020 New York State Building Code

1.05 DESCRIPTION

SYSTEM DESIGN REQUIREMENTS

- A. Vertical Finish Surface Deflection: Wall and furred space framing shall be limited to a surface deflection of 1:360 under a lateral point load of 100 pounds.
- B. Horizontal Finish Surface Deflection: Ceiling and soffit framing shall be limited to a surface deflection of 1:360 under superimposed dead loads and wind uplift.
- C. Fire rated assemblies shall conform to ASTM E119 and all applicable codes.
- D. Sustainable Design Requirements
 - 1. Recycled Content of Metal Lath and Metal Accessories: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

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- E. Project-specific system/design requirements will be provided (if necessary) in the Contract in order to update the requirements given herein or to supplement other requirements given in the Contract Drawings.
- 1.06 QUALITY ASSURANCE
- A. All metal furring and lathing work shall be performed in accordance with ASTM C841, ASTM C847, ASTM C1063, GA-600, ML/SFA 540, and ML/SFA 920. The Contractor shall maintain one copy of each of the aforementioned documents on site.
- 1.07 SUBMITTALS
- A. Contractor shall submit Shop Drawings for approval of the Engineer. Submittals shall include, but not be limited to: catalog cuts, drawings, and reference materials.
 - 1. Submittals shall include the following:
 - a. Data: The Contractor shall submit copies of specifications, installation instructions and general recommendations from the metal furring and metal lath manufacturers, for each type of product.
 - b. Manufacturer's data substantiating that the materials comply with the requirements shall be included.
 - 2. Test Reports: Test data shall be submitted:
 - a. All fire rated systems at no additional cost to the City.
 - 3. Sustainable Design Submittals:
 - a. Environmental Materials Reporting Form (EMRF) Recycled Content and Regional Materials. Provide the following information:
 - 1) Name of Product and Manufacturer.
 - 2) Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
 - B. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Delivery of Materials
 - 1. Materials shall not be delivered to the project site before the time of installation.
 - 2. Materials shall be delivered in sufficient quantities to allow continuity of the Work.
 - B. Storage of Materials
 - 1. Materials shall be stored in original, undamaged containers and packaging with manufacturer's labels and seals intact.

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2. All materials shall be stored in a dry, enclosed area, off the ground and away from all possible contact with water, ice or snow.
3. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the job-site before being incorporated into construction systems.

C. Handling of Materials

1. Materials shall be handled carefully in order to avoid damage or breakage.
2. Materials shall not be exposed to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the site and shall not be incorporated into the Work.
3. Packages or containers shall not be opened until all necessary preparatory Work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Furring and Lathing manufacturers shall be as specified in the Contract.

2.02 MATERIALS / EQUIPMENT

- A. Galvanizing: All steel items included as a part of the metal furring and lathing system shall be galvanized in accordance with Section 05 05 13.01 - Galvanizing, unless specified otherwise.
- B. Furring channels shall be of formed galvanized steel, minimum 0.040-inch thick, 3/8 inches deep by 7/8 inches high. Splicing shall be permitted.
- C. Main ceiling channels shall be of formed galvanized steel, minimum 0.05-inch thick, 3/4 inches deep by 1-1/2 inches high. Ceiling channels shall be a single piece; splicing shall not be allowed.
- D. Hangers and Support for Suspended Ceilings: Ceiling suspension system shall be connected directly to the structural suspension system with galvanized direct hang clips of galvanized rolled steel sections of size and type to suit application.
- E. Casing bead shall be of formed galvanized steel of a depth as required by the plaster thickness and in the maximum possible lengths. Casing bead shall have expanded metal flanges with square edges.
- F. Corner bead shall be of formed galvanized steel of a depth as required by the plaster thickness and in the maximum possible lengths. Corner bead shall have expanded metal flanges with radiuses edges.
- G. Base screed shall be of formed galvanized steel of a depth as required by the plaster thickness and in the maximum possible lengths. Base screed shall have expanded metal flanges with beveled edge.
- H. Expansion Joint Accessories: Expansion joint shall be of formed galvanized steel and shall have an accordion profile, two-inch, with expanded metal flanges on each side.
- I. Metal lath shall conform to ASTM C847, and shall be galvanized flat diamond mesh weighing a minimum of 3.4 pounds per square yard.
- J. Corner mesh shall be of formed galvanized steel sheet, minimum 0.018 inches thick with expanded metal flanges, two-inch, shaped to permit complete embedding in plaster.
- K. Strip mesh shall be of formed galvanized steel sheet, minimum 0.018 inches thick by 24 inches wide.
- L. Fasteners shall conform to ASTM C1002 and shall be of the self-drilling, self-tapping type.
- M. Polyethylene sheet shall be clear and shall be 6 mil thick.
- N. Tie wire, where required, shall be of 18 gauge stainless steel.

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2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. The Contractor shall verify that areas to receive metal furring and lathing are properly prepared and completed to final elevations.

3.02 INSTALLATION

A. Wall and Furred Space Framing

1. General: Lathing and furring for plaster work shall be installed in accordance with ASTM C1063.
2. Attachment: Wall furring shall be attached directly to masonry or concrete walls.
3. Erection: Furring channels shall be erected vertically and shall be secured to walls with fasteners on alternate channel flanges spaced at a maximum of 24 inches on center.
4. Spacing: Furring channels shall be spaced at a maximum of 16 inches on center, and furring channels shall be not more than 4 inches from abutting walls.

B. Ceiling and Soffit Framing

1. General: Ceiling and soffit framing shall be erected after all work above ceiling or soffit is complete. Furring shall be installed independent of walls, columns, and above ceiling work.
2. Structural Anchorage: Structural suspension system shall be securely anchored to structural members above or embedded in structural slab.
3. Ceiling suspension system shall be securely and rigidly anchored to the structural suspension system with rigid hangers spaced to achieve deflection limits as specified herein.
4. Spacing: Main carrying channels shall be spaced at a maximum of 6 feet on center, and not more than 6 inches from walls. Channels shall be lap spliced securely.
5. Furring: Furring channels shall be placed perpendicular to carrying channels and shall be not more than 2 inches from perimeter walls. Channels shall be lap spliced securely.

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6. Openings in suspension system which interrupt main carrying channels or furring channels shall be reinforced with lateral channel bracing. Bracing shall extend a minimum of 24 inches past each opening.
 7. Bracing: Ceiling and soffit suspension systems shall be laterally braced.
- C. Control and Expansion Joints
1. Control joints shall be installed using back to back casing beads set 1/4-inch apart, and filled with sealant as specified in Section 07 90 00 – Joint Protection. Where required, both beads shall be set over a 6-inch wide strip of polyethylene to assist with air seal.
 2. Spacing: Control joints shall be installed at intervals not to exceed 12 feet.
 3. Expansion joints of the type specified herein shall be installed where expansion joints are shown on the Contract Drawings.
- D. Lathing
1. General: Metal lath shall be applied taut, and shall have the long dimension perpendicular to the supports.
 2. Laps: Lathing ends shall be lapped a minimum of 1 inch, and secure with tie wire where they occur between supports. Sides of diamond mesh shall be lapped a minimum of 1-1/2 inches.
 3. Attachment: Metal lath shall be attached to metal supports using tie wire spaced at not more than 6 inches on center.
 4. Reinforcing: Additional reinforcing is required as follows:
 - a. Internal angles shall be continuously reinforced with corner mesh, fastened at perimeter edges only. Corner mesh is not required where metal lath returns 3 inches from the corner.
 - b. Lath shall be placed vertically above each top corner and each side of door and borrowed light frame, and shall extend to 6 inches above the ceiling.
 - c. Additional strip mesh shall be placed diagonally at corners of all lathed openings, and rigidly secured in place.
 5. Corner beads shall be placed at exterior corners and shall be fastened at outer edges of lath only.
 6. Base screeds shall be placed at termination of plaster areas and rigidly secured in place.
 7. Dissimilar Backing Materials: At junctions of dissimilar backing materials, 4-inch wide strips of metal lath shall be placed centered over the junction and rigidly secured in place.
 8. Terminations: Casing beads shall be placed at all terminations of plaster finish, and shall be rigidly secured in place.

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E. Tolerances

1. True Lines and Level: The maximum variation in true lines and level shall be 1/8-inch in 10 feet.
2. True Position: The maximum variation from true position shall be 1/8-inch.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

PROTECTION

- A. All components of the Work shall be protected from detrimental weather and damage until construction operations are completed.
- B. Metal furring and lathing work shall be protected from all damage and abuse from all other Contractors and installers involved in the Work until Final Acceptance by the City.

ADJUSTMENT

- A. System components which are dislodged, damaged, expanded, broken, penetrated or crushed for any reason after installation shall be replaced immediately with undamaged material in compliance with the Sections, and properly protected as specified.

END OF SECTION

SECTION 09 23 00 – GYPSUM PLASTERING
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PART 1 GENERAL

1.01 SUMMARY

- A. Gypsum plaster as specified herein shall include, gypsum plaster, interior finish, in either a two or three coat system, and all accessories and appurtenances.
- B. Gypsum plaster shall be provided where shown on the Contract Drawings, specified in the Contract, or as required for a complete installation.
- C. The Contractor shall implement practices and procedures to meet the Project’s sustainability goals as identified in the Contract Documents.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 08 11 19 – Stainless Steel Doors and Frames

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- B. Section 08 51 23 - Steel Windows
- C. Section 09 22 01 - Furring and Lathing
- D. Section 09 29 00 - Gypsum Board

1.04 REFERENCES

- A. ASTM C28 - Standard Specification for Gypsum Plasters
- B. ASTM C35 - Standard Specification for Inorganic Aggregates for Use In Gypsum Plaster
- C. ASTM C1396 - Standard Specification for Gypsum Board
- D. ASTM C61 - Standard Specification for Gypsum Keene's Cement
- E. ASTM C206 - Standard Specification for Finishing Hydrated Lime
- F. ASTM C631 - Standard Specification for Bonding Compounds for Interior Gypsum Plastering
- G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
- H. ASTM C841 - Standard Specification for Installation of Interior Lathing and Furring
- I. ASTM C842 - Standard Specification for Application of Interior Gypsum Plaster
- J. ASTM C844 - Standard Specification for Application of Gypsum Base To Receive Gypsum Veneer Plaster
- K. ASTM C847 - Standard Specification for Metal Lath
- L. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and elements
- M. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials
- N. GA-600 - Gypsum Association; Fire Resistance Design Manual
- O. U.L. - Fire Resistance Directory and Building Material Directory
- P. NYSBC - 2020 New York State Building Code

1.05 DESCRIPTION

- A. System Description

SECTION 09 23 00 – GYPSUM PLASTERING
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1. General: Gypsum plaster shall be used as an interior finish only and where applicable according to the Contract Drawings.
2. Two Coat Application: Gypsum plaster shall be applied in two coats over masonry, concrete, gypsum lath or other solid surface as shown on the Contract Drawings or specified in the Contract.
3. Three Coat Application: Gypsum Plaster shall be applied in three coats over metal lath as shown on the Contract Drawings or specified in the Contract.

B. Regulatory Requirements

1. Fire rated assemblies shall conform to ASTM E119 and all applicable codes as specified in the Contract.

C. Sustainable Design Requirements

1. Recycled Content of Gypsum Plaster: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 45 percent.
2. Recycled Content of Blanket Insulation: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 45 percent.
3. Acoustical sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Project Conditions

1. Comply with ASTM C 842 requirements or gypsum plaster manufacturer's written recommendations, whichever are more stringent.
2. Plaster shall not be applied when the substrate or ambient air temperature is less than 50 degrees F or more than 80 degrees F.
3. A minimum ambient temperature of 50 degrees F shall be maintained during and after the installation of gypsum plaster.

1.06 QUALITY ASSURANCE

- A. General: All gypsum plaster work shall be performed in accordance with GA-600. The Contractor shall maintain one copy of each of the aforementioned documents on site.
- B. Applicator: The applicator shall be a company specializing in performing the work of this Section having a minimum of five years documented experience.

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings for approval of the Engineer. Submittals shall include, but not be limited to: catalog cuts, drawings, and reference materials.
 1. Submittals shall include the following:
 - a. Data: The Contractor shall submit copies of specifications, installation instructions and general recommendations from the gypsum plaster manufacturer.

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- b. Manufacturer's data substantiating that the materials comply with the requirements shall be included.
- 2. Test Reports: Test data shall be submitted for all fire rated systems at no additional cost to the City.
- 3. Sustainable Design Submittals:
 - a. Environmental Materials Reporting Form (EMRF) Recycled Content and Regional Materials. Provide the following information:
 - 1) Name of Product and Manufacturer.
 - 2) Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
 - 3) The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.
- 4. VOC Reporting Form. Provide the following information:
 - a. For all sealants applied on site and within the building's weatherproofing system, provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

- 1. Materials shall not be delivered to the project site before the time of installation.
- 2. Materials shall be delivered in sufficient quantities to allow continuity of the Work.

B. Storage of Materials:

- 1. Materials shall be stored in original, undamaged containers and packaging with manufacturer's labels and seals intact.
- 2. All materials shall be stored in a dry, enclosed area, off the ground and away from all possible contact with water, ice or snow.
- 3. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the site before being incorporated into construction systems.

C. Handling of Materials:

- 1. Materials shall be handled carefully in order to avoid damage or breakage.
- 2. Materials shall not be exposed to detrimental conditions or physical damage. Materials which are so exposed shall be permanently removed from the site and shall not be incorporated into the Work.

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- 3. Materials shall be handled in such a manner so as to prevent the inclusion of foreign materials.
 - D. Packages or containers shall not be opened until all necessary, preparatory Work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. As recommended by:
 - 1. Georgia-Pacific Gypsum: 133 Peachtree Street NE Atlanta, GA 30303
 - 2. National Gypsum Company: 2001 Rexford Road Charlotte, North Carolina 28211
 - 3. American Gypsum: 3811 Turtle Creek Blvd., Suite 1200 Dallas, TX 75219
 - 4. Or approved equal

2.02 MATERIALS / EQUIPMENT

- A. General: Specific materials shall be as included in the Contract. General types of materials shall be as follows.
 - 1. Base Coat Plaster: Plaster for base coat shall be a gypsum mill aggregated type in accordance with ASTM C28.
 - 2. Bonding Plaster: Plaster base for use on monolithic concrete or concrete masonry surfaces shall be a gypsum bonding type in accordance with ASTM C28 and ASTM C631.
 - 3. Lightweight Aggregate: Aggregate, when required to meet fire rating requirements shall be sand and vermiculite or perlite in accordance with ASTM C35.
 - 4. Finishing Plaster: Specific type of finishing plaster shall be as specified in the Contract.
 - a. Gypsum/Lime Putty Type: Gypsum/lime putty type plaster shall be a mixture of gaging plaster and lime, and shall be in accordance with ASTM C28.

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- b. Keene's Cement/Lime Putty Type: Keene's cement/lime putty type plaster shall be a mixture of Keene's cement and lime, and shall be in accordance with ASTM C61 and C206.
 - c. Sand Float Type: Sand float type plaster shall be a prepared mixture of gypsum plaster and sand in accordance with ASTM C28 and C35.
 - d. Keene's Cement Sand Float Type: Keene's cement sand float type plaster shall be a prepared mixture of Keene's cement/lime putty and sand in accordance with ASTM C61 and C35.
- 5. Water shall be clean, fresh, potable, and shall be free of any mineral or organic matter which can affect plaster.
 - 6. Gypsum lath shall be 1/2-inch thick and shall be in accordance with ASTM C1396. Lath shall be a standard or fire rated type as shown on the Contract Drawings or specified in the Contract.
 - 7. Metal lath and accessories shall be as specified in Section 09206 - Metal Furring and Lathing.
 - 8. Access panels shall be provided where indicated on the Contract Drawings, and shall be as specified in Section 08311 - Access Doors.
 - 9. Acoustic Accessories: Where shown on the Contract Drawings or indicated in the Contract, acoustic accessories shall be as follows:
 - a. Resilient Furring Channels: Resilient furring channels shall be of formed galvanized steel, minimum 0.020 inches thick, and shall be hat shaped with a serrated face.
 - b. Acoustic Insulation: Acoustic insulation shall be a friction fit type, unfaced, in thickness indicated on the Contract Drawings or in the Contract, and shall be in accordance with ASTM C665.
 - 10. Acoustic Sealant: Acoustic sealant shall be a non-hardening, non-skinning type made for use in conjunction with a gypsum plaster system.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Plaster Mix: Plaster shall be mixed and proportioned in accordance with ASTM C842 and the manufacturer's instructions.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Contractor shall verify that areas to receive gypsum plaster are properly prepared and completed to final elevations.
- B. Substrate: The Contractor shall verify that substrates are prepared as follows:

SECTION 09 23 00 – GYPSUM PLASTERING
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1. Masonry: Masonry joints shall be cut flush, and no bituminous or water repellent coatings shall be on masonry surface.
 2. Concrete: Concrete surfaces shall be flat and all honeycombs shall be filled flush. There shall be no bituminous or water repellent coatings or form release agents on the concrete surface.
 3. Metal Lath: All metal lath shall be flat, secured to substrate, and joint and surface perimeter accessories shall be in place.
- C. The Contractor shall verify that mechanical and electrical services within walls have been tested and approved.

3.02 INSTALLATION

A. Two Coat Plaster Installation

1. General: Plaster work shall be installed in accordance with ASTM C 842 and the manufacturer's instructions.
2. Application: Apply plaster over gypsum lath, masonry, or concrete in two coats as follows:
 - a. Brown coat shall be applied to a nominal thickness of 3/8-inch.
 - b. Finish coat shall be applied to a nominal thickness of 1/8-inch, or as required for the finish specified in the Contract.
3. Finishing: Finish coat shall be finished as specified in the Contract. Excessive working of the surface shall be avoided, and troweling shall be delayed as long as possible to avoid drawing excessive fines to the surface.

B. Three Coat Plaster Installation

1. General: Plaster work shall be installed in accordance with ASTM C842 and the manufacturer's instructions.
2. Application: Apply plaster over metal lath in three coats as follows:
 - a. Scratch coat shall be applied to a nominal thickness of 3/8-inch.
 - b. Brown coat shall be applied to a nominal thickness of 3/8-inch.
 - c. Finish coat shall be applied to a nominal thickness of 1/8-inch, or as required for the finish specified in the Contract.

- C. Finishing: Finish coat shall be finished as specified in the Contract. Excessive working of the surface shall be avoided, and troweling shall be delayed as long as possible to avoid drawing excessive fines to the surface.

3.03 FIELD TESTING / QUALITY CONTROL

A. Tolerances

1. True Flatness: The maximum variation from true flatness shall be 1/8-inch in 10 feet.

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3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Adjusting: System components which are dislodged, damaged, expanded, broken, penetrated or crushed by subsequent installation operations or damaged by detrimental weather shall be immediately replaced with undamaged material in compliance with the Sections and properly protected as specified.
- B. Protection: All components of the Work shall be protected from detrimental weather and damage until construction operations are completed. Plastering work shall be protected from all damage and abuse from all other Contractors and installers involved in the Work until Final Acceptance by the City.
- C. Clean Up: Upon completion of plastering work, areas shall be left in a neat, clean, dust free condition.

END OF SECTION

SECTION 09 29 00 – GYPSUM BOARD
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Gypsum board systems as specified herein include but are not limited to:
Interior fire, moisture, and mold resistant gypsum boards, metal stud partitions,
furring, suspension systems, and trim and appurtenances.
- B. Gypsum board systems shall be provided as indicated on the Contract Drawings,
specified herein, or as required otherwise for a complete installation.
- C. The Contractor shall implement practices and procedures to meet the Project’s
sustainability goals as identified in the Contract Documents.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this
Section. All costs for Work required by this Section shall be included in the
applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00
– Measurement and Payment.

SECTION 09 29 00 – GYPSUM BOARD
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1.03 RELATED SECTIONS

- A. Section 09 22 01 - Furring and Lathing
- B. Section 09 23 00 - Gypsum Plastering
- C. Section 09 91 00 - Painting

1.04 REFERENCES

- A. ASTM C1396 - Standard Specification for Gypsum Board
- B. ASTM A580 - Standard Specification for Stainless Steel Wire
- C. ASTM C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
- F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board
- G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
- H. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
- I. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
- J. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold On the Surface of Interior Coatings in an Environmental Chamber
- K. ASTM D3274 - Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation
- L. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and elements
- M. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
- N. ASTM E119 - Standard Test Methods for Fire Tests of Building

SECTION 09 29 00 – GYPSUM BOARD
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Construction and Materials

- O. ASTM E413 - Classification for Rating Sound Insulation
 - P. ANSI A118.9 - American National Standard for Test Methods and Specification for Cementitious Backer Units
 - Q. NYSBC - 2020 New York State Building Code
 - R. Underwriters Laboratories: Fire Resistance Directory and Building Materials Directory.
 - S. Northeast Ozone Transport Commission (OTC) Model Rule. The OTC created model AIM VOC rule - Regulated by New York State Department of Environmental Conservation (DEC).
- 1.05 DESCRIPTION
- A. System Design Requirements
 - 1. Interior Moisture- and Fire-Resistant Wallboard: Shall meet product standard ASTM C1396 and installation standard ASTM C840; fire resistance classified by UL according to ASTM standards; recycled content on a dry-weight basis certified in accordance with ISO 14021.
 - B. Sustainable Design Requirements
 - 1. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 45 percent.
 - 2. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
 - 3. Recycled Content of Sound Attenuation Blankets: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 45 percent.
 - 4. Regional Materials: When possible, gypsum panel products shall be manufactured within 500 miles of Project Site from materials that have been extracted, harvested, or recovered within 500 miles of Project Site.
 - 5. VOC Content: Products applied on Site and within the building's weatherproofing system shall comply with VOC limits of authorities having jurisdiction and the following VOC limits of when calculated according to SCAQMD Rule 1168:
 - a. Gypsum Board and Panel Adhesives: 50 g/L.
 - b. Architectural Sealants: VOC not more than 250 g/L.
 - C. Project-specific system / design requirements under the work of this Section will be provided in the Contract (if necessary) to update the requirements made herein or to supplement requirements made on the Contract Drawings.

SECTION 09 29 00 – GYPSUM BOARD
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1.06 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: All gypsum board system Work shall comply with fire-resistance ratings as shown, and as required by governing authorities and the New York State Building Code and shall be in accordance with the following requirements:
1. The Contractor shall adhere to all regulations and rules of the Town of Mount Pleasant Department of Buildings, the New York State building codes and all AHJs.
- B. In those instances where the Commissioner of Buildings requires a certificate of compliance of the manufacturer or producer certifying that the item or product system was tested and is equivalent to material of the same kind and quality regularly being manufactured by such manufacturer or producer Contractor shall provide all such certificates to the Commissioner of Buildings without additional expense to the City.

1.07 SUBMITTALS

- A. The Contractor shall submit Shop Drawings for approval by the Engineer. Submittals shall include, but not be limited to: catalog cuts, drawings, and reference materials.
1. Product Data: The Contractor shall submit:
 - a. Copies of specifications, installation instructions and general recommendations from the gypsum board systems manufacturers, for each type of product.
 - b. Manufacturer's data substantiating that the materials comply with the requirements shall be included.
 2. Sustainable Design Submittals:
 - a. Environmental Materials Reporting Form (EMRF) Recycled Content and Regional Materials. Provide the following information:
 - 1) Name of Product and Manufacturer.
 - 2) Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
 - 3) The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.
 - 4) Indicate the location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. For assemblies, include the percentage by weight that is considered regional.
 3. VOC Reporting Form. Provide the following information:

SECTION 09 29 00 – GYPSUM BOARD
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- a. For all adhesives and sealants used on Site, provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

- 1. Materials shall not be delivered to the Project Site before the time of installation.
- 2. Materials shall be delivered in sufficient quantities to allow continuity of the Work.

B. Storage of Materials:

- 1. Materials shall be stored in original, undamaged containers with manufacturer's labels and seals intact.
- 2. All materials shall be stored in a dry, enclosed area, off the ground and away from all possible contact with water, ice or snow.
- 3. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the Site before being incorporated into construction systems.

C. Handling of Materials:

- 1. Materials shall be handled carefully in order to avoid damage or breakage.
- 2. Materials shall not be exposed to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the Site and shall not be incorporated into the Work.
- 3. Materials shall be handled in such a manner so as to prevent inclusion of foreign materials.
- 4. Packages or containers shall not be opened until all necessary preparatory work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Georgia-Pacific Gypsum, Atlanta, GA;
- B. National Gypsum Company, Charlotte, North Carolina;
- C. American Gypsum, Dallas, TX;

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D. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Gypsum wallboard shall be synthetic wallboard made using the output of the Flue Gas Desulphurization (FGD) process from fossil-fuel burning power plants.
- B. Non-synthetic gypsum board shall be made with 100% recycled paper facings.
- C. Gypsum wall board shall comply with ASTM C 1396.
- D. Gypsum wallboard shall be of the tapered type, Sheetrock Firecode Core 5/8-inch thick, Type X gypsum panels, 4 feet wide, and of lengths indicated or required. 5/8-inch thick Sheetrock Foil-Back gypsum panels shall be provided for use at exterior walls and Firecode C Core gypsum panels shall be provided for fire-rated gypsum wallboard.
- E. Moisture-Resistant Gypsum Board: 5/8-inch thick Sheetrock Mold Tough Gypsum Panels shall be used in interior areas subject to moisture and where indicated.
- F. Tile Backer Board: ½-inch thick cement board shall be used as a backing for interior ceramic tile at furred and metal stud partitions and walls at shower stalls and other wet areas.
- G. Metal materials and accessories shall be galvanized in accordance with Section 05 05 13.01 - Galvanizing unless indicated otherwise.
- H. Studs and tracks shall comply with ASTM C 645 and be 18-gauge steel 3-5/8-inch width for gypsum board, with studs spaced at 16-inch centers. Studs for tile backer board shall be of size recommended by the manufacturer.
- I. Furring Channels and Clips: Furring channels shall be hat type, 7/8-inch by 2-1/2-inch spaced on 16-inch centers, ASTM C 645. Furring channel clips shall be as recommended by the manufacturer to fasten furring channels to runners.
- J. Screws and Fasteners: ASTM C 1002 Type "S-12" coated drywall screws shall be used for attaching gypsum wallboard in lengths 3/8-inch greater than the total thickness of wallboard being fastened to the framing. Size and type of screws for attaching metal door frames and runners, metal trim and the like shall be as recommended by the gypsum wallboard manufacturer.
- K. Control Joints, Casing Beads, Corner Beads and Accessories: Materials shall be as required for thickness of the board required, ASTM C1047.
- L. Hangers for Suspended Ceilings and Soffits: Hangers shall be galvanized steel rod not less than 0.25-inch diameter. Suspended ceilings and soffits shall be rigidly mounted to the structure above.
- M. Tie wire shall be of 18-gauge stainless steel, ASTM A580.
- N. Runners shall be cold-rolled 1-1/2-inch channels weighing not less than 475 pounds per 1,000 lineal feet, ASTM C 645.

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- O. Joint Treatment: Joint compound, perforated tape, and taping compound shall be as recommended by the manufacturer for intended use of the gypsum board. Comply with ASTM C 475.
 - P. Adhesives, sealants, and primers shall comply with VOC limits and be as recommended by the gypsum wallboard manufacturer.
 - Q. Acoustical Accessories:
 - 1. RC-1 resilient channels.
 - 2. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - a. Basis of Design: Thermafiber SAFB insulation.
 - 3. Sheetrock Acoustical Sealant: Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- 2.03 FABRICATION / ASSEMBLING / FINISHES
- A. Not Used
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Contractor shall verify that areas to receive gypsum board systems are properly prepared and completed to final elevations.
- B. Protection: In cold weather, during gypsum wallboard application and joint finishing, temperatures within the building shall be maintained in the range of 55 to 70 degrees F and adequately ventilated to remove excess moisture.

3.02 INSTALLATION

- A. General: Gypsum Wallboard System shall be installed in accordance with the manufacturer's recommendations and approved shop drawings.
- B. Wall Furring and Framing Installation: ASTM C 754, Furring channels and runners for metal studs shall be accurately aligned and secured to the structure at intervals of not more than 24-inch centers, and additional fasteners shall be provided not more than 2 inches from the end of each length. Metal studs shall be crimped into runner tracks at top and bottom, both sides, for friction fit with 1/4-inch deflection clearance at the top. Studs shall be securely fastened at ends of partitions, openings, and intersections to runners with screws through both flanges of the stud and runner. Adequate provisions shall be provided for deflection, expansion and contraction between structural members and partitions. Additional studs,

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reinforcing channels, accessories and total installation shall be as recommended by the manufacturer. Double studs shall be used at free ends of partitions.

C. Ceiling and Soffit Framing Installation:

1. Gypsum board ceilings and soffits shall be suspended, where shown, from support systems consisting of runner channels and furring channels installed in strict compliance with the manufacturer's printed specifications and recommendations. Runner channels shall be installed at a maximum of 48-inch centers and within 6 inches of parallel walls, and shall be run at right angles to the joists and directly suspended from the concrete deck or joists above with no play in the hanger rods. Hanger spacing shall not exceed 3-foot centers.
2. Splices in runner channels shall be overlapped a minimum of 12 inches and securely tied near the ends with double loops of tie wire. Furring channels shall be securely clipped to runner channels at right angles and spaced at 24-inch centers. Splices in furring shall be overlapped at least 8 inches and securely tied near the ends with double loops of tie wires.
3. Framing channels shall be provided around all recessed lighting fixtures and access panels. Stud partitions shall be fastened to ceiling grillage with double strand tie wire.

D. Wallboard Installation:

1. Comply with ASTM C840 or gypsum board manufacturer's written recommendations, whichever are more stringent..
2. Wallboard shall be installed in strict compliance with the manufacturer's printed specifications and recommendations for metal framed dry wall construction, including fireproofing, gypsum wallboard erection, and application of joint system, accessories and adhesives. Gypsum wallboard surfaces shall be isolated with control joints at the following locations:
 - a. Where partitions abut a structural element or dissimilar wall material.
 - b. Where construction changes within the plane of the partition.
 - c. Where partition or furring run exceeds 30 feet.
3. Ceiling height door frames may be used as control joints, and less than ceiling height door frames may be used if control joints extend to the ceiling from both corners of the frame.
4. Gypsum boards shall be fastened to walls vertically. Joints shall not occur on opposite sides of a partition on the same stud.
5. Partitions around all stairs and shafts shall have a 2-hour fire rating, comprising double layers of fire-rated gypsum wallboard on each side of the metal stud partition.

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6. All gypsum wallboard surfaces shall be sanded as necessary to provide a flat smooth surface ready for painting or application of other materials.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Protection

1. All components of the Work shall be protected from detrimental weather and damage until construction operations are completed and acceptable to Engineer.
2. Work which cannot for reasons acceptable to Engineer be covered with complete construction system before onset of weather detrimental to the Work shall be completely covered and protected in such a manner as to deflect water and weather from the installation without damaging adjacent work.
3. Gypsum board systems shall be protected from all damage and abuse until Final Acceptance by the City.

- B. Adjustment

1. System components which are dislodged, damaged, expanded, broken, penetrated, or crushed by subsequent installation operations or by detrimental weather shall be immediately replaced with undamaged material in compliance with the requirements herein and properly protected as specified.

- C. Cleaning

1. After installation, gypsum board systems shall be cleaned and left in a neat condition, ready to be painted as specified in Section 09 91 00 - Painting. Cleaning shall be performed using materials and processes as recommended by the manufacturer.

END OF SECTION

SECTION 09 29 00 – GYPSUM BOARD
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NO TEXT ON THIS PAGE

SECTION 09 30 13 – CERAMIC TILING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Ceramic tile as specified herein shall include, but not be limited to, ceramic floor tile, ceramic wall tile, matching base and trim, and appurtenances.
- B. Ceramic tile items shall be provided where shown on the Contract Drawings, specified in the Contract, or as required for a complete installation.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. TCA - Installation Handbook: Tile Council of America, Inc.

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- B. ANSI A108.1 - Installation of Ceramic Tile Installed with Portland Cement Mortar, American National Specification for
- C. ANSI A108.5 - Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar, American National Specification for
- D. ANSI A108.10 - Installation of Grout in Tile Work
- E. ANSI A118.1 - Dry-Set Portland Cement Mortar
- F. ANSI A118.6 - Ceramic Tile Grouts
- G. ANSI A137.1 - Ceramic Tile

1.05 DESCRIPTION

- A. Environmental Requirements: The ambient temperature of the area in which the Work occurs shall be at least 60 degrees F and rising. A minimum 60 degree F ambient temperature shall be maintained without interruption while the Work is being done, and for at least three days after completion of the Work.

1.06 QUALITY ASSURANCE

- A. All Work described in this Section shall be in conformance with the latest edition of the TCA Handbook for Ceramic Tile Installation

1.07 SUBMITTALS

- A. Contractor shall submit Shop Drawings for approval of the Engineer. Submittals shall include, but not be limited to: catalog cuts and reference materials.
 - 1. Product Data: The Contractor shall submit:
 - a. Copies of specifications, installation instructions and general recommendations from the ceramic tile manufacturer, for each type of ceramic tile product.
 - b. Manufacturer's data substantiating that the materials comply with the requirements shall be included.
 - 2. Samples:
 - a. Samples of floor and wall tile shall be submitted for color selection and approval of material.
 - b. Grout samples shall also be submitted.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Materials:
 - 1. Materials shall not be delivered to the project site before the time of installation.
 - 2. Materials shall be delivered in sufficient quantities to allow continuity of the Work.

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3. All materials shall be checked upon arrival to the site, and any item that is damaged in any way shall be returned and replaced at no extra cost to the DEP.

B. Storage of Materials:

1. Materials shall be stored in original, undamaged containers with manufacturer's labels and seals intact.
2. All materials shall be stored in a dry, enclosed area, off the ground and away from all possible contact with water, ice or snow.
3. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the site before being incorporated into construction systems.
4. Any materials damaged while stored on site shall be returned and replaced at no extra cost to the DEP.

C. Handling of Materials:

1. Materials shall be handled carefully in order to avoid damage or breakage.
2. Materials shall not be exposed to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the site and shall not be incorporated into the Work.
3. Materials shall be handled in such a manner so as to prevent inclusion of foreign materials.
4. Packages or containers shall not be opened until all necessary preparatory Work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.
5. Any material damaged while being handled prior to installation shall be rejected and replaced at no extra cost to the DEP.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Aruba Marine Blue, 5X10 Polished Ceramic, Subway Wall Tile, sold by Tilebar, Phone: 888.541.3840, Email: info@tilebar.com
- B. Barbados Blue, 5 in. x 10 in. 9 mm Polished Ceramic Wall Tile, by Ivy Hill Tile.

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- C. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Floor Tile: Ceramic floor tile and paver tile shall be of a size and type as specified in the Contract. Surface bull nose to match the floor tile shall be provided to finish the floor where required at finished openings. All floor tile shall be in conformance with ANSI A108.1 and A137.1.
- B. Wall Tile: Ceramic wall tile shall be of a 5in x10in, Light Blue Color, Glazed, size and type as specified herein and as per the Contract Drawings. Surface bull nose to match the wall tile shall be provided to finish walls where indicated. All wall tile shall be in conformance with ANSI A137.1.
- C. Bond Coat: Ceramic tile shall be set with dry-set mortar conforming to ANSI A118.1.
- D. Mortar Bed: Where shown on the Contract Drawings or specified in the Contract, mortar bed shall be in accordance with ANSI A108.1A.
- E. Mortar Bed Bond Coat: Where shown on the Contract Drawings or specified in the Contract, mortar bed bond coat shall be a Portland Cement slurry.
- F. Latex Grout: Latex Portland Cement grout shall conform to ANSI A118.6.
- G. Epoxy Grout: Epoxy grout shall conform to ANSI A118.3.
- H. Expansion Joints: Expansion joints shall extend through the bond coat and mortar bed to the substrate, and shall be formed with a material that will bond well to the tile and which will not soften at 140 degrees F or become stiff or hard at minus 30 degrees F. Expansion joint color shall match the color of the grout.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. The Contractor shall verify that areas to receive ceramic tile materials are properly prepared and completed to final grades and elevations.

3.02 INSTALLATION

- A. Thinset Method: Tile shown to be installed by the Thinset Method, shall be installed as follows:

SECTION 09 30 13 – CERAMIC TILING
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1. Ceramic tile shall be installed by the "dry set mortar" method and shall be in accordance with the TCA Handbook for Ceramic Tile Installation Method No. F113 for floors, Method No. W202 for masonry or concrete walls, and Method No. W243 for gypsum board walls. Tile shall be grouted using latex Portland Cement grout with latex additives. Tile shall be installed in compliance with ANSI A108.5 and A108.10.
- B. Exterior Patios and Walkways: Floor tile shown to be installed on exterior patios and walkways, shall be installed as follows:
1. Ceramic tile shall be installed in a nominal 1-1/4-inch thick mortar bed and shall be in accordance with the TCA Handbook for Ceramic Tile Installation Method No. F101 for floors. Mortar bed shall be in accordance with ANSI A108.1A. Tile shall be grouted using latex Portland Cement grout with latex additives in accordance with ANSI A118.6. Tile shall be installed in compliance with ANSI A108.5 and A108.10.
- C. Heavy Duty Method: Floor tile shown to be installed in areas subject to heavy traffic, and where shown on the Contract Drawings or specified in the Contract, shall be installed as follows:
1. Tile shall be installed in a nominal 1-1/4-inch to 2- inch thick reinforced mortar bed and shall be in accordance with the TCA Handbook for Ceramic Tile Installation Method No. F114 for floors. Mortar bed, reinforcing, and cleavage membrane shall be in accordance with ANSI A108.1A. Tile shall be grouted using epoxy grout in accordance with ANSI A108.6. Tile shall be installed in compliance with ANSI A108.1A and A108.10.
- D. Shower Stalls and Receptors: Ceramic mosaic tile shower walls and receptors shall be installed by the cement mortar method and shall be in accordance with the TCA Handbook for Ceramic Tile Installation Method No. B411 and Method No. B414. Tile shall be grouted using latex Portland Cement grout with latex additives. Tile shall be installed in compliance with ANSI A108.1 and A108.10.
- E. Expansion joints shall be in accordance with the TCA Handbook for Ceramic Tile Installation Method No. EJ171. Expansion joints shall extend from the tile surface completely through the setting bed and shall be of the same width as other joints. Expansion joints shall be spaced approximately 12 feet apart for length and width of areas covered with tile floor finish. Expansion joints shall be located wherever tile Work abuts restraining surfaces such as walls, curbs, columns and the like. Expansion joints shall also be located directly over any expansion joints and control joints in the structural floor slab.
- F. Base shall be as indicated and shall be installed by the Square method, Thin-lip method, or Flush method as indicated in the TCA Handbook for Ceramic Tile Installation. Method shall be as specified in the Contract.
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Not Used

**SECTION 09 51 01 – SUSPENDED ACOUSTICAL CEILING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Suspended acoustical ceilings as specified herein shall include lay-in ceiling systems of acoustical ceiling panels, structural and exposed grid suspension systems, fire rated ceiling systems of acoustical fire rated panels and exposed grid suspension systems; metal panel ceiling systems of acoustical panels, spray-on acoustical treatment ceiling, spray-on fire rated ceiling, and all accessories and appurtenances.
- B. Acoustical ceilings shall be provided where shown on the Contract Drawings, specified in the Contract, or as required for a complete installation.
- C. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are fully implemented.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 05 05 13.01 - Galvanizing

1.04 REFERENCES

- A. NYSBC - 2020 New York State Building Code
- B. ANSI/UL 263 - Fire-Resistance Rating of a Ceiling Assembly
- C. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- D. ASTM C635 - Standard Specification for the Manufacture Performance And testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings
- E. ASTM C636 - Standard Specification Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
- G. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials
- H. ASTM E1264 - Standard Classification for Acoustical Ceiling Products
- I. NFPA 251 - Standard Methods of Tests of Fire Resistance of Building Construction and Materials
- J. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth

1.05 DESCRIPTION

A. System Design Requirements

1. Suspended acoustical ceilings shall be complete systems and each shall include, acoustical ceiling panels, structural suspension system, exposed grid suspension system, trim, accessories and appurtenances as required for a complete installation.
2. Spray-on acoustical treatment shall be a complete system and shall include, but not be limited to sprayed mineral fiber, sealer, trim, and appurtenances as required for a complete installation.

B. Sustainable Design Requirements

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1. Recycled Content for Acoustical Panels: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 35 percent.
2. Recycled Content of Suspension Systems: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1.06 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: All suspended ceiling work shall comply with fire-resistance ratings as shown, and as required by governing authorities and the New York State Building Code.
- B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.

1.07 SUBMITTALS

- A. Contractor shall submit Shop Drawings for approval of the Engineer. Submittals shall include, but not be limited to: catalog cuts, drawings, and reference materials.
- B. Submittals shall include the following:
 1. Data: The Contractor shall submit:
 - a. Copies of specifications, installation instructions and general recommendations from the acoustical ceiling product manufacturers, for each type of acoustical ceiling product.
 - b. Manufacturer's data substantiating that the materials comply with the requirements shall be included.
 2. Samples:
 - a. Color and finish samples of each acoustical ceiling product, including each accessory and miscellaneous material to be used in the Work.
 3. Test Reports:
 - a. Test data shall be submitted for all fire rated ceiling systems.
 4. Sustainable Design Submittals:
 - a. Environmental Materials Reporting Form (EMRF) Recycled Content and Regional Materials. Provide the following information:
 - 1) Name of Product and Manufacturer.
 - 2) Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
 - 3) The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.

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- 4) Indicate the location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. For assemblies, include the percentage by weight that is considered regional.

5. VOC Reporting Form. Provide the following information:

- C. For all adhesives and sealants used on site, provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials

1. Materials shall not be delivered to the project site before the time of installation.
2. Materials shall be delivered in sufficient quantities to allow continuity of the Work.
3. Materials damaged during delivery shall be returned to the manufacture and replaced with new materials at no extra charge to the City.

B. Storage of Materials:

1. Materials shall be stored in original, undamaged containers with manufacturer's labels and seals intact.
2. All materials shall be stored in a dry, enclosed area, off the ground and away from all possible contact with water, ice or snow.
3. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the job-site before being incorporated into construction systems.
4. Materials damaged during Storage shall be replaced with new materials at no extra charge to the City.

C. Handling of Materials:

1. Materials shall be handled in such a manner to avoid damage or breakage.
2. Materials shall not be exposed to detrimental conditions or physical damage. Materials, which are so exposed, shall be removed from the site and shall not be incorporated into the Work.
3. Materials shall be handled in such a manner so as to prevent inclusion of foreign matter.
4. Packages or containers shall not be opened until all necessary preparatory work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.
5. Materials damaged during handling pre or post installation shall be replaced with new materials at no extra charge to the City.

SECTION 09 51 01 – SUSPENDED ACOUSTICAL CEILING
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- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Two cartons of each type of acoustical panel supplied under these Sections shall be provided.
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Armstrong World Industries, Inc. (AWI), P.O. Box 3001 Lancaster, PA 17604
- B. USG Corporation, 550 West Adams Street, Chicago, IL 60661
- C. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Acoustical panels shall be as follows:
1. Mineral and Ceramic Acoustical Panels: Panels shall be lay-in panels with square cut edge of Class A noncombustible type per ASTM E1264 with flame spread 25 or under, and shall be U.L. labeled.
 2. Fire Rated Acoustical Panels: Panels shall be lay-in square cut edge panels approved for U.L. Design No.G258.
 3. Light Fixture Fire Protection: Light fixtures in fire rated ceiling assemblies shall be protected using approved 1-1/2-inch thick light fixture protection fabricated to U.L. Design No. G258 requirements from flexible spun mineral fiber mats, unsurfaced and unbacked.
- B. Metal Panel Ceiling: Units complying with ASTM E 1264, shall be of aluminum and shall be finished with the manufacturer's standard baked enamel finish. A 1-inch layer of black low-density fiberglass acoustical insulation shall be installed on top of the panels. Suspension systems for acoustical panel ceiling systems, shall be as follows:
1. General: Structural and exposed suspension systems shall include all supporting members and required trim. Exposed suspension systems shall have exposed surfaces of matching color and finish. Suspension systems shall comply with the requirements of ASTM C 635 and shall be as recommended by the manufacturer.
 2. Structural Suspension System: Structural system for suspended ceilings shall be rigidly mounted to the structure above and shall consist of 1-1/2-inch cold rolled galvanized steel 0.475 lb. channels clipped to 1/4-inch diameter galvanized steel rod hangers. Channels and rods shall be galvanized in accordance with Section 05 05 13.01 - Galvanizing.

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3. Exposed Suspension System for Acoustical Ceramic Panels: Suspension system for lay-in acoustical ceramic panels shall be of aluminum with an aluminum cap, finished as specified in the Contract.
 4. Exposed Suspension System for Acoustical Panels: Suspension system for acoustical panels shall be a grid suspension system for lay-in acoustical panels. Finish of the exposed portion of the grid shall be as specified in the Contract.
 5. Exposed Suspension System for Fire Rated Acoustical Panels: Suspension system for fire rated lay-in ceilings shall be as approved for UL Design No. G258. Suspension system shall have exposed flanges capped with steel finished as specified in the Contract.
 6. Suspension System for Metal Panel Ceiling Units: Suspension system for metal panel ceilings shall be the manufacturer's standard concealed aluminum runner system and trim. Access panels shall be of material and pattern to match the ceiling panels.
- C. Anchors and Clips: The ceiling grid shall be hung from the concrete structure as per Contract Drawing.
- D. Hangers and Support for Suspended Ceilings: Exposed ceiling suspension system shall be connected directly to the structural suspension system with galvanized direct hang clips. System shall include carrying channels, main runners, cross tees, clamps, angle moldings, clips, spacers, and trim.
- E. Tie wire, where required, shall be of 18 gauge stainless steel.
- F. Spray-on acoustical ceilings shall be of sprayed mineral fiber type and shall conform to Mineral-type fiber adhesive shall be as recommended by the manufacturer and as approved, and sealer shall be noncombustible-type as rated by U.L., Inc.
- G. Spray-On Fire Rated Ceiling: Spray-on treatment shall have a Fire Hazard Classification conforming to ASTM E84, listed by U.L., Inc., and as follows:
- | | |
|----------------------|---|
| 1. Flame spread | 5 |
| 2. Fuel contribution | 0 |
| 3. Smoke development | 0 |
- H. Acoustic nonwoven material shall be:
1. Soundtex as manufactured by:
 - a. Freudenberg Performance Materials, Durham, NC.
 - b. Or approved equal, and shall meet the following requirements:
 - 1) Weight: 61 g/m²
 - 2) Thickness: 0.008 inch
 - 3) Fiber: Cellulose/Glass

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4) Flame and Smoke Spread: Class A (ASTM E84)

5) Sound Impedance 190 Ns/m²

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. The Contractor shall verify that areas to receive acoustical ceiling systems are properly prepared and completed to final elevations.

3.02 INSTALLATION

A. Acoustical ceilings shall be installed in accordance with the manufacturer's recommendations.

B. Lay-In Acoustical Tile Ceiling:

1. Structural system shall be installed with hanger rods and carrier channels at not more than 4'-6" on center in each direction, and in compliance with ASTM C636.
2. Exposed grid shall be installed in the pattern shown. Extra hangers shall be provided at lighting fixtures and air diffusers that are supported by the system. Hangers shall be spaced as required to prevent deflection in excess of 1/360 of the span of the cross-T or runner. Accessible tile board hold-down clips shall be installed.
3. All members shall be aligned for a true, level surface and straight lines.
4. Borders shall be finished with factory finished wall molding which shall be kept under tension by the use of wall springs. Parallel tile borders shall be 6 inches or larger and equal.
5. Fire-rated ceiling assemblies shall have a 2 hour U.L., Inc. fire protection rating. Fixture and duct protection boxes shall be installed as required for the specified fire protection rating.

C. Metal Panel Acoustical Ceiling Treatment:

1. Metal panel ceiling and suspension system shall be installed in strict compliance with the manufacturer's recommendations and as approved. All members shall be aligned for true, level surface and straight lines. The installation shall provide for expansion and contraction of the ceiling system. Suspension system shall be direct hung from the structural suspension system as indicated.

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2. Extra hangers shall be provided at lighting fixtures and air diffusers that are supported by the system. Hangers shall be spaced as required to prevent deflection in excess of 1/360 of the span of the cross-T or runner.
3. Lengths of panels shall be a minimum of 3-feet and a maximum of 16-feet. Join panels by butting on top of a matching colored interior splice. Joints shall be staggered on adjoining carriers. Acoustical pads shall be placed on panels between panel carriers.
4. Access panels shall be provided at all areas where access to space above the ceiling is necessary. Location of access panels shall be carefully coordinated with the locations of mechanical equipment requiring access.

D. Spray-On Acoustical Ceiling Treatment:

1. Spray-on acoustical ceiling treatment shall be installed on clean surfaces, which are free of grease, dirt, oil, loose paint or other material. Surface preparation shall be in strict accordance with the manufacturer's instructions and recommendations.
2. Spray-on acoustical ceiling treatment shall be applied using an approved adhesive or a bonding medium. Fiber shall be sprayed onto the wet adhesive film to a thickness as required to achieve the specified noise reduction coefficient.
3. Spray-on acoustical treatment shall be applied in strict conformance with the manufacturer's directions by an applicator who is licensed by the manufacturer for this type of work.
4. Spray-on acoustical treatment shall be applied to concrete as shown. Cast bead moldings, 1-inch by 1-3/8-inch, shall be installed on ceilings and as shown and wherever the sprayed-on material abuts a vertical surface or terminates on a horizontal surface. Edges around the sprayed-on panels shall be finished evenly. Adjacent areas and materials shall be protected during the spraying operation. Casing beads shall be fastened using power driven anchors and as approved.
5. The manufacturer's standard transparent sealer shall be spray-applied to the finished acoustical ceiling. All adjacent areas shall be protected from the spray application of acoustical treatment and sealer.

E. The noise reduction coefficient of the system shall be as specified in the Contract.

3.03 FIELD TESTING / QUALITY CONTROL

A. Not Used

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Adjusting

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1. System components, which are dislodged, damaged, expanded, broken, penetrated or crushed after installation, shall be replaced immediately with undamaged material in compliance with the Sections, and properly protected as specified.
- B. Protection
1. All components of the Work shall be protected from detrimental weather and damage until construction operations are completed.
 2. Work, which cannot be covered with complete construction system before onset of weather detrimental to the Work, shall be completely covered and protected in such a manner as to deflect water and weather from the installation without damaging adjacent Work.
 3. Acoustical ceiling work shall be protected from all damage and abuse until Final Acceptance by the City.
- A. Cleaning
1. General: Soiled or discolored surfaces shall be cleaned following installation. Acoustical units, which are damaged or improperly installed, shall be removed and replaced.
 2. Sprayed-on Insulation: Excess materials and debris and all over-sprayed insulation shall be removed from adjacent surfaces. Work areas shall be left in a clean condition.

END OF SECTION

SECTION 09 51 01 – SUSPENDED ACOUSTICAL CEILING
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NO TEXT ON THIS PAGE

SECTION 09 88 00 – PROTECTIVE COATINGS
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Protective Coatings, as specified herein, shall include, but not be limited to, preparation of surfaces, and coating of substrates with a non-vapor barrier, protective waterproofing, polymer-modified, Portland cement slurry.
- B. Protective Coatings shall be provided as shown on the Contract Drawings, specified herein or in the Contract, or as required for a complete installation.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

A. NOT USED.

1.04 REFERENCES

A. ASTM:

C307 - Standard Test Method for Tensile Strength of
Chemical-Resistant Mortar, Grouts, and Monolithic
Surfacings.

D522 - Standard Test Methods for Mandrel Bend Test of
Attached Organic Coatings.

D695 - Standard Test method for Compressive Properties of
Rigid Plastics.

E96 - Standard Test methods for Water Vapor Transmission
of Materials.

B. American Concrete Institute (ACI):

503R-30 - Use of Epoxy Compounds with Concrete.

C. German Institute for Standardisation (DIN):

1048 - Testing Concrete – Testing of Hardened Concrete
(Specimens Prepared in Mould)

D. NSF- National Sanitation Foundation Standard 61

E. International Concrete Repair Institute (ICRI):

Technical Guideline No. 310.2 - Selecting and Specifying
concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and
Concrete Repair.

1.05 DESCRIPTION

NOT USED.

1.06 QUALITY ASSURANCE

A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.

B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 10 years or more experience.

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Contractor shall maintain qualified personnel who have received product training by manufacturer's representative.

- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state, and federal authorities having jurisdiction. Consult manufacturer's Material Safety Data Sheets for complete handling recommendations.

1.07 SUBMITTALS

- A. Contractor shall submit copies of manufacturer's literature, including the following: Product Data Sheets, Material Safety Data Sheets (MSDS).
- B. Submit copy of Certificate of Approved Contractor status by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the Site immediately.
- B. Store all materials off the ground and protect from rain, snow, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Provide a written warranty from the Manufacturer against defects of materials for a period of (10) years, beginning with date of substantial completion of the Project.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. SikaTop Seal 107 by Sika Corporation, 201 Polito Ave., Lyndhurst, NJ 07071, (201) 933-8800, www.usa.sika.com
- B. Vandex Cemelast, by Euclid Chemical, 19215 Redwood Road, Cleveland, OH 44110, (800) 321-7628, www.euclidchemical.com
- C. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Polymer-modified Portland cement coating:

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Component “A” shall be a liquid polymer emulsion of an acrylic co-polymer base and additives.

Component “B” shall be a blend of selected Portland cements, specially graded aggregates, and admixtures to control setting time and workability.

The ratio of Component A: Component B shall be:

- a. Slurry 1:4 by weight.
- b. Mortar 1:4.5 by weight.

The material shall be non-combustible either before or after cure.

B. Performance Criteria:

Properties of the cured polymer-modified Portland cement coating:

- a. Tensile Strength (ASTM C307) 28 days: 900 psi.
- b. Bond Strength (ACI 503R-30 Modified): Pull-off test: 180 psi at 28 days.
- c. Moisture Vapor permeability (ASTM E96): 18 perms at 28 days.
- d. Compressive Strength (ASTM D695): 3000 psi at 28 days.
- e. Flexibility (ASTM D522 Modified): Approximately 25%
- f. Carbon Dioxide Diffusion: Coefficient (uCO₂) approximately 35,000 equivalent to 6 inches of concrete.

The material shall not produce a vapor barrier.

The material meets the chemical requirements in accordance with ANSI/NSF Standard 61 – potable water approval.

The material shall be thermally compatible with Portland cement mortar and concrete.

Water tightness under Hydrostatic Pressure (DIN 1048 Mod.):

Water Pressure (ft)	Penetrated Water (grains)	Water Absorption (grains/ft ² * hours)
16	0	0
33	15	3
99	31	10

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Note: Rendering mortars absorbing less than 91 grains/ft.²*hours are considered watertight.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Substrate must be clean, sound, and free of surface contaminants. Remove dust, laitance, grease, oils, curing compounds, form release agents, and all foreign particles by mechanical means. An open-textured, sandpaper-like substrate is ideal. Substrate shall be in accordance with ICRI Technical Guideline No. 310.2 for coatings and fall within CSP4. All surfaces must be saturated surface dry (SSD), with no standing water at time of application.

3.02 APPLICATION

- A. Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F and rising.
- B. Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified material.
- C. Mixing: Under normal circumstances, full quantities of both components are mixed together, a slurry consistency with result. For a trowelable consistency use only 90% of component A. Mix in a clean container by slowly adding the powder component to the liquid component and mixing with a slow speed (400-600 rpm) drill and mixing paddle.
- D. Coating Application:

Apply trowel, notched trowel, stiff bristle brush, or spray equipment.
Work material into the prepared substrates, filling all pores and voids.

For brush grade: Apply first coat, with horizontal brush strokes and leave to harden (4 to 8 hours). Apply second coat with vertical brush strokes.

For trowel consistency: Apply the first coat with a notched trowel and leave to harden (4 to 8 hours). Apply the second coat with a flat trowel.

For spray application: Use a hopper gun spray equipment, textured sprayer, or a rotor/stator pump equipment. Allow the first coat to harden

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(4 to 8 hours) prior to the application of the second coat. As soon as the mortar layer starts to set, a uniform surface with a fine sponge or a plastic trowel.

- E. When applying the coating, never stop the application until the entire surface has been coated. Always stop application at an edge, corner, or joint. Never let a previously coated film dry; always coat into a wet film. Always apply the coating at a 45° angle to an edge, corner, or joint.
- F. Adhere to all limitations and cautions for the polymer-modified cement coating in the manufacturer's printed literature.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

The uncured polymer-modified Portland cement coating can be cleaned from tools with water. The cured polymer-modified Portland cement coating can only be removed mechanically.

Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION

SECTION 09 91 00 – PAINTING
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Painting, as specified herein, shall include, but not be limited to, preparation of surfaces, shop painting of items furnished, and field painting of structures, piping, conduit, ducts and equipment, and marking of piping and electrical conduit.
- B. Painting shall be provided as shown on the Contract Drawings, specified herein or in the Contract, or as required for a complete installation.
- C. The following index of this Section is presented for convenience:

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- D. The following schedule, attached after the End of Section designation, is a part of this Section:

1. Material Paint Schedule

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

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1.03 RELATED SECTIONS

- A. Section 40 05 97 - Identification for Process Equipment.

1.04 REFERENCES

- A. SSPC - The Society of Protective Coatings (formerly of Steel Structures Painting Council)

1. SSPC-SP 1 Solvent cleaning
2. SSPC-SP 6 Commercial blast cleaning
3. SSPC-SP 10 Near white cleaning
4. SSPC-SP 2 Hand tool cleaning
5. SSPC-SP 11 Power tool cleaning to bare metal
6. SSPC- SP 15 Commercial grade power tool cleaning
7. SSPC-SP 16 Brush off Blast Cleaning of Non Ferrous Metals

- B. ASTM - American Society for Testing Materials

1. ASTM D3359 - Measuring Adhesion by Tape Test
2. ASTM D16 - Terminology Relating to Paint, Varnish, Lacquer, and related Products

- C. NSF- National Sanitation Foundation Standards

1.05 DESCRIPTION

- A. Safety Requirements

1. All painting materials specified herein, and ingredients of coatings containing substances that are potentially toxic or hazardous shall be shipped with warning labels. These products shall be applied in strict conformance with the safety requirements of the following:
 - a. Manufacturer
 - b. National Paint and Coatings Association (NPCA)
 - c. Society of the Plastics Industry (SPI)
 - d. Manufacturing Chemist Association (MCA)
 - e. Society of Protective Coatings (SSPC)
 - f. United States Government Occupational Safety and Health Administration (OSHA)
 - g. Health and Safety Requirements of the State of New York (PESH-Public Employees Safety and Health)
 - h. Health and Safety Requirements of the City of New York (COSH-Citywide Office of Safety and Health)

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- B. Environmental Requirements
 - 1. Weather:
 - a. Air and surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer’s instructions.
 - b. Surface Temperature: Minimum of 5 degrees F (3 degrees C) above dew point.
 - c. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer’s instructions.
 - d. Precipitation: Do not prepare surfaces or apply coatings in rain, snow, fog or mist.
 - e. Wind: Do not spray coatings if wind velocity is above manufacturer’s limit.
 - 2. Ventilation
 - a. Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with AWWA D102.
 - 3. Dust and Contaminants:
 - a. Schedule coating Work to avoid excessive dust and airborne contaminants.
 - 4. Protect Work areas from excessive dust and airborne contaminants during coating application and curing.

1.06 QUALITY ASSURANCE

- A. Paint Quality Assurance Records
 - 1. The following information shall be recorded for every paint project and submitted to the Project-Manager:
 - a. Date
 - b. Shift
 - c. Part Temperature
 - d. Dew Point
 - e. Paint Batch Number/s
 - f. Mixing Time for Each Part and the Combined Parts of a Paint System
 - g. Pot Life
 - h. Curing Time of Primer and Finish Layers

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- i. Paint thickness measurements (DFT)
- j. Holiday Test Results and Repair Data
- k. Peel Test Results and Repair Data
- l. Foreman or Supervisor's Signature

B. Test Surfaces

- 1. The Contractor shall paint certain areas of concrete and other surfaces, where directed, using approved coatings for use by the Engineer for comparisons with coating systems applied during the progress of the Work.
- 2. Such coated areas shall not be subsequently painted during the entire period of construction or during the period one-year after the date of Final Acceptance.
- 3. At or about one year after Final Acceptance, the test surfaces shall be inspected by the City for any deterioration such as cracks, blisters, flakes and excessive chalking.
- 4. The Contractor shall supply all material and labor and shall perform any remedial Work on all such deteriorated surfaces using the coating system represented by the test surface at no additional cost to the City.

C. Painting Requirements

- 1. General: The Contract does not specify the surface treatment for every individual part of the Work, however this Contract shall be provided with a complete painting job throughout the Work as specified herein. All items customarily or specified to be shop painted shall be primed and finished in the shop. Field painting will not be allowed unless requested in writing to the Engineer, and written consent is given by the Engineer. In general, only areas that are to be field welded are not to be painted until field erected.
- 2. Manufacturer's Standard Finished Items: The following items shall be furnished with the manufacturer's standard prime and finish coats applied in the shop: pumps, motors, gears, gear housings, air compressors, wall fans, temperature control and instrument panels, process air blowers, engines, filters, strainers, air dryers, meters, gas boosters, gas turbines, generators, panelboards, transformers, boilers, condensing units, water chillers, cooling towers, condensers, heat exchangers, humidifiers, air handling units, sound attenuators, air conditioning and dehumidification units, convector cabinets, unit heaters, enclosures for finned tube radiators, cabinet heaters, boilers, wood seats, lockers, metal toilet partitions, metal urinal screens, aluminum fascia, motor control centers, aluminum light standards, and hoisting equipment. Steel reinforcing bars for concrete shall be coated in accordance with the Contract. When powder coatings are required by the Contract, the powder coatings shall be in accordance with the requirements of the manufacturer of the item.

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3. Painted Items: The following items shall be painted as specified herein: steel water storage tank, structural steel and wrought metals, composite metal floor deck, pipelines, hangers and supports, sluice gates, pumps and pumps parts, valves, valve and sluice gate operators and stands, guard housings, air filter equipment, effluent strainers, heat exchangers, air receivers, tanks, air silencing equipment, storage tanks, gas domes, sediment tanks, steel stair framing, steel lintels, hollow metal doors and frames, gypsum wallboard, interior concrete block, interior concrete walls, columns, beams and ceilings, covering over insulation on piping, electrical conduit systems, small piping and copper tubing, ducts, covering over ducts, and PVC piping, valves and fittings.
4. Unpainted Items: The following items shall not be painted, unless otherwise specified: registers, grilles, dampers and linkage, fire sprinklers, name and identification plates and tags, floor gratings, brass pipe and fittings, brass valves, stainless steel, wood, stop log panels, spray-on fireproofing steel to receive spray-on fireproofing, surfaces to receive field welding, and fraying surfaces of high strength bolted connections.

1.07 SUBMITTALS

- A. Contractor shall submit Shop Drawings for approval by the Engineer. Submittals shall include, but not be limited to:
 1. Catalog cuts and reference materials.
 2. Color Chart: The Contractor shall submit the manufacturer's standard color chart for color selection for painting of items other than process piping, valves, pipe line equipment, pump casings, blowers and other mechanical equipment and their drive units, all of which shall be in conformance with the "BACKGROUND COLOR" of the General Color Code specified in Section 40 05 97 – Identification for Process Equipment.
 3. Paint Samples:
 - a. Two one-quart samples of each required kind of paint material, or the ingredients thereof which are to be mixed on the job.
 - b. Samples shall be labeled and shall include the certificate of the manufacturer stating the actual percentages by weight and volume of all ingredients entering into the mixture.
 - c. Upon request, further samples shall be provided as the Work progresses.
 - d. Painting materials shall not be applied without written approval of samples by the Engineer.
 4. Painted Surface Samples:
 - a. Upon request, duplicate samples of the results obtained by painting and finishing various materials on the Work shall be submitted.

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Such samples, and the approved paint applied thereto, shall be applied in strict conformance with these Sections.

- b. Finished areas shall be considered adequate for the purpose of determining the quality of the Work. All painting work shall be performed in a quality equal to the approved samples.
- c. Where equipment is customarily shipped with a standard finish, samples of the proposed color and finish shall be submitted for approval prior to shipping.

5. Certification:

- a. Affidavits from the manufacturer certifying that materials furnished conform to the requirements specified.
- b. And that paint products have been checked for compatibility.

6. Immersion Certification:

- a. Affidavits from the manufacturer certifying that coatings in immersion service contain no water soluble solvents or corrosion inhibitive (active) pigments with slight water solubility.

7. List of Paints:

- a. A list of paint products with mil thickness and solids by volume, including all paint applied in the shop and in the field. The list shall be in accordance with the requirements of this Section and the recommendations of the paint manufacturer.

8. Applicator's Quality Assurance:

- a. Submit list of a minimum of 5 completed projects of similar size and complexity to this Work. Include for each project:
 - 1) Project name and location
 - 2) Name of owner
 - 3) Name of Contractor
 - 4) Name of Engineer
 - 5) Name of coating manufacturer
 - 6) Approximate area of coatings applied.
 - 7) Date of completion.

9. Warranty:

- a. Submit manufacturer's standard warranty.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. General: All products and materials shall be delivered, stored, and handled as specified in Contract Documents and as follows:

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- B. Delivery and Storage: All paint materials delivered and stored at the site shall be from the approved manufacturer only.
 - C. Packaging and Labeling: Paints, stains, varnish or ingredients of paints to be used on the job shall be properly prepared, packed, and labeled. All materials shall be delivered to the Site in original, unbroken containers bearing the manufacturer's printed labels, which shall specify the following:
 - 1. Project and Contract No.
 - 2. Name of manufacturer
 - 3. Address of manufacturer
 - 4. Generic name of paint or ingredients
 - 5. Brand and trademark
 - 6. Schedule letter as listed herein
 - 7. Percent solids by volume
 - 8. Net quantity
 - 9. Date of manufacturer
 - 10. Date packed
 - D. Storage: Painting materials shall be stored at the Site in manner and place which shall be in accordance with applicable codes and regulations, and in accordance with manufacturer's instructions. The storage space shall be kept clean at all times. Every precaution shall be exercised to eliminate fire hazards.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Standards of Quality: Proprietary protective coatings included herein by brand name or trade mark are given solely as standards of quality and for bidding purposes and do not preclude the use of an approved equivalent.
- B. Latest Products: Unless specified otherwise, the proprietary protective coatings of the manufacturer's latest products in regular production on the date of receipt of order shall be provided.
- C. Equivalents: Equivalent products shall be of a standard, regularly produced product of a manufacturer. Equivalent products shall be submitted on their applicable published printed literature that states the generic type, instructions for use, solids

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by volume, application rates, and chemical components of vehicles and solids. Equivalent products shall be accompanied by a list of projects where each of the coatings has been used on new construction and has rendered satisfactory service for at least three years. Should the manufacturer's literature of the product being offered call for higher film thickness, the greater film thickness shall be applied, and the submitted schedule shall so state.

D. Paints shall be as manufactured by the following manufacturers:

1. Tnemec Company, Inc., Kansas City, MO.
2. Sherwin Williams, Cleveland, OH.
3. International Paint, Houston, TX.
4. Carboline Company, St. Louis, MO.
5. PPG Amercoat, Little Rock, AR.
6. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. General:

1. Compatible shop and field coats shall be provided.
2. All coats of paint for any particular surface shall be from the same manufacturer.
3. Paint shall be of approved color as selected from the manufacturer's standard range of colors.
4. The Contractor shall submit proposed modifications to the specified painting systems for the Engineer's approval prior to use.
5. Paints containing lead or manganese driers shall not be submitted.

B. Classification of Paints: Alphabetical designations have been used in the following list to classify/group acceptable paints by the type and quality of materials desired. Equivalent material from the manufacturers named above or from other approved manufacturers may be used in any of these paint groups in accordance with the procedures for substitution. Refer to the "Material Painting Schedule", attached after the "End of Section" designation, for applicability of these paint groups.

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CLASSIFICATION OF PAINTS			
Paint Group	Product Name and Number	Volume Solids %	Dry Film Thickness Mils per Coat
A	Tnemec: Series V69 Hi-Build Epoxoline II	69	3.0-5.0
	Carboline: Carboguard 60/61 or Carboguard 635 or Carboguard 890 Series	72 65 75	4.0-8.0 4.0-6.0 4.0-8.0
	Sherwin Williams: Macropoxy 240	72	2.0-4.0
	International Paint: Integrated 345 or Devran 224V	70/77	3.0-4.0 (typically 4.0-6.0)
	PPG: Amerlock 2/400	85	4.0-8.0
B	Tnemec: Series V140-44 BR Pota-Pox Plus	69	4.0-6.0
	Carboline: Sanitile 120	38	1.0-2.0
	Sherwin Williams: Dura-Plate 235 (Waste Water)	68	3.0-5.0
	International Paint: Interseal 670 HS or Bar Rust 233HS	82/80	3.0-6.0 (typically 4.0-8.0)
	PPG: Amerlock 2/400	85	4.0-8.0
C	Tnemec: Series 1095 Endura-Shield	68	2.0-3.0
	Carboline: Carbothane 134 Series or Carbothane 134WB	70 50	2.0-3.0 2.0-3.0
	Sherwin Williams: Hi Solids Polyurethane 250 or Sherloxane 800	63 90	3.0-5.0 4.0-6.0
	International Paint: Interthane 990V or Devthane 379	71/63	2.0-3.0
	PPG: Pithane Ultra	70	2.0-3.0
D	Tnemec: Series V69 Hi-Build Epoxoline II	69	3.0-5.0
	Carboline: Carboguard 61 or Carboguard 691 or Carboguard 635 Series	72 80 65	4.0-8.0 4.0-20.0 4.0-8.0
	Sherwin Williams: Macropoxy 646	72	4.0-6.0
	International Paint: Interseal 670HS or Bar Rust 233H/236	82	3.0-6.0
	PPG: Amerlock 2/400	85	4.0-8.0
E	Tnemec: Series 90-97 Tnemec-Zinc	63	2.5-3.5

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CLASSIFICATION OF PAINTS			
Paint Group	Product Name and Number	Volume Solids %	Dry Film Thickness Mils per Coat
	Carboline: Carbozinc 859 Series or Carboguard 890 Series or Carboguard 60/61	66 75 72	3.0-10.0 4.0-10.0 4.0-10.0
	Sherwin Williams: Corothane I Galvapak	67	2.5-3.5
	International Paint: Interzinc 52	59	3.0-5.0 (typically 2.0-3.0)
	PPG: Amercoat 68HS	70	2.5-5.0
F	Tnemec: Series 54 Envirofill Masonry Filler	68	As Required
	Carboline: Sanitile 100 Block Filler or Carbocrylic 3350	54	As Required
	Sherwin Williams: Heavy Duty Block Filler (dry) Kem Cati –Coat Epoxy Filler/ Sealer	50 72	8-10 10-20
	International Paint: Devran 224 or Intercrete 4820	77/NA	As Required
	PPG: Perma-Crete 4-100XI	55	8.0-11.0
G	Tnemec: Series 151 Elasto-Grip	17	1.0-1.5
	Carboline: Galoseal WB	31	0.5-1.0
	Sherwin Williams: Pro-Mar 200 Zero VOC / Primer	26	1.0-2.0
	International Paint: Intercryl 520	44	1.0-2.0 (typically 2.0-3.0)
	PPG: Seal Grip 17-921XI	28	1.6
H	Tnemec: Series 1026	43	2.0-3.0
	Carboline: Sanitile 155	38	2.0-3.0
	Sherwin Williams: Pro-Mar 200 Zero VOC Series Eg-Shel (dry wall) or Pro Industrial DTM Acrylic Gloss (pipe insulation)	42 40	1.5-2.0 2-4
	International Paint: Intercryl 530/WB	35	1.5-2.0 (typically 2.0-3.0)
	PPG: Speedhide Interior Latex 4510XI	37	1.5

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CLASSIFICATION OF PAINTS			
Paint Group	Product Name and Number	Volume Solids %	Dry Film Thickness Mils per Coat
I	Tnemec: Series V140-AA83 Pota-Pox Plus	82	4.0-6.0
	Carboline: Carboguard 691/ Phenoline Tank Shield	80-100	4.0-20.0
	Sherwin Williams: Macropoxy 646 PW	72	4.0-6.0 (2-4 as concrete primer)
	International Paint: Interseal 670HS or Bar Rust 233H	82/80	4.0-6.0 (typically 4.0-8.0)
	PPG: Amerlock 2	85	4.0-8.0
J	Tnemec: Series 141 or Series 435	82 100	1.0-3.0 20-30
	Carboline: Carbozinc 621 / Plastite 4503 / Carboguard 691	80-100	4.0-10.0
	Sherwin Williams: Duraplate 235	68	3.0-5.0
	PPG: Amerlock 2	85	4.0-8.0
K	Tnemec: Series 141 or Series 435	82 100	1.0-3.0 20-30
	Carboline: Reactamine 760 Series Plasite 4550S	100 100	20.0-100.0 20.0-60.0
	Sherwin Williams: PolyCote 115 or Duraplate 6000	100 100	25.0-100.0/ 40.0-125.0
	International Paint: Enviroline 222	100	20.0-100.0 (typically 70.0-80.0)
	PPG: Amerthane 490	100	20.0-100.0
L	Tnemec: Series 141	82	6.0-14.0
	Carboline: Reactamine 28 or Carboguard 1340 WB	100 55	1.0-2.0 1.5-2.0
	International Paint: Interzone 954	85	14.0-18.0 (typically 18.0-20.0)
	PPG: Amerlock 2	85	4.0-8.0
M	Tnemec: Series 431 Perma- Shield PL	100	30.0-40.0
	Carboline: Reactamine ET	100	30.0-40.0
	Sherwin Williams: Duraplate UHS or Duraplate 6000	100 100	30.0-40.0 40-60
	PPG: Novaguard 890	100	25.0-30.0

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CLASSIFICATION OF PAINTS			
Paint Group	Product Name and Number	Volume Solids %	Dry Film Thickness Mils per Coat
N	Tnemec: Series FC22 or 22 Epoxoline	100	20.0-30.0
	Carboline: Phenoline Tank Shield / Polyclad 777 Series	100	20.0-30.0
	Sherwin Williams: Sher Plate PW or Duraplate UHS	100 100	25.0-35.0 25-35
	International Paint: Interline 975P	100	30.0-40.0 (up to 50.0 mils max)
	PPG: Novaguard 810 ER	100	20.0-40.0

2.03 FABRICATION / ASSEMBLING / FINISHES

A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Surface Preparation: Prior to painting, Surface preparation prior to painting shall be in accordance with the following guidelines and as recommended by the painting material manufacturer.

SURFACE PREPARATION GUIDELINES	
Class of Work	Preparation of Surface Prior to Painting
Structural Steel and Steel Encased in Concrete, Masonry or Fireproofing	All visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter shall be removed by compressed air nozzle blasting, centrifugal wheels or other specified method. Discoloration caused by certain stains shall be limited to no more than 33 percent of each square inch of surface area in accordance with Society of Protective Coatings (SSPC-SP6).

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SURFACE PREPARATION GUIDELINES	
Class of Work	Preparation of Surface Prior to Painting
Steel (other than structural, encased or galvanized) and Steel Submerged Under Water	All visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter shall be removed by compressed air nozzle blasting, centrifugal wheels or other specified method. Discoloration caused by certain stains shall be limited to no more than 5 percent of each square inch of surface area in accordance with Society of Protective Coatings (SSPC-SP10).
Galvanized Steel and Other Metals	All welds, beads, blisters or protuberances, other than identification markings shall be smooth, and other imperfections shall be removed. All nonferrous metals and galvanized steel, whether shop primed or field primed, shall be solvent cleaned in accordance with Society of Protective Coatings (SSPC-SP1).
Canvas Pipe Covering	All adhering debris shall be removed and indentations or other unsightly spots shall be smoothed out to give a uniform, even surface. Surfaces shall be brushed clean.
Gypsum Wallboard and Plastered Surfaces	Gypsum wallboard shall be prepared as recommended by the wallboard manufacturer. Plaster surfaces shall be dry. Scratches, cracks, holes and other defects shall be filled flush with adjoining surfaces by approved methods, sandpapered smooth, and brushed clean.
Concrete and Masonry Surfaces	Poured Concrete and masonry shall be dried for a minimum of 28 days and then the dry concrete and masonry shall be brushed and washed to remove all loose dirt, dust, free lime and other deleterious substances by approved methods. Protruding fins and other adhering matter shall be removed or ground until a smooth, even finish is obtained. Concrete surfaces to be painted shall be acid etched or otherwise roughened as recommended by the manufacturer of the coating to be applied, to produce a slightly granular surface required for adherence of coating to the concrete, unless otherwise indicated. Precast concrete: only once precast panels have been installed, sealed and appropriate preparations have been made, painting shall commence. See Contract Drawing for locations that require painting or shall be avoided.
PVC	All adhering debris shall be removed and surface shall be roughened using suitable sandpaper. Surfaces shall be dry and free from dirt, oil, grease etc.

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3.02 APPLICATION

- A. General: All painting and coatings shall be applied in accordance with the manufacturer's recommendations and approved submittals. A representative of the paint manufacturer shall inspect the surfaces to be painted and shall advise on the proper application. The paint manufacturer representative shall periodically be consulted regarding ambient temperature and humidity conditions.
- B. Shop Painting: The following items shall be provided with shop coats of primer and finish coats as herein specified before exposure to the weather:
1. Metals:
 - a. Structural steel
Note: For galvanized steel see notes in Contract drawings.
 - b. Miscellaneous steel and wrought iron
 - c. Ornamental wrought and light iron
 - d. Iron castings
 2. Machinery and Equipment:
 - a. Mechanical and electrical equipment
 3. Pipe:
 - a. All piping except galvanized iron, stainless steel, aluminum, copper, brass and bronze piping.
- C. Field Painting: All painting at the site of the project is hereby designated as field painting for those items that cannot be shop painted or are touched up due to minor damage to the painted surface.
1. Repair and Repainting: Field coatings shall not be applied until all marred surfaces have been repaired or repainted. Shop coated surfaces shall be thoroughly cleaned and retouched prior to the application of successive paint coats in the field.
 2. Unpainted Materials: Do not paint or finish copper, bronze, chromium plate, nickel, stainless steel, aluminum (except ducts and conduit adjacent to finish painted surfaces), monel metal, lead, lead coated copper and brass, except as otherwise indicated.
 3. Items to Receive Coating: All ferrous metals and insulated surfaces shall be provided with a protective coating. Interior surfaces, exposed masonry walls and concrete walls, floors and ceilings shall be provided with protective coatings as specified.
 4. Surface Condition: Only surfaces that are dry and free from dust, grease or other undesirable or interfering substances shall receive coatings. Coatings shall be as specified in the "Material Painting Schedule", attached after the "End of Section" designation.

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5. Application: Finish coats shall be applied after all adjacent work has been completed. Successive coats shall have different shades or tints of color wherever possible. Colors shall be as selected and approved by the Engineer. Prime and successive finish coats shall be cleaned, sand papered, or otherwise treated before the next coat is applied, in accordance with the recommendations of the coating manufacturer, and as approved by the Engineer. All coats shall be inspected and approved by the Engineer, before application of any succeeding coats. All coats shall be applied to the dry film thickness (DFT) specified. Coatings shall be applied by skilled personnel under adequate illumination. All painted surfaces shall be left in a clean, orderly and acceptable condition.
 6. Surface and Atmospheric Conditions: Paints shall not be applied when the surface temperature is less than 40 degrees F, when the relative humidity exceeds 85 percent, or when the surface to be painted is wet or damp, unless more stringent requirements are called for by the paint manufacturer.
- D. Field Painting Operations: Surfaces to be given protective coating shall be thoroughly cleaned. Scratches and abrasions on equipment which has been shop coated shall be refinished and all surfaces to be field painted shall be approved by the Engineer before proceeding with painting. Painting shall be performed in a continuous and orderly operation to facilitate adequate inspection, however material subject to weathering or corrosion shall be given prime coats as quickly as practicable.
1. Method of Application: All paint material shall be applied by brush or roller. Spray painting will be permitted only with the specific approval of the Engineer. Surfaces which are so close together as to prevent the insertion of a standard size roller or brush shall be painted thoroughly with the prescribed number of coats by using special narrow rollers or brushes.
 2. Adjacent Areas: Areas under and adjacent to painted surfaces shall be fully protected at all times. Dripped or spattered paint shall be promptly removed and any adjacent surfaces that have been damaged or discolored by overspray shall be repaired, refinished, and repainted.
 3. Tinting: Successive coats of paint shall be tinted to make the various coats easily distinguishable. Undercoats of paint shall be tinted to the approximate shade of the final coat of paint. Final coats of paint shall not be applied until all other Work has been completed, the dirt and rubbish removed and the surfaces suitably prepared. Paint to be applied shall be at room temperature.
 4. Conditions for Application: Each coat of paint shall be given sufficient time to cure per the manufacturer's recommendation before application of the succeeding coat. Each succeeding coat shall be applied within the recoat time specified by the manufacturer; otherwise the painted surface shall be prepared per the manufacturer's recommendation before it is recoated. Exterior painting will not be allowed in dust laden air, during damp or

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threatening weather, or on moist or wet surfaces, or when the surface temperature is below 40 degrees F on a falling thermometer or under 50 degrees for catalyzed epoxy material; it will not be allowed in extreme heat or when metal is hot enough to cause the paint to blister and produce a porous film. Do not apply interior painting until the building is thoroughly dry. If the temperature in the interior of the building, in the opinion of the Engineer, is too low painting will be stopped until the building is heated. Proper ventilation and sufficient heat shall be maintained to permit the paint to dry. The building shall be maintained to be free from dust.

5. Remedial Work: Any paint found defective shall be removed. Touch-up and remedial painting shall be provided as directed and as required until completion and acceptance of final Work. If damage to the painted surface is excessive, as determined by the Engineer, that item shall be rejected and shipped back, at Contractor's expense, to be properly recoated before it can be accepted.
6. Application: Each coat of paint shall be applied as a continuous film of uniform thickness, free of pinholes and blemishes, to the maximum extent practicable. Any thin spots or areas missed in the application shall be repainted and permitted to dry before the next coat is applied. An approved low voltage wet sponge "holiday" detector shall be used as directed by the Engineer. All paint shall be carefully applied to a smooth even coating without runs or sagging. Enamels shall be brushed with a smooth even flow. Each coat of paint shall be dry, not only on the surface, but throughout the thickness of the paint film, before the next coat is applied. Finished surfaces shall be uniform in gloss, finish, and color, and free from flash spots and brush marks. In all cases, the resultant paint film produced shall be satisfactory in all respects to the Engineer.
7. Thinning: If the paint material must be diluted for application by spray gun, the coating shall be built up to the same film thickness achieved with undiluted material (i.e., one gallon of paint as originally furnished must not cover a greater surface area when sprayed than when applied unthinned by brush). Where thinning is necessary, only the products of the manufacturer furnishing the paint shall be used for the particular purpose, and thinning shall be done with the manufacturer's knowledge, in accordance with his printed instructions.
8. Thickness and Adhesion Testing: Dry film thickness of each coat shall be as specified herein. Dry film thickness will be checked by the Engineer or a representative with a magnetic gauge for ferrous metal in accordance with SSPC 2 or Tooke gauge destructive test for concrete. Film thickness of shop coats or other previously applied coating shall be checked by the Engineer or a representative and recorded before painting in order to determine thickness of field coats. Dry film thicknesses for concrete surfaces shall be determined by measuring with a wet-film gauge and by

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material consumption. Paint adhesion shall be tested by the peel method in accordance with ASTM D 3359.

9. Inaccessible Items: Exposed members which will be inaccessible after erection shall be painted and cleaned prior to erection.
 10. Coverage: All surfaces to be painted shall be completely covered. When color on undercoats shows through the final coat of paint, surfaces shall be covered by additional coats until paint is of uniform color and appearance and coverage is complete.
 11. Safe Atmosphere: The Contractor shall provide sufficient temporary ventilation during painting operations in enclosed areas to remove moisture and solvents, and to keep the atmosphere safe from harmful or dangerous fumes and dust levels for personnel.
- E. Workmanship: Only skilled painters shall perform the Work and specialists shall be employed where required. Finished surface shall not show brush marks or other irregularities. Top and bottom edges of doors shall be painted as required for the adjacent surfaces. Undercoats on hollow metal shall be thoroughly and uniformly sanded with No. 00 sandpaper, or equal abrasive, to remove all surface defects and provide a smooth, even surface.
 - F. Mixing: All paints and coatings shall be mixed in accordance with the manufacturer's instructions on the printed label. The Contractor shall provide galvanized iron pans of sufficient size to contain all mixing pails and mix all paints and ingredients therein.
 - G. Rates of Application: Paints shall be applied so as to give coverage per gallon not greater than that recommended by the manufacturer. Quantities of paint used for successive coats on the various parts of the Work shall be recorded in a manner satisfactory to the Engineer.
 - H. Touch-Up of Shop-Primed and Finished Items: Touch-up of any and all damaged portions and imperfections in shop-primed and finished items shall be accomplished using the same paint as used for the shop prime and finish. Surface shall be prepared prior to touch-up by wire brushing and sanding to remove rust, scale and loose paint.
 - I. Aluminum and Incompatible Surfaces: Where aluminum surfaces come in contact with incompatible metals, lime, mortar, concrete or other masonry materials, one field coat of Group A paint as specified under Article 2.03 "Classification of Paints" in this Section shall be applied to the incompatible surfaces.
 - J. Concealed Surfaces: All wall surfaces which will be concealed by equipment shall be painted before equipment installation.
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Not Used

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3.04 STARTUP / DEMONSTRATION

 A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

 A. The Contractor shall touch up and restore any finish damaged. Paint or other finishes spilled, splashed or splattered shall be removed from all surfaces using care so as not to mar any surface or item being cleaned.

1. The Contractor shall rectify any failures or breakdowns, loosening of the paint or coatings within a year after acceptance of Work, regardless of the paint systems used. This will require removal of the entire coating where failure occurs and repainting with the coating system previously specified. Patching will not be allowed.

END OF SECTION

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MATERIAL PAINTING SCHEDULE																				
Materials and Conditions	Paint Groups (refer to “Classification of Paints” table for acceptable paints in Groups A-N) Tn: Tnemec, Cb: Carboline, SW: Sherwin Williams, IP: International paint, PPG: PPG/Amercoat																			
	Prime Coat					Finish Coats														
						1st					2nd					3rd				
Paint Manufacturer	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG
Steel and Iron - Structural and Miscellaneous Uses:																				
Interior (Indoors) shop primed, field finished	B or E or I	A	A or D	A	A	B or I	A	D	A	B	B or I	A	D	A	B	--	A	D	A	B
Exterior (Outdoors) shop primed, field finished	B or I	A	A or D	A or B or E	A	C	A	D	A or B	B	--	A	D	A	B	--	C	C	C	C
Submerged, Buried or Continuously Wet Exposed to sewage, shop primed, field finished, see Contract Drawings.	B or I	A	A	B	B	J or K or L or M	A	B or J	B	B	--	D	B or J	D	B	--	D	B or J	D	--
Steel and Iron - Industrial Equipment (Exposed to wastewater):																				
Submerged, Buried or continuously wet in wastewater , completely shop coated inside and out, includes OEM factory finished items such as gates, valves, etc.	J or K or L or M	A Or K*	A or M*	D or K or L	A	J or K or L or M	A	B or J	D	B	--	A	B or J	D	B	--	--	B or J	D	B

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MATERIAL PAINTING SCHEDULE																				
Materials and Conditions	Paint Groups (refer to “Classification of Paints” table for acceptable paints in Groups A-N) Tn: Tnemec, Cb: Carboline, SW: Sherwin Williams, IP: International paint, PPG: PPG/Amercoat																			
	Prime Coat					Finish Coats														
						1st					2nd					3rd				
Paint Manufacturer	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG
Above grade, indoors, exposed to waste water , completely shop coated inside and out, includes OEM factory finished, items such as gates, valves etc.	J or K or L or M	A or N*	A or M*	D or K or L	A	J or K or L or M	A	B or J	A or D	B	--	A	B or J	A or D	B	--	--	B or J	A or D	--
Above grade, outdoors, exposed to waste water , completely shop coated inside and out, includes OEM factory finished, items such as gates, valves etc.	J or L or M	A or N*	A or M*	D or E or K or L	A	J or L or M	A	B or L	A or D	B	--	A or C	B or J	A or D	B	--	--	C	A or D	--
Inside of item immersed in sewage	J or K or L or M	A or N*	A or M*	D or K or L	B	J or K or L or M	A	B or J	D	B	--	A	B or J	D	B	--	--	B or J	D	B
Ductile Iron or Steel Process Piping, submerged, Buried or constantly wet, exposed to sewage , H2S exposures, OEM factory finished.	M*	A or K*	A or M*	D or K	M	--	A	B	D or K	--	--	A	B or J	D or K	--	--	--	B or J	D or K	--
Steel and Iron - Industrial Equipment (Exposed to Potable water):																				

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MATERIAL PAINTING SCHEDULE																				
Materials and Conditions	Paint Groups (refer to “Classification of Paints” table for acceptable paints in Groups A-N) Tn: Tnemec, Cb: Carboline, SW: Sherwin Williams, IP: International paint, PPG: PPG/Amercoat																			
	Prime Coat					Finish Coats														
						1st					2nd					3rd				
Paint Manufacturer	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG
Shop primed, field finished	B or I	A or J	E or I	B or I	A	B or I	D	I	B or I	B	B or I	D	I	B or I	B	--	--	--	B or I	--
Exposed to Potable water (NSF) completely shop coated, inside and out, OEM factory finished items such as Gates, Valves etc.	B or I	A or J	E or I	B or I or N	A	B or I	D	I	B or I	B	B or I	D	I	B or I	B	--	--	--	--	--
Equipment above grade, indoors, exposed to Potable water (NSF) , completely shop coated inside and out, OEM factory finished items such as Gates, Valves etc.	B or I	A or J	E or I	B or I or N	A	B or I	D	I	B or I	B	B or I	D	I	B or I	B	--	--	--	--	--
Equipment above grade, outdoors, exposed to Potable water (NSF) , completely shop coated inside and out, OEM factory finished items such as Gates, Valves etc.	N*	A or J	E or I or N*	B or I or N	N*	--	D	I	B or I	--	--	D	I	B or I	--	--	--	--	--	--
Ductile Iron or steel process piping exposed to Potable Water (shop finished) alternate	N*	A or L or N*	E or I or N*	B or I or N	N*	--	A	I	B or I	--	--	C	I	B or I	--	--	--	--	--	--
MISCELLANEOUS USES:																				

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MATERIAL PAINTING SCHEDULE																				
Materials and Conditions	Paint Groups (refer to “Classification of Paints” table for acceptable paints in Groups A-N) Tn: Tnemec, Cb: Carboline, SW: Sherwin Williams, IP: International paint, PPG: PPG/Amercoat																			
	Prime Coat					Finish Coats														
						1st					2nd					3rd				
Paint Manufacturer	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG
Piping concealed in Masonry	B or I	A	A	A	A	A	A	D	A	B	A	--	D	A	B	--	--	--	--	--
Piping wrapped in Insulation	A	A	A or D	A or B	A	A	A	D	A or B	B	A	--	D	A or B	B	--	--	--	--	--
Heated Metal (Air Main Piping): Submerged, Buried and Exposed	J or L or M*	D or E or M*	D or M*	D	D	--	E	D	D	D	--	A or D	D	D	--	--	A or D	D	D	--
Concrete Masonry: Interior	F	--	F	--	F	A or D	F	D	F	B	D	A	D	D	B	D	A	D	D	--
Concrete: Interior, see Contract Drawings for areas to be painted.	A	B	--	--	A	A or D	A	D	D	B	D	A	D	D	B	--	--	--	D	--
Concrete: Immersion, Waste Water	A or J or L	J or L	--	--	N	A or J or L	D or I or K*	I	D	N	--	D	B or J or K	D	--	--	--	--	D or K	--
Pipe and Duct Insulation: Exposed	A	--	--	--	A	H	B	H	H	B	H	H	H	H	B	--	--	--	--	--

SECTION 09 91 00 – PAINTING
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MATERIAL PAINTING SCHEDULE																				
Materials and Conditions	Paint Groups (refer to “Classification of Paints” table for acceptable paints in Groups A-N) Tn: Tnemec, Cb: Carboline, SW: Sherwin Williams, IP: International paint, PPG: PPG/Amercoat																			
	Prime Coat					Finish Coats														
						1st					2nd					3rd				
Paint Manufacturer	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG	Tn	Cb	SW	IP	PPG
PVC (Interior)	A	--	--	--	A	A	B	D	A	B	A	A	D	A	--	--	--	--	--	--
PVC (Exterior)	A	--	--	--	A	A	B	D	A	C	A	C	C	A	--	C	--	C	C	--
Gypsum Wallboard and Plaster:	G	B	G	G	G	H	H	H	H	H	H	H	H	H	--	H				--
Nonferrous Metal and Galvanized steel: Interior	A	--	--	--	A	A	G	D	A	B	A	A	D	A	--	A	--	D	A	--
Nonferrous Metal and Galvanized Steel: Exterior	A	--	--	--	A	A	G	D	A	C	A	C	C	A	--	C	--	C	C	--
* Requires only one coat.																				

SECTION 09 91 00 – PAINTING
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NO TEXT ON THIS PAGE

SECTION 10 14 01 – IDENTIFYING DEVICES
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. Identifying devices as specified herein shall include standing signs, metal letters and numbers signs and appurtenances.
- B. Identifying devices shall be provided where shown on the Contract Drawings, specified in the Contract, or as required for a complete installation.
- C. The Contractor shall implement practices and procedures to meet the project’s sustainability goals as identified in the Contract Documents. The Contractor shall ensure that the sustainability requirements of this Section are implemented to the fullest extent.
- D. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the

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applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 03 21 00 - Reinforcing Steel
- B. Section 03 30 00 - Cast-in-Place Concrete
- C. Section 05 05 23.01 - Welding
- D. Section 05 05 23.02 - Miscellaneous Metal Fastening
- E. Section 05 12 00 - Structural Steel Framing

1.04 REFERENCES

- A. OSHA - 1910.145 – Specifications for Accident Prevention Signs and Tags
- B. NYSBC - New York State Building Code
- C. ANSI/ICC A117.1 - Accessible and Usable Buildings and Facilities
- D. AWS A5.12 - Tungsten and Oxide Dispersed Tungsten Electrodes for Arc Welding and Cutting
- E. AWS D1.1 - Structural Welding Code - Steel

1.05 DESCRIPTION

- A. Sustainable Design Requirements
 - 1. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesives: Do not use adhesives that contain added urea formaldehyde.
 - 3. Composite Wood and Agrifiber Products: Do not use composite wood and Agrifiber products that contain added urea formaldehyde.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Engage a single fabricator, with undivided responsibility for detailing and performance of the signage structure and wall mounted metal lettering.
 - 2. Engage a firm which can show five years previous successful experience in detailing and fabrication of signage paneling, signage structures, and metal lettering, of scope and type similar to the required work.
 - 3. Materials and fabrication procedures shall be subject to inspection and tests in the mill, shop, and field, conducted by a qualified inspection agency.

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Such inspections and tests shall not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

B. Installer Qualifications:

1. Engage a single installer skilled, trained and with documented successful experience in the installation of signage structures and wall mounted metal lettering, and with specific skill and successful experience in the erection of the types of materials required; and who agrees to employ only tradesmen with specific skill and successful experience in this type of Work. Submit names and qualification to Engineer along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owner, architects, or engineers responsible for projects.
 - b. Approximate contract cost of the ornamental fences and gates.
 - c. Amount of area installed.

C. Source Quality Control:

1. Obtain all signage structure components and accessories from the same manufacturer.
2. Provide qualified welding processes and welding operators in accordance with AWS D1.1, Section 6 “Qualification”.
3. Provide certification that all welders employed on, or to be employed for, the fabrication of the signage structures and wall mounted metal lettering, have satisfactorily passed AWS qualification tests within the previous twelve months. Contractor shall ensure that all certifications are kept current.

1.07 SUBMITTALS

A. The Contractor shall submit for approval, catalog cuts, shop drawings, and reference materials.

B. Shop Drawings

1. The Contractor shall submit copies of specifications, installation instructions and general recommendations from the identifying device manufacturers, for each type of identifying device product. Manufacturer's data substantiating that the materials comply with the requirements of the Contract Documents shall be included.
2. Drawings showing extent of the Work and all details required for the Work referencing system components provided as samples, and shall include:
 - a. Complete details for all signs giving sizes and styles of lettering and colors.

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- b. Complete schedules for all signs, and building name letters giving location, message, letter, size, color, and method of attachment.
- c. Details of fabrication and attachment of all items.
- d. Complete location plan for all sign types.

C. Samples

- 1. Submit for approval color and finish samples of each identifying device product, including each accessory and miscellaneous material to be used in the Work.

D. Mockups

- 1. Mockups of each type of Identifying Device including wall mounded letters, shall be done in shop and await approval before installation.

E. Sustainable Design Submittals

- 1. Environmental Materials Reporting Form (EMRF) Recycled Content Materials. Provide the following information:
 - a. Name of Product and Manufacturer.
 - b. Material cost breakdowns. Cost breakdowns must include total material-only cost (excluding installation, labor and equipment).
 - c. The percentage (by weight) of post-consumer and pre-consumer recycled content in the submitted product(s), if applicable.
- 2. Environmental Materials Reporting Form (EMRF) - Composite Wood Products. Include the following information:
 - a. Confirmation that composite wood and Agrifiber products contain no added urea formaldehyde.
 - b. For each laminate adhesive used on site and in the shop, documentation indicating that the adhesive contains no added urea formaldehyde.
- 3. VOC Reporting Form. Provide the following information:
 - a. For all adhesives used on site, provide the VOC content in grams/Liter (g/L) less water and other exempt compounds.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

- 1. Materials shall not be delivered to the project site before the time of installation.
- 2. Materials shall be delivered in sufficient quantities to allow continuity of the Work.

SECTION 10 14 01 – IDENTIFYING DEVICES
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3. All welding and fastening shall be done in shop prior to delivery to the site to minimize installation time.

B. Storage of Materials:

1. Materials shall be stored in original, undamaged containers with manufacturer's labels and seals intact.

2. All materials shall be stored in a dry, enclosed area, off the ground and away from all possible contact with water, ice or snow.

3. Damage to materials during storage shall be prevented by minimizing the amount of time they are stored at the site before being incorporated into the Work.

C. Handling of Materials:

1. Materials shall be handled in such a manner to avoid damage or breakage.

2. Materials shall not be exposed to detrimental conditions or physical damage. Materials which are so exposed shall be removed from the site and shall not be incorporated into the Work.

3. Packages or containers shall not be opened until all necessary preparatory Work is complete and installation is to begin immediately. Materials shall not be allowed to become wet or soiled or covered with ice or snow.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. The Contractor shall provide a Manufacturer's standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval by the Engineer.

1. Standard Signs and Handicap Signs: (exterior)

a. Nelson-Harking Industries

b. Or approved equal

2. Metal Letters and Numbers: (exterior)

a. Nelson-Harking Industries

b. American Sign Letters

c. Or approved equal

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2.02 MATERIALS / EQUIPMENT

A. General:

1. Accessibility Standard: Comply with applicable provisions in ICC A117.1 for signs.

B. Standard Signs and Handicap Signs:

1. All standard signs information shall be as per contract drawing and the In-design File that is to be provided by the Engineer. For signs font, font size, color, logo and graphic refer to the In-Design File.
2. All wayfinding, directional, identifying signage and handicap signs, shall be a standalone structure. No signage shall be secured to the new fence, gates, or other structures.
3. All sign support structures shall be made of white powder coated steel and bolted to concrete footings.
4. All mounting hardware shall be as provided as shown on the Contract Drawings.
5. All signage imagery shall be provided as shown in Contract Documents and shall be digitally printed on non-directional stainless steel panels.

C. Metal Letters and Numbers (Exterior)

1. All metal letters, numbers, and symbols shall be as per Contract Drawings and made of:
 - a. Metal: 316 stainless steel
 - b. Thickness: 1/2 inch
 - c. Finish: No. 4 Satin
 - d. Size: 10 inches and 5 inches - refer to the Contract Drawings
 - e. Font: Shall be as per the design file that will be provided by the Engineer.
2. All letters shall be manufactured to have projected mounting hardware with 1/2 inch.

D. Attachments: All attachments and anchors necessary for concealed installments of identifying devices shall be furnished.

2.03 FABRICATION / ASSEMBLING / FINISHES

A. For wall mounted metal letters

1. All surfaces shall be cleaned and prepared to receive the metal lettering as per Contract Documents.
2. All pegs/bolts/nuts/clips, etc., fastening the metal lettering to the wall surface shall be of like materials or separated by neoprene washers.

SECTION 10 14 01 – IDENTIFYING DEVICES
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3. The Contractor shall follow requirements for metal fastening as per Section 05 05 23.02 - Miscellaneous Metal Fastening.
- B. For Post Mounted Signs
1. All steel posts are to be welded to their baseplates or any other items in shop unless other wise instructed by the Contract Documents.
 2. All welding is to be done in accordance with Section 05 05 23.01 – Welding.
 3. All structural steel fabrication shall be done in accordance with Section 05 12 00 -Structural Steel Framing.
 4. All metal finishes as per Contract Drawings shall be done in accordance with Section 05 05 15 - Thermal Sprayed Metal Coating
 5. All Concrete and Concrete re-enforcement to be used for footings shall be done in accordance with Section 03 21 00 - Reinforcing Steel and Section 03 30 00 - Cast-in-Place Concrete.
- C. Welding
1. For all welding in shop or in field the Contractor shall adhere to AWS A5.12, AWS D1.1 and any other applicable reference.
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
- A. Not Used
- PART 3 EXECUTION**
- 3.01 EXAMINATION / PREPARATION
- A. The Contractor shall verify that areas to receive identifying devices are properly prepared and completed.
- 3.02 INSTALLATION
1. All materials specified herein shall be installed in compliance with the New York City Building Code, ANSI A117, OSHA regulations, and the approved manufacturer’s printed specifications. Mounting devices, bolts, screws, nuts, and the like shall be in accordance with the Contract Drawings, and all related sections listed herein.
- B. Identifying devices shall be installed where shown on the Contract Drawings.
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Not Used
- 3.04 STARTUP / DEMONSTRATION
- A. Not Used

SECTION 10 14 01 – IDENTIFYING DEVICES
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3.05 **ADJUSTING / PROTECTION / CLEANUP**

- A. Adjustment: System components which are dislodged, damaged, expanded, broken, penetrated, or crushed by subsequent installation operations or damaged by detrimental weather shall be immediately replaced with undamaged material in compliance with the Specifications and properly protected as specified.
- B. Protection: Identifying devices shall be protected from all damage and abuse from all other Contractors and installers involved in the Work until Final Acceptance by the City.
- C. Cleaning: Upon completion of the project, all protection devices shall be removed and identifying devices shall be touched up as necessary. All exposed surfaces shall be cleaned using a mild solution of detergent and warm water. All surfaces shall be left in a neat and clean condition.

END OF SECTION

SECTION 10 44 16 – FIRE EXTINGUISHERS
CONTRACT KENS-EAST-2

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install fire extinguishers, complete and operational, with cabinets and all anchor bolts, fasteners, and accessories.
- B. The following index of this Section is presented for convenience:

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- C. Refer to the Contract Drawings for the Fire Extinguisher Schedule.

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

1.04 REFERENCES

- A. Abbreviations and Acronyms:

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1. DC Dry Chemical
2. CO2 Carbon Dioxide

B. Reference Standards:

1. NFPA 10 Portable Fire Extinguishers.
2. NYSBC - 2020 New York State Building Code

1.05 DESCRIPTION

- A. Not Used

1.06 QUALITY ASSURANCE

- A. Not Used

1.07 SUBMITTALS

- A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to, the following:

1. Action Submittals:
 - a. Shop Drawings:
 - 1) Complete detail and installation drawings for fire extinguishers and cabinets.
 - 2) Wall mount hardware.
2. Information Submittals:
 - a. Manufacturer's specification data sheets and verification of UL ratings.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall deliver equipment provided under this Section in accordance with the requirements of the Contract Documents.
- B. The Contractor shall store and handle equipment provided under this Section in accordance with the requirements of the Contract Documents.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. All products specified under this Section shall be covered under the manufacturer's standard warranty unless specified otherwise.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. DC fire extinguishers:

SECTION 10 44 16 – FIRE EXTINGUISHERS
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1. Ansul Inc., Marinette, WI.
2. Kidde as manufactured by United Technologies Corp., Mebane, NC.
3. Or approved equal.

B. Cabinets:

1. 'Duo-vertical' panel w/ tempered safety glass style, as manufactured by Potter-Roemer Inc., Union, NJ.
2. Stainless Steel fire extinguisher Cabinets by ULINE
12575 Uline Drive
Pleasant Prairie, WI 53158
3. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. DC fire extinguishers shall be 10 lb. capacity, cartridge operated, hand portable, with wall mount, tri-class dry chemical type, with Underwriters' Laboratories rating of 4A:60B:C.
- B. CO2 fire extinguishers shall be 10 lb. capacity, portable carbon dioxide type with wall mounts, having Underwriters' Laboratories rating of at a minimum 1A:10B:1C.
- C. Except where indicated to be mounted within cabinets, provide the manufacturer's standard wall-mounting bracket for each fire extinguisher.
- D. Cabinets: Surfaced mounted or recessed cabinets as indicated on the Contract Drawings. All cabinets shall be #4 finish type 316 stainless steel and 1/8-in. thick, double strength sheet ('DSA') glass. Size cabinets for extinguishers.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 INSTALLATION

- A. Install fire extinguishers in complete accordance with the manufacturer's printed instructions and the approved shop drawings.
 1. Fire extinguishers shall be installed where shown on the Contract Drawings and as directed by the Engineer.

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- B. Wall mounts for extinguishers shall be securely mounted to masonry with Type 316 stainless steel lag bolts and shields.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Not Used

END OF SECTION

**SECTION 13 34 23 – FABRICATED POLICE BOOTH
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. Labor, materials, equipment, and incidentals as shown, specified, and required to provide custom prefabricated Police Booth.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or Allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 28 05 00 - Common Work Results for Electronic Security
- B. Section 28 10 00 - Access Control and Alarm Monitoring
- C. Section 28 16 46 - Hostile Vehicle Control System
- D. Section 28 20 00 - Video Surveillance System

SECTION 13 34 23 – FABRICATED POLICE BOOTH
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E. Section 28 51 00 - Security Intercommunication System

1.04 REFERENCES

A. Reference Standards:

1. Building Code of the State of New York
2. The New York City Building Code
3. HPW TP-0501.1 Ballistic Resistance of Structural Materials
4. NIJ Std. 0108.01 Ballistic Resistant Protective Materials
5. UL 752 Bullet-Resisting Equipment

1.05 DESCRIPTION

A. System Description

1. Provide one Police Booth and associated reinforced concrete foundation slab for Temporary Entrance located per the Project Civil drawings. The general appearance of the booth is to be similar to the reference product described in Style, section 2.02 B. It is to have a hip roof with integrated gutters and downspout, rectangular overall floorplan, ballistic windows to the front and sides, and two exterior doors. A reference floorplan is provided as an attachment to this specification in Section 2.02. The Police Booth will be factory fabricated in a controlled environment in the largest pieces possible to minimize field assembly. The Police Booth will be UL Ballistic Level 8 rated and will include all walls, floors, roofs, counters, glazing, doors, plumbing fixtures and shall be prepped to accept HVAC and electrical and lighting.

B. Design Requirements

1. Design the Police Booth and foundation to withstand the live and dead loads described by the New York State Building Code and the Building Code of New York City. In addition, the Police Booth shall be designed to be certified as an UL Ballistic Level 8 Facility.
2. Contractor shall be responsible to ensure the Police Booth and associated foundation adhere to all Specifications.

1.06 QUALITY ASSURANCE

- A. Employ only experienced Contractors (Installers) skilled in the successful installation of the specified materials and assemblies on similar projects for a minimum of five (5) years.
- B. Employ only manufacturers with at least five (5) years' experience making custom ballistic rated Police Booths.
- C. Unless specifically noted otherwise, provide products of the same manufacturer for each type of unit specified.

**SECTION 13 34 23 – FABRICATED POLICE BOOTH
CONTRACT KENS-EAST-2**

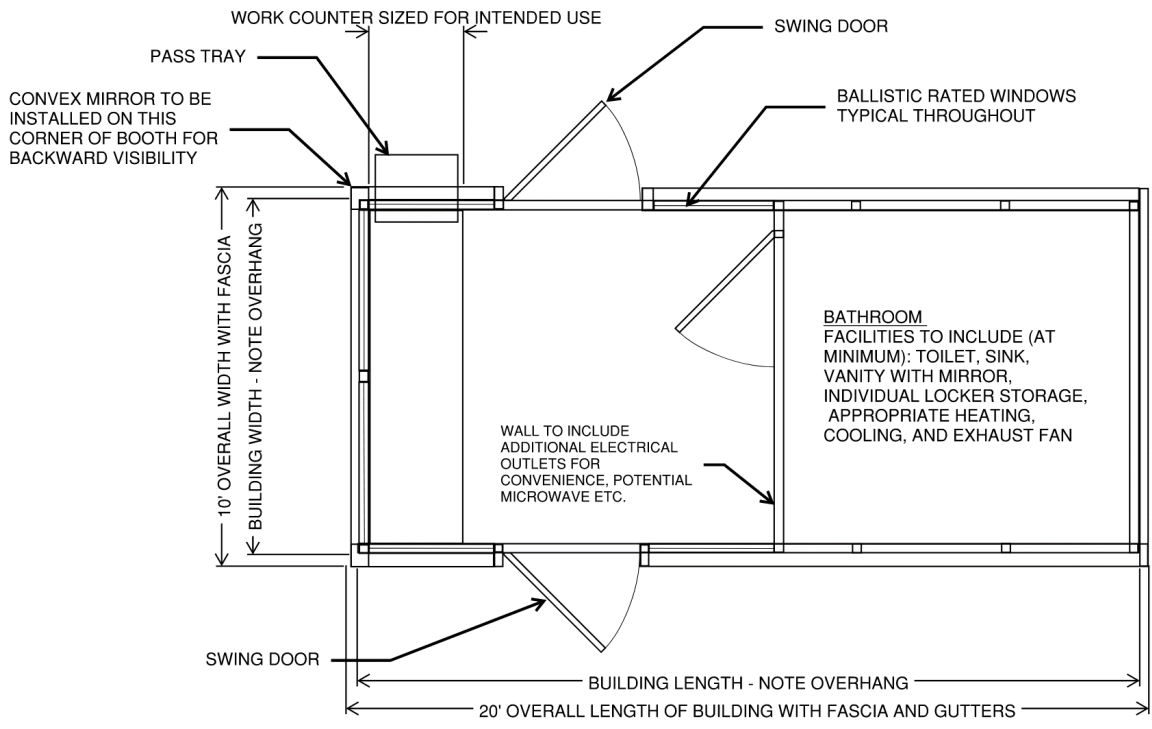
- D. Preinstallation Meetings: Conduct meetings to verify Project requirements, substrate conditions, utility connections, manufacturer's installation instructions, and warranty requirements.
- 1.07 SUBMITTALS
- A. Manufacturer's descriptive data for each component. Indicate ballistic ratings of all materials.
 - B. Material samples for approval by the Engineer of finishes including, but not limited to, counter-top material, floor finishes, color selection and similar options available from selected, approved manufacturer.
 - C. Shop drawings complete with plans, elevations, sections, details, wiring diagrams, penetration details, and attachment details.
 - D. Certificates: Product certificates signed by the manufacturer certifying material compliance with specified performance characteristics and criteria, and physical requirements.
 - E. Structural calculations indicating compliance with all loads and signed by a Professional Engineer registered in the State of New York.
 - F. Installation instructions.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Police Booth shall be packaged at the factory to allow protection to exposed elements during transportation
 - B. Delivery shall be coordinated so Police Booth is delivered only after slab and rough-in of services has been approved and ready for connection. Police Booth shall not be stored on Site.
 - C. Handle Police Booth in strict accordance with manufacturer's recommendations to ensure it is not damaged, and all operable parts operate smoothly.
 - D. Touch-up exposed finishes.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used
- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
- A. Austin Mohawk
 - B. Shelters Direct
 - C. York Guardshack
 - D. Panel Built

SECTION 13 34 23 – FABRICATED POLICE BOOTH
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E. Or approved equal

2.02 MATERIALS / EQUIPMENT

- A. General: Provide a complete, integrated set of manufacturer’s standard, mutually dependent components that form a completely assembled, prefabricated Police Booth, ready for installation on Project Site. Police Booth shall be capable of withstanding structural and other loads indicated, thermally induced movement, and exposure to weather without failure or infiltration of water into booth interior. Include structural framing, roof and wall panels, door, windows, and accessories complying with requirements indicated.
- B. Style: Rectangular guard booth of Steel construction with hip roof. Reference style is Austin Mohawk Model BDG-1020 with hip roof. Refer to floorplan sketch below for reference layout.



ALL DIMENSIONS ARE APPROXIMATE. DO NOT SCALE. PROVIDED FOR SPATIAL AND FUNCTIONAL INTENT AND REFERENCE.

- C. Size: Minimum ceiling height of 7’-6” with external dimensions of approximately 10’ by 20’. Interior layout to include working area and bathroom including all standard fittings (toilet, sink and vanity, toilet tissue holder, etc.).
- D. Work Counter: Provide for two workstations with barrier controls, gun safe, and a pass-tray. The work counter area will have room for up to three NYCDEP Police Officers during peak time. Gun safe shall be easily accessible, fitting fully under the Work Counter and be able to contain four M16 or M4 rifles and eight magazines of ammunition.

SECTION 13 34 23 – FABRICATED POLICE BOOTH
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- E. Electrical Requirements: Provide conduits and boxes throughout entire booth, terminating at electrical panel, outlets, switches, etc. Sufficient outlets and power supplies shall be provided for workstations and other equipment on desk area as well as conveniences such as a microwave or similar equipment in the booth.
- F. Lighting: Coordinate and provide conduits, supporting framework and other accessories required to allow the installation of lighting fixtures, switches, and accessories. LED lighting to illuminate all facades of the booth including over doorways. Lighting elements and controls shall provide sufficient level of control, both in brightness and in sensible grouping of switches for fixtures, to enable appropriate lighting for all lighting conditions, day and night, allowing for sufficient brightness in daytime and dimming at night.
- G. Security Monitors and Controls: Coordinate and provide conduits, supporting framework, junction boxes and other accessories required to allow the installation of security fixtures and accessories. These items include but are not limited to CCTV monitoring, intercom and buzzer, and operation of the Vehicle Access Device. Provide junction boxes and conduits for the installation of cameras to view doorways to booth, card readers at doors, PTZ cameras on the front façade facing traffic, and PTZ cameras on the back of booth facing Shaft 18.
- H. Heating/Cooling Units: HVAC shall be provided to provide comfortable working conditions in all seasons. Coordinate and provide conduits supporting framework and other accessories required to allow the installation of lighting fixtures, switches, and accessories. Additionally, the bathroom shall have an exhaust fan.
- I. Plumbing: The Police Booth shall be equipped with a bathroom and lavatory connected to permanent utilities.
- J. Structural Framework: Fabricated from a minimum 2-by-2-by-0.0747-inch steel structural or mechanical tubing. Connect framework by welding. Framing shall be designed by a Structural Engineer to resist loads required by the New York State Building Code and New York City Building Code.
- K. Base/Floor Assembly: 4-inch high assembly consisting of perimeter frame welded to structural framework of booth. Fabricate frame from a minimum of 2-by-4- inch galvanized-steel structural tubing; 0.0966-inch thick, C-shaped steel channels; or structural-steel angles. Include anchor clips fabricated from a minimum of 1/4-inch thick steel plate, pre-drilled and welded to base exterior. Provide special clips and anchors as required for assemblies requiring field assembly. All elements shall be protected against corrosion in a manner that will remain effective for the design life of the Booth.
- L. Subfloor and Finished Floor: Assembly consisting of 0.079-inch thick, galvanized steel sheet underside with rigid insulation core; covered by 0.125-inch thick, aluminum rolled tread plate; with overall assembly thickness of 2 inches. Floor shall be covered with a seamless rubber flooring.
 - 1. Base and floor assembly shall be installed on a waterproof membrane above the concrete pad to prevent condensation and wet environments within the floor cavity to prevent corrosion to the structural framework over time. In

SECTION 13 34 23 – FABRICATED POLICE BOOTH
CONTRACT KENS-EAST-2

addition, framework perimeter curtain should have vent holes to prevent the accumulation of humidity. Manufacturer should demonstrate sufficiency of booth subfloor design against corrosion, assessing the benefit of stainless steel framing elements if necessary.

2. Seal all conduits with Duct seal and steel wool. Finish with the appropriately sized conduit cap.
- M. Wall Panel Assembly: Assembly consisting of exterior face panel fabricated from minimum 0.079-inch thick, galvanized steel sheet and a precast concrete base; and interior face panel fabricated from minimum 0.064-inch thick, galvanized steel sheet; with 3-inch thick, rigid fiberglass or polystyrene board insulation in cavity between exterior and interior face panels. The walls of the Police Booth shall additionally be designed to comply with UL Ballistic Level 8 requirements.
- N. Interior wall panels: Provide manufacturer's standard painted wall systems. Provide interior walls with blocking, backboards, and chases as required to support or accommodate equipment, fixtures, and accessories.
- O. Doors: Two exterior doors shall be provided that are swinging and UL Level 8 Ballistic rated. Interior doors shall be manufacturer's standard swinging type with glazed vision panel measuring not less than 6" by 6". Locksets and security devices shall be coordinated with BPS preferences for hardware and security requirements. Door swing shall be oriented to swing outward with hinge towards the front (glazed portion) of the booth. Doors shall be provided with robust opening hardware and hinge assemblies that enable operation of the doors without settlement, warping, scraping, or sticking for the design life of the Police Booth. External doors shall provide adequate resistance to moisture and the elements, provided with proper sill flashings and measures to drain excess moisture away from the door.
- P. Glazing: Tinted laminated glass and frame as required to meet UL Level 8 Ballistic requirements. Provide Police Booth with one ballistic rated retractable transaction window that projects a minimum of 12" from the face of the Police Booth.
- Q. Ceiling: 2'-0" x 2'-0" acoustical ceiling grid and tile.
- R. Roof/Ceiling Assembly: Provide manufacturer's standard insulated roof system. Sub-framing for standing seam roof system may be a retrofit cold form framing system.
- S. Finish: Finish exposed metal surfaces, including structural framework, walls, roof panels, and ceilings with cathodic protection, rust-inhibitive primer and one finish coat of industrial air-dry polyurethane enamel. Exterior Color shall match. Interior color shall be selected from manufacturer's standard colors. Precast concrete base shall have a finish coordinated with Architect's requirements. Exterior and Interior Colors are to be coordinated with the Engineer.
- T. Concrete: Coordinate slab size and load requirements of slab. Provide anchor bolts for anchoring to concrete slab.

**SECTION 13 34 23 – FABRICATED POLICE BOOTH
CONTRACT KENS-EAST-2**

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Fabricate Police Booth in largest possible pieces in factory to minimize any field assembly. Acquire and permanently attach labels as required by Federal, State and Local Codes. Pre-glaze windows and doors at factory. Install conduits, race-ways, backboards, supports, and chases at factory, ready for connection to service at Project Site and to accept Work of other Contracts.
- B. Where field assembly is required, ensure proper fit of units and factory fabricate joining materials, clips, anchors, and other accessories required to ensure a complete and weathertight assembly. Joints shall additionally be designed in a manner that will not affect the Ballistic rating.
- C. Fabricate control Booth with forklift pockets in base of booth or other means for transport and delivery to jobsite and placement onto concrete base/pad. Provide Police Booth with leveling devices.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Examine substrates, areas, and conditions with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Check installed anchor bolts for accuracy. Verify that bearing surfaces are ready to receive the Booth.
- C. Verify the rough-in of required mechanical and electrical services prior to placement of the structure.
- D. Prepare a written report, endorsed by Installer, stating compliance with requirements, and listing conditions detrimental to performance.
- E. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 IMPLEMENTATION

- A. Install in accordance with manufacturer's instructions.
- B. Separate dissimilar materials using nonconductive tape, paint, or other material not visible in finished Work.
- C. Install Police Booth on concrete foundation slab that is 12 inches larger than the Police Booth base in both width and length.
- D. Set Police Booth plumb and aligned. Level base plates true to plane with full bearing on concrete bases.
- E. Fasten control Booth to cast-in anchor bolts.

SECTION 13 34 23 – FABRICATED POLICE BOOTH
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- F. Provide final electrical, mechanical, and plumbing connections to the Police Booth per building code requirements for all amenities.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Adjust door, drawer, and hardware to operate smoothly, easily, properly, and without binding. Confirm that lock engages
- B. Lubricate hardware and other moving parts.
- C. Inspect exposed finishes and repair damaged finishes to the satisfaction of the Engineer.
- D. Separate and dispose of waste in accordance with the Project's Waste Management Plan.

END OF SECTION

**SECTION 21 05 17 – SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION
PIPING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all sleeves and sleeve seals for fire-suppression piping, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 61 50 – General Product Requirements

**SECTION 21 05 17 – SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION
PIPING
CONTRACT KENS-EAST-2**

1.04 REFERENCES

A. Abbreviations and Acronyms:

1. USCS U.S. Department of Commerce Commercial Standard

B. Reference Standards:

1. ASTM A53/A53M Steel Pipe Sleeves
2. U.S. Department of Commerce Commercial Standard.
3. New York State Building Code.

1.05 DESCRIPTION

A. This Section includes requirements for providing sleeves and sleeve seals in accordance with applicable standards and regulations. In addition:

1. Sleeves and sleeve seal shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
2. Sleeves and sleeve seal shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

A. The Contractor shall be a New York State licensed Fire Protection Contractor.

1.07 SUBMITTALS

A. Action Submittals:

1. Product Data: For each type of product

B. Field quality-control reports.

1.08 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

1. Equipment shall be delivered to the Site to ensure uninterrupted progress of the Work.

B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

1. Sleeves and sleeve seals shall be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
2. Sleeves and sleeve seal shall be protected from corrosion and deterioration and shall be stored in a dry area.

**SECTION 21 05 17 – SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION
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- 3. Sleeves and sleeve seals shall be properly protected from damage during construction, and shall be cleaned in accordance with the manufacturer's instructions prior to installation.
 - C. To avoid unnecessary handling, sleeves and sleeve seals shall be unloaded as close to the place where they are to be installed as is practical. Interiors shall be kept free from dirt and foreign matter.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used
- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
- 1. Not Used
- 2.02 MATERIALS / EQUIPMENT
- A. Sleeves:
 - 1. Materials of construction:
 - a. Cast-Iron Pipe Sleeves: Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop.
 - b. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, anticorrosion coated or galvanized, with plain ends and integral welded waterstop collar.
 - c. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
 - B. Sleeve-Seal Systems:
 - 1. General:
 - a. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 - b. Designed to form a hydrostatic seal of 20 psig minimum.
 - 2. Materials of Construction:
 - a. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size.
 - b. Pressure Plates: Carbon steel.

**SECTION 21 05 17 – SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION
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- c. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, ASTM B633 of length required to secure pressure plates to sealing elements.

C. Sleeve-Seal Fittings:

- 1. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.
- 2. Plastic or rubber waterstop collar with center opening to match piping OD.

D. Grout:

- 1. General:
 - a. Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
- 2. Materials of Construction:
 - a. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
 - b. Design Mix: 5000-psi, 28-day compressive strength.
 - c. Packaging: Premixed and factory packaged.

E. Silicone Sealants:

- 1. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant, ASTM C920, Type S, Grade NS, Class 25, Use NT.
- 2. Silicone, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT. Grade P Pourable (self-leveling) formulation is for opening in floors and other horizontal surfaces that are not fire rated.
- 3. Silicone Foam: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

**SECTION 21 05 17 – SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION
PIPING
CONTRACT KENS-EAST-2**

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

3.02 INSTALLATION

A. Sleeve-Seal-System

1. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
2. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

B. Sleeve-Seal-Fitting Installation

1. Install sleeve-seal fittings in new walls and slabs as they are constructed.
2. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
3. Secure nailing flanges to concrete forms.
4. Use grout or silicone sealant, to seal the space around outside of sleeve-seal fittings.

C. Sleeve and Sleeve-Seal Schedule

1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves.
2. Interior Partitions:
 - a. Piping Smaller Than NPS 6: Steel pipe sleeves.

3.03 FIELD TESTING / QUALITY CONTROL

A. Perform the following tests and inspections:

1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

**SECTION 21 05 17 – SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION
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- 3.05 ADJUSTING / PROTECTION / CLEANUP
A. Not Used

END OF SECTION

**SECTION 21 05 18 – ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified, and required, to furnish, install and test all escutcheons for fire-suppression piping, complete and operational.

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1.02 PAYMENT

No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

Section 01 61 50 – General Product Requirements

SECTION 21 05 18 – ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING
CONTRACT KENS-EAST-2

1.04 REFERENCES

Abbreviations and Acronyms:

1. Not Used.

Reference Standards:

2. New York State Building Code.

1.05 DESCRIPTION

This Section includes requirements for escutcheons in accordance with applicable standards and regulations. In addition:

1. Escutcheons shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
2. Escutcheons shall conform to the requirements of the New York State Building Code

1.06 QUALITY ASSURANCE

The Contractor shall be a New York State licensed Fire Protection Contractor.

1.07 SUBMITTALS

Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Product data:
 - a. Provide catalogue cuts of all escutcheons, showing: sizes, rough-in dimensions.

1.08 DELIVERY, STORAGE, AND HANDLING

1. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:
 - a. Equipment shall be delivered to the Site to ensure uninterrupted progress of the Work.
2. The Contractor shall store, and handle materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:
 - a. Escutcheons shall be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
 - b. Escutcheons shall be protected from corrosion and deterioration and shall be stored in a dry area.

SECTION 21 05 18 – ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING
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- c. Escutcheons shall be properly protected from damage during construction and shall be cleaned in accordance with manufacturer's instructions prior to installation.
- d. To avoid unnecessary handling, escutcheons shall be unloaded as close to the place where they are to be installed as is practical. Interiors shall be kept free from dirt and foreign matter.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

PART 2 NOT USED PRODUCTS

2.01 MANUFACTURERS

2.02 NOT USED MATERIALS / EQUIPMENT

Escutcheons:

1. Materials of construction:

One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.

One-Piece, Stainless-Steel Type: With polished stainless-steel finish.

One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.

One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped steel with polished, chrome-plated finish and spring-clip fasteners.

One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.

Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed hinge; and spring-clip fasteners.

Sleeve-Seal Systems:

2. General:

Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

Designed to form a hydrostatic seal of 20 psig minimum.

3. Materials of Construction:

Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size.

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Pressure Plates: Carbon steel.

Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, ASTM B633 of length required to secure pressure plates to sealing elements.

2.03 FABRICATION / ASSEMBLING / FINISHES

Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

Not Used

3.02 INSTALLATION

Escutcheons

1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
3. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
4. Chrome-Plated Piping: One-piece steel or split-plate steel with polished, chrome-plated finish.
5. Insulated Piping: One-piece steel with polished, chrome-plated finish.
6. Insulated Piping: One-piece stainless steel with polished stainless-steel finish.
7. Insulated Piping: One-piece cast brass with polished, chrome-plated finish.
8. Insulated Piping: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
9. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
10. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
11. Bare Piping in Unfinished Service Spaces: One-piece steel with polished, chrome-plated finish.
12. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.

SECTION 21 05 18 – ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING
CONTRACT KENS-EAST-2

- 13. Bare Piping in Equipment Rooms: One-piece cast brass with polished, chrome-plated finish.
- 3.03 FIELD TESTING / QUALITY CONTROL
Not Used.
- 3.04 STARTUP / DEMONSTRATION
Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
Not Used

END OF SECTION

SECTION 21 05 18 – ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING
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NO TEXT ON THIS PAGE

**SECTION 21 05 48.13 – VIBRATION AND SEISMIC CONTROLS FOR FIRE-
SUPPRESSION PIPING AND EQUIPMENT
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all vibration and seismic controls for fire-suppression piping, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used

**SECTION 21 05 48.13 – VIBRATION AND SEISMIC CONTROLS FOR FIRE-
SUPPRESSION PIPING AND EQUIPMENT
CONTRACT KENS-EAST-2**

1.04 REFERENCES

A. Definitions:

1. Designated Seismic System: A fire-suppression component that requires design in accordance with ASCE/SEI 7, Ch. 13 and for which the Component Importance Factor is greater than 1.0.

B. Abbreviations and Acronyms:

1. IBC International Building Code.
2. OSHPD: Office of Statewide Health Planning and Development

C. Reference Standards:

1. ASTM A53/A53M Steel Pipe Sleeves
2. U.S. Department of Commerce Commercial Standard.
3. New York State Building Code.

1.05 DESCRIPTION

- A. This Section includes requirements for providing vibration and seismic controls for fire suppression piping and equipment in accordance with applicable standards and regulations.

1.06 QUALITY ASSURANCE

A. Qualifications of Manufacturers:

1. The manufacturer(s) shall have a minimum of five (5) years of experience in the manufacture of process piping insulation products of similar size and type to those specified herein, and shall show evidence of at least five (5) substantially similar installations in satisfactory operation.

B. Supply and Compatibility:

1. All components of vibration and seismic controls for fire suppression piping and equipment shall be provided by the Contractor through a single vibration and seismic controls vendor.
 - a. The Contractor (through the vibration and seismic controls vendor) shall have the sole responsibility for matching all components and providing equipment which functions together as a system.
2. The vibration and seismic controls for fire suppression piping and equipment shall be standard products of the manufacturer.

**SECTION 21 05 48.13 – VIBRATION AND SEISMIC CONTROLS FOR FIRE-
SUPPRESSION PIPING AND EQUIPMENT
CONTRACT KENS-EAST-2**

3. The vibration and seismic controls for fire suppression piping and equipment shall be designed, constructed, and installed in accordance with the best practices of the trade, and shall operate satisfactorily when installed as shown on the Contract Drawings.
4. Qualifications of Vendor:
 - a. Vendor shall have at least five (5) years of experience in the design and fabrication of the vibration and seismic controls for process equipment of similar size, capacity, and type to those specified herein, and shall show evidence of at least five (5) substantially similar installations in satisfactory operation.
- C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- E. Seismic-Restraint Device Load Ratings: Devices to be tested and rated in accordance with applicable code requirements and authorities having jurisdiction. Devices to be listed by a nationally recognized third party that requires periodic follow-up inspections and has a listing directory available to the public. Provide third-party listing by one or more of the following: an agency acceptable to authorities having jurisdiction.

1.07 SUBMITTALS

- A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:
 1. Product data:
 - a. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
 - b. Include load rating for each wind-load-restraint fitting and assembly.
 - c. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component.
 - d. Annotate types and sizes of seismic restraints and accessories, complete with listing markings or report numbers and load rating in tension and compression as evaluated by an agency acceptable to authorities having jurisdiction.

**SECTION 21 05 48.13 – VIBRATION AND SEISMIC CONTROLS FOR FIRE-
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- e. Annotate to indicate application of each product submitted and compliance with requirements.
 - f. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.
2. Shop Drawings:
- a. Detail fabrication and assembly of equipment bases.
 - b. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
3. Delegated-Design Submittal:
- a. For each seismic-restraint device, including seismic-restrained mounting, pipe-riser resilient support, snubber, seismic-restraint accessory, and concrete anchor and insert that is required by this Section or is indicated on Drawings, submit the following:
 - 1) Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, and seismic loads. Include certification by professional engineer that riser system was examined for excessive stress and that none exists.
 - 2) Post-Installed Concrete Anchors and Inserts: Include calculations showing anticipated seismic loads. Include certification that device is approved by an NRTL for seismic reinforcement use.
 - 3) Seismic Design Calculations: Submit all input data and loading calculations prepared under "Seismic Design Calculations" Paragraph in "Performance Requirements" Article.
 - 4) Qualified Professional Engineer: All designated-design submittals for seismic calculations are to be signed and sealed by qualified professional engineer responsible for their preparation.
 - b. Seismic-Restraint Detail Drawing:
 - 1) Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.

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- 2) Details: Indicate fabrication and arrangement. Detail attachments of restraints to restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
 - 3) Coordinate seismic restraint details with wind-load restraint details required for equipment mounted outdoors. Comply also with requirements in other Sections for equipment mounted outdoors.
 - c. Product Listing, Preapproval, and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).
 - d. 4. All delegated-design submittals for seismic-restraint detail Drawings are to be signed and sealed by qualified professional engineer responsible for their preparation.
 - 4. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, and seismic loads. Include certification that riser system was examined for excessive stress and that none exists.
 - B. Informational Submittals:
 - 1. Coordination Drawings: Show coordination of seismic bracing for fire-suppression piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
 - 2. Qualification Data: For professional engineer and testing agency.
 - 3. Welding certificates.
 - 4. Field quality-control reports.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:
 - 1. Equipment shall be delivered to the Site to ensure uninterrupted progress of the Work.
 - B. The Contractor shall store, and handle materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:
 - 1. Products shall be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.

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2. Products shall be protected from corrosion and deterioration, and shall be stored in a dry area.
 3. Products shall be properly protected from damage during construction and shall be cleaned in accordance with manufacturer's instructions prior to installation.
- C. To avoid unnecessary handling, products shall be unloaded as close to the place where they are to be installed as is practical. Interiors shall be kept free from dirt and foreign matter.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Not Used

2.02 MATERIALS / EQUIPMENT

- A. Performance Requirements:

1. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic control system.

- B. Elastomeric Isolation Pads:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following or approved equal:
 - a. Ace Mountings Co., Inc.
 - b. California Dynamics Corporation.
 - c. Isolation Technology, Inc.
 - d. Kinetics Noise Control, Inc.
 - e. Mason Industries, Inc.
 - f. Vibration Eliminator Co., Inc.
 - g. Vibration Isolation.
 - h. Vibration Mountings & Controls, Inc.
3. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.

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4. Size: Factory or field cut to match requirements of supported equipment.
5. Pad Material: Oil and water resistant with elastomeric properties. Neoprene rubber, silicone rubber, or other elastomeric material.
6. Surface Pattern: Smooth, ribbed, or waffle pattern.
7. Infused nonwoven cotton or synthetic fibers.
8. Load-bearing metal plates adhered to pads.

- 1) Surface Pattern: Smooth, ribbed, or waffle pattern.
- 2) Infused nonwoven cotton or synthetic fibers.

C. Elastomeric Isolation Mounts:

1. Double-Deflection, Elastomeric Isolation Mounts:
2. Manufacturers: Subject to compliance with requirements, provide products by the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following (or approved equal):
 - a. Ace Mountings Co., Inc.
 - b. California Dynamics Corporation.
 - c. Isolation Technology, Inc.
 - d. Kinetics Noise Control, Inc.
 - e. Mason Industries, Inc.
 - f. Vibration Eliminator Co., Inc.
 - g. Vibration Isolation.
 - h. Vibration Mountings & Controls, Inc.

CI. Mounting Plates:

- 1) Top Plate: Encapsulated steel load transfer top plates, factory drilled and threaded with threaded studs or bolts.
- 2) Baseplate: Encapsulated steel bottom plates with holes provided for anchoring to support structure.

CII. Elastomeric Material: Molded, oil- and water-resistant neoprene rubber, silicone rubber, or other elastomeric material.

CIII. Restrained Elastomeric Isolation Mounts:

1. Description: All-directional isolator with seismic restraints containing two separate and opposing elastomeric elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
 - a. Housing: Cast-ductile iron or welded steel.

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- b. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.
- E. Elastomeric Hangers:
 - 1. Elastomeric Mount in a Steel Frame with Upper and Lower Steel Hanger Rods:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the following (or approved equal):
 - a. Ace Mountings Co., Inc.
 - b. California Dynamics Corporation.
 - c. Isolation Technology, Inc.
 - d. Kinetics Noise Control, Inc.
 - e. Mason Industries, Inc.
 - f. Vibration Eliminator Co., Inc.
 - g. Vibration Isolation.
 - h. Vibration Mountings & Controls, Inc.
 - 3. Frame: Steel, fabricated with a connection for an upper threaded hanger rod and an opening on the underside to allow for a maximum of 30 degrees of angular lower hanger-rod misalignment without binding or reducing isolation efficiency.
 - 4. Damping Element: Molded, oil-resistant rubber, neoprene, or other elastomeric material with a projecting bushing for the underside opening preventing steel-to-steel contact.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Examine areas and equipment to receive vibration isolation and seismic control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Provide seismic restraint devices for systems and equipment where indicated in Equipment Schedules or Vibration Isolation, Seismic, where indicated on Drawings, where the Specifications indicate they are to be installed on specific equipment and systems, and where required by applicable codes.
- B. Coordinate location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."
- C. Installation of vibration isolators and seismic restraints must not cause any stresses, misalignment, or change of position of equipment or piping.
- D. Comply with installation requirements of NFPA 13 for installation of all seismic-restraint devices.
- E. Equipment Restraints:
 - 1. Install snubbers on fire-suppression equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
 - 2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
 - 3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- F. Piping Restraints:
 - 1. Comply with all requirements in NFPA 13.
 - 2. Design piping sway bracing in accordance with NFPA 13.
 - a. Maximum spacing of all sway bracing to be no greater than indicated in NFPA 13.
 - b. Design loading of all sway bracing not to exceed values indicated in NFPA 13.
- G. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- H. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

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- I. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- J. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- K. Post-Installed Concrete Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Mechanical-Type Anchor Bolts: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 - 4. Adhesive-Type Anchor Bolts: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
 - 5. Set anchors to manufacturer's recommended torque, using a torque wrench.
 - 6. Install zinc-coated steel anchors for interior and stainless steel anchors for exterior applications.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. Adjust isolators after system is at operating weight.

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- B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

END OF SECTION

**SECTION 21 05 48.13 – VIBRATION AND SEISMIC CONTROLS FOR FIRE-
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NO TEXT ON THIS PAGE

**SECTION 21 22 00 – CLEAN-AGENT FIRE-EXTINGUISHING SYSTEMS
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PART 1 GENERAL

1.01 SUMMARY

The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test clean-agent fire extinguishing system, complete and operational.

The following index of this Section is presented for convenience:

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1.02 PAYMENT

No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

Section 01 61 50 – General Product Requirements

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1.04 REFERENCES

Abbreviations and Acronyms:

1. EPO Emergency Power Off.

Reference Standards:

2. NFPA 2001 Clean Agent Fire Extinguishing Systems
3. NFPA 70 National Electrical Code
4. NFPA 72 National Fire Alarm Code
5. FMFactory Mutual Approval Guide
6. UL Listings.
7. New York State Building Code.

1.05 DESCRIPTION

This specification outlines the requirements for a “Total Flood” Clean Agent Fire Suppression System with automatic detection and control. The work described in this specification includes all engineering, labor, materials, equipment and services necessary, and items required to complete and test the fire suppression system.

1.06 REQUIREMENTS

- A. The suppression system installation shall be made in accordance with the Contract Drawings, Specifications, and applicable standards. Should a conflict occur between the Contract Drawings and Specifications, the Specifications shall prevail.

1.07 QUALITY ASSURANCE

Pipe and Pressure-Vessel Welding Qualifications: Qualify procedures and operators in accordance with ASME Boiler and Pressure Vessel Code.

INSTALLER:

1. The installing contractor shall be trained by ANSUL to design, install, test, and maintain fire suppression systems.
2. When possible, the installing contractor shall employ a NICET certified special hazard designer, Level II or above, who will be responsible for this Project.
3. The installing contractor shall be an experienced firm regularly engaged in the installation of automatic Clean Agent, or similar fire suppression systems in strict accordance with all applicable codes and standards.

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4. The installing contractor must have a minimum of 5 years' experience in the design, installation, and testing of Clean Agent, or similar fire suppression systems. A list of systems of a similar nature and scope shall be provided on request.
5. The installing contractor shall show evidence that his company carries a minimum \$2 million liability and complete operations insurance policy. These limits shall supersede limits required in the general conditions of the Specifications.
6. The installing contractor shall maintain, or have access to, a clean agent recharging station. The installing contractor shall provide proof of his ability to recharge the largest Clean Agent system within 24 hours after a discharge. Include the amount of bulk agent storage available.
7. The installing contractor shall be an authorized stocking distributor of the Clean Agent system equipment so that immediate replacement parts are available from inventory.
8. The installing contractor shall show proof of emergency service available 24 hours a day, 7 days a week.

1.08 EXCLUSIONS

The work listed below shall be provided by others or under other sections of this specification:

1. 120 VAC or 220 VAC power supply to the system control panel.
2. Interlock wiring and conduit for shutdown of HVAC, dampers, and/or electric power supplies, relays, or shunt trip breakers.
3. Connection to local/remote fire alarm systems, listed central alarm station(s), or sprinkler pre-action/deluge valve actuation.

1.09 SUBMITTALS

Product data: for each type of product indicated.

The installing contractor shall submit the following design information and drawings for approval prior to starting work on this Project:

1. Field installation layout drawings having a scale of not less than 1/8 in. (3 mm)= 1 ft 0 in. (0.3 m) or 1:100 detailing the location of all agent storage containers, nozzles, pipe runs including pipe sizes and lengths, control panel(s), detectors, manual pull stations, abort stations, audible and visual alarms, etc.
2. Auxiliary details and information such as maintenance panels, door holders, special sealing requirements, and equipment shutdown.

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3. Separate layouts or drawings shall be provided for each level, (i.e. room, under floor, and above ceiling) and for mechanical and electrical work.
4. A separate layout or drawing shall show isometric details of agent storage containers, mounting details, proposed pipe runs and sizes, and symbol legend.
5. Electrical layout drawings shall show the location of all devices, and include point-to-point conduit runs, and a description of the method(s) used for detector mounting.
6. Provide an internal control panel wiring diagram, which shall include power supply requirements and field wiring termination points.
7. Separate drawing providing symbol legend to identify all symbols used.
8. Annunciator wiring schematics and dimensioned display panel illustration shall be provided. (Optional device)
9. Complete hydraulic flow calculations, from a UL Listed computer program, shall be provided for all engineered Clean Agent systems. Calculation sheet(s) must include the manufacturers name and UL listing number for verification. The individual sections of pipe and each fitting to be used, as shown on the isometrics, must be identified and included in the calculation. Total agent discharge time must be shown and detailed by zone.
10. Provide calculations for the battery stand-by power supply taking into consideration the power requirements of all alarms, initiating devices, and auxiliary components under full load conditions.
11. A complete sequence of operation shall be submitted detailing all alarm devices, shutdown functions, remote signaling, damper operation, time delay, and agent discharge for each zone or system.

Submit drawings, calculations, and system component data sheets for approval to the local fire prevention agency, Owner's insurance underwriter, and all other authorities having jurisdiction before starting installation. Submit approved plans to the Architect Engineer for record.

CLOSEOUT SUBMITTALS

12. Operation and Maintenance Data: For clean-agent fire-extinguishing system to include in emergency, operation, and maintenance manuals.

MAINTENANCE MATERIAL SUBMITTALS

13. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.

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14. Detection Devices: Not less than 20 percent of amount of each type installed.
15. Container Valves: Not less than 10 percent of amount of each size and type installed.
16. Nozzles: Not less than 20 percent of amount of each type installed.
17. Extinguishing Agent: Not less than 100 percent of amount installed in largest hazard area. Include pressure-rated containers with valves.

1.10 DELIVERY, STORAGE, AND HANDLING

The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

1. Equipment shall be delivered to the Site to ensure uninterrupted progress of the Work.

The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

2. Clean agent equipment be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
3. Clean agent equipment shall be protected from corrosion and deterioration, and shall be stored in a dry area.
4. Clean agent equipment shall be properly protected from damage during construction, and shall be cleaned in accordance with manufacturer's instructions prior to installation.

To avoid unnecessary handling, clean agent equipment shall be unloaded as close to the place where they are to be installed as is practical. Interiors shall be kept free from dirt and foreign matter.

1.11 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

Not Used

1.12 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Clean Agent Systems:

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- a) FM-200 (HFC-227ea):
 - b) Johnson Controls (hereinafter referred to as “ANSUL”);
 - c) Kidde-Fenwal, Inc. Fire Systems, Ashland, MA;
 - d) Fike Corporation, Blue Springs, MO;
 - e) Or approved equal.
2. The name of the manufacturer shall appear on all major components.
 3. All devices, components, and equipment shall be the products of the same manufacturer.
 4. All devices, components, and equipment shall be new, standard products of the manufacturer’s latest design and suitable to perform the functions intended.
 5. All devices and equipment shall be UL Listed and FM Approved.
 6. Locks for all cabinets shall be keyed alike.

2.02 MATERIALS / EQUIPMENT

Performance Requirements:

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
2. FM Global Compliance: Provide components that are FM Approved and that are listed in FM Approvals' "Approval Guide."
3. UL Compliance: Provide equipment listed in UL's "Fire Protection Equipment Directory."
4. Seismic Performance: Fire-suppression piping shall withstand the effects of earthquake motions determined in accordance with NFPA 13 and ASCE/SEI 7.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
 - b. Component Importance Factor: 1.5.

Clean Agent Systems:

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5. The system shall be a Total Flood FM-200 Fire Suppression System supplied by ANSUL or approved manufacturer.
6. Description: Clean-agent fire-extinguishing system shall be an engineered system for total flooding of the hazard area including the room cavity above the ceiling, below the ceiling, and below the raised floor. System includes separate zones above and below the ceiling and beneath the raised floor. If smoke is detected below the raised floor, extinguishing agent shall be discharged in the underfloor zone only. If smoke is detected below the ceiling, extinguishing agent shall be discharged in zones above and below the ceiling and below the floor. If smoke is detected above the ceiling, extinguishing agent shall be discharged in the zone above the ceiling only.
7. Delegated Design: Design clean-agent fire-extinguishing system and obtain approval from authorities having jurisdiction. Design system for Class A and Class C fires as appropriate for areas being protected, and include safety factor. Use clean agent indicated and in concentration suitable for normally occupied areas.
8. Performance Requirements: The system shall provide the FM-200 fire extinguishant minimum design concentration of 6.7% (UL) by volume for Class A hazards and a minimum of 7.2% (UL) by volume for Class C hazards, in all areas and/or protected spaces, at the minimum anticipated temperature within the protected area. System design shall not exceed 10.5% for normally occupied spaces, adjusted for maximum space temperature anticipated, with provisions for room evacuation before agent release.
 - a. The system shall be complete in all ways. It shall include all mechanical and electrical installation, all detection and control equipment, agent storage containers, FM-200 agent, discharge nozzles, pipe and fittings, manual release and abort stations, audible and visual alarm devices, auxiliary devices and controls, shutdowns, alarm interface, caution/advisory signs, functional checkout and testing, training and all other operations necessary for a functional, UL Listed and FM Approved FM-200 Clean Agent Fire Suppression System.
 - b. Provide 2 inspections during the first year of service. Inspections shall be made at 6 month intervals commencing when the system is first placed into normal service.
 - c. The general Contractor shall be responsible for sealing and securing the protected spaces against agent loss and/or leakage during the

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“hold” period, which is a minimum period of 10 minutes or a time period sufficient to allow for response by trained personnel.

- d. The FM-200 system shall be automatically actuated by either counting zone detection or cross-zoned detection methodology. Smoke detectors shall utilize photoelectric technology and/or Aspiration Smoke Detectors (ASD) for very early warning smoke detection. Smoke detectors and ASD sample points shall be installed at no more than 250 ft² (23.2 m²) of coverage per detector. When using analog addressable sensors or ASD detectors offering pre-alarm thresholds, further system design consideration is suggested for providing very early warning detection which can offer extended investigation time prior to suppression agent release. In all cases, the compatibility listings of the detectors for use with the control unit should be observed. The system shall require two detectors in alarm prior to automatic agent release.
 - e. Both Photoelectric and ASD type smoke detectors can be combined in the releasing process, using one of following methods:
 - 1) 1st alarm ASD / 2nd alarm ASD
 - 2) 1st alarm ASD / 2nd alarm Photoelectric Detector
 - 3) 1st alarm Photoelectric Detector / 2nd alarm Photoelectric Detector
9. Sequence of operation:
- a. Activation of any single detector in any detection zone shall:
 - 1) Cause a first-stage alarm.
 - 2) Energize a lamp on the activated detector and identify detector on the display of the control panel (and remote annunciator, if included).
 - 3) Note: The shutdown of electrical equipment will be optional based on requirements of the local AHJ or applicable standards.
 - b. Activation of a second smoke detector shall:
 - 1) Transmit an alarm signal to remote monitoring or building alarm panel.
 - 2) Cause a second-stage (pre-discharge) Audio/Visual alarm to operate.

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- 3) Operate auxiliary contacts for air conditioning shutdowns and automatic dampers.
- 4) Initiate a programmable pre-discharge time delay (FM-200 agent release).
- 5) Upon completion of the time delay the FM-200 system shall:
- 6) Cause a discharge alarm to be activated.
- 7) Operate auxiliary contacts for emergency power off of all electrical equipment (excluding lighting and emergency circuits for life safety).
- 8) Activate visual alarms (strobe) at protected area entrance.
- 9) Energize control solenoid for FM-200 container, releasing gaseous agent into the protected area.

Auxiliary Components:

10. Double action manual releasing stations shall be provided at each exit of the protected area, and shall, when activated, release the FM-200 agent and cause all audible / visual alarms to activate. In addition, activation of the manual releasing stations shall cause immediate shutdown of air and power circuits.
 - 1) Abort station shall be provided at each exit of the protected area, and shall, when operated, interrupt the pre-discharge time delay of the FM-200 agent and emergency power-off functions. The abort station shall be momentary devices (dead-man) requiring constant pressure to maintain contact closure.
 - 2) Note: Manual Releasing Station activation shall override any abort station. Abort station operation shall be per IRI and FM guidelines.

Piping and fittings:

11. Piping, Valves, and Discharge Nozzles: Comply with types and standards listed in NFPA 2001, Section "Distribution," for charging pressure of system.
12. Steel Pipe: ASTM A53/A53M, Type S, Grade B or ASTM A106/A106M, Grade A and Grade B; Schedule 40, Schedule 80, and Schedule 160, seamless steel pipe.
 - a. Threaded Fittings:

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- 1) Malleable-Iron Fittings: ASME B16.3, Class 300.
 - 2) Flanges and Flanged Fittings: ASME B16.5, Class 300 unless Class 600 is indicated.
 - 3) Fittings Working Pressure: 620 psig (4278 kPa) minimum.
 - b. Flanged Joints: Class 300 minimum.
 - c. Forged-Steel Welding Fittings: ASME B16.11, Class 3000, socket pattern.
 - d. Steel, Grooved-End Fittings: FM Approved and NRTL listed, ASTM A47/A47M malleable iron or ASTM A536 ductile iron, with dimensions matching steel pipe and ends factory grooved in accordance with AWWA C606.
13. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
- a. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch- (3.2-mm-) maximum thickness unless thickness or specific material is indicated.
14. Flange Bolts and Nuts: ASME B18.2.1, carbon steel.
15. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
16. Steel, Keyed Couplings: UL 213, AWWA C606, approved or listed for clean-agent service, and matching steel-pipe dimensions. Include ASTM A536, ductile-iron housing, rubber gasket, and steel bolts and nuts.

Valves:

17. General Valve Requirements:
- a. UL listed or FM Approved for use in fire-protection systems.
 - b. Compatible with type of clean agent used.
18. Container Valves: With rupture disc or solenoid and manual-release lever, capable of immediate and total agent discharge and suitable for intended flow capacity.
19. Valves in Sections of Closed Piping and Manifolds: Fabricate to prevent entrapment of liquid, or install valve and separate pressure relief device.
20. Valves in Manifolds: Check valve; installed to prevent loss of extinguishing agent when container is removed from manifold.

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Manifold And Orifice Unions:

21. Description: NRTL-listed device with minimum 2175-psig (15-MPa) pressure rating, to control flow and reduce pressure of IG-541 gas in piping.
 - a. NPS 2 (DN 50) and Smaller: Piping assembly with orifice, sized for system design requirements.
 - b. NPS 2-1/2 (DN 65) and Larger: Piping assembly with nipple, sized for system design requirements.

Extinguishing-Agent Containers:

22. Description: Steel tanks complying with ASME Boiler and Pressure Vessel Code: Section VIII, for unfired pressure vessels. Include minimum working-pressure rating that matches system charging pressure, valve, pressure switch, and pressure gage.
 - a. Finish: [Red] [Manufacturer's standard color], enamel or epoxy paint.
 - b. Manifold: Fabricate with valves, pressure switches, and connections for multiple storage containers, as indicated.
 - c. Manifold: Fabricate with valves, pressure switches, selector switch, and connections for main- and reserve-supply banks of multiple storage containers.
23. Storage-Tank Brackets: Factory- or field-fabricated retaining brackets consisting of steel straps and channels; suitable for container support, maintenance, and tank refilling or replacement.

General requirements:

24. The FM-200 Clean Agent System materials and equipment shall be standard products of the supplier's latest design and suitable to perform the functions intended. When one or more pieces of equipment must perform the same function(s), they shall be duplicates produced by one manufacturer.
25. All devices and equipment shall be UL Listed and FM Approved.

FM-200 agent storage and distribution:

26. Each system shall have its own supply of clean agent.
27. The system design can be modular, central storage, or a combination of both design criteria.
28. Systems shall be designed in accordance with the manufacturer's guidelines.

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29. Each supply shall be located within the hazard area, or as near as possible, to reduce the amount of pipe and fittings required to install the system.
30. The clean agent shall be stored in ANSUL® agent storage containers. Containers shall be super-pressurized with dry nitrogen to an operating pressure of 360 psi at 70 °F (24.8 bar at 21 °C). Containers shall be of high-strength low alloy steel construction and conform to NFPA 2001.
31. Containers shall be actuated by a resettable electric actuator with mechanical override located at each agent container or connected bank of cylinders. Non-resettable or explosive devices shall not be permitted.
32. Each container shall have a pressure gauge and low pressure switch to provide visual and electrical supervision of the container pressure. The low-pressure switch shall be wired to the control panel to provide an audible and visual “Trouble” alarms in the event the container pressure drops below 290 psi to 294 psi (19.9 psi to 20.3 bar). The pressure gauge shall be color coded to provide an easy, visual indication of container pressure.
33. Each container shall have a pressure relief provision that automatically operates before the internal pressure exceeds 774.5 psi (53.4 bar) ± 5%.
34. Engineered discharge nozzles shall be provided within the manufacturer’s guidelines to distribute the FM-200 agent throughout the protected spaces. The nozzles shall be designed to provide proper agent quantity and distribution:
 - a. Nozzles shall be available in 3/8 in. through 2 in. pipe sizes. Each size shall be available in 180° and 360° distribution patterns.
 - b. Ceiling plates can be used with the nozzles to conceal pipe entry holes through ceiling tiles.
35. Distribution piping and fittings shall be installed in accordance with the manufacturer’s requirements, NFPA 2001 and approved piping standards and guidelines. All distribution piping shall be installed by qualified individuals using accepted practices and quality procedures. All piping shall be adequately supported and anchored at all directional changes and nozzle locations:
 - a. Before assembly, all piping shall be reamed, blown clear, and swabbed with suitable solvents to remove burrs, mill varnish, and cutting oils.
 - b. All pipe threads shall be sealed with Teflon tape pipe sealant applied to the male thread only.

Control Systems – General:

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36. All control systems shall be UL Listed and FM Approved, and shall be utilized with listed or approved compatible operating devices, and shall be capable of the following features:
- a. Ground fault indication
 - b. Supervised detection circuit(s)
 - c. Supervised alarm circuit(s)
 - d. Supervised release circuit(s)
 - e. Supervised manual release circuit (if applicable)
 - f. Supervised primary power circuit
 - g. Battery standby
 - h. 4.3” color touchscreen LCD operator interface and LED indicating lamps
 - i. Key lock steel enclosure
 - j. Programmable time delay
 - k. Programmable detection logic
 - l. Microprocessor based logic
 - m. History buffer

Control Panel – Autopulse Z-20 Agent Releasing Control Panel:

37. The Fire Alarm Control Panel (FACP) shall be an AUTOPULSE Z-20 control panel with the capability of protecting up to 20 hazards. The panel shall contain a Central Processing Unit (CPU) with integral 8 amp power supply which is rated to provide 8 amp for “Special Application” appliances including suppression release peripherals such as horns, strobes and horn/strobes and rated to 6 amp for “regulated 24 VDC” appliance power. The CPU shall communicate with and control the following types of equipment used to make up the system: addressable and conventional initiating devices, addressable modules, annunciators, and other system controlled devices.
38. System Capacity and General Operation:
- a. The control panel shall provide up to a 250 addressable point capacity with the capability of expansion to 3 loops.
 - b. The system shall include 4 Class B programmable notification appliance circuits rated at 3 A each.

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- c. The control panel and remote annunciator (optional) shall include a full featured, intuitive color touch screen display capable of supporting up to two languages. The menu-driven interface shall provide color coded system status LEDs, allow for direct control of the fire alarm system and also allow for quick access to more detailed system information.
- d. The control panel shall provide the following features:
 - 1) Drift Compensation to extend detector accuracy over life.
 - 2) Sensitivity Test meeting requirements of NFPA 72.
 - 3) Maintenance Alert to warn of excessive smoke detector dirt or dust accumulation.
 - 4) System Status Reports to display, export to USB device (or print if optional RS232 module is provided).
 - 5) Rapid manual station reporting (under 2 seconds).
 - 6) Non-Alarm points for general (non-fire) control.
 - 7) Periodic Detector Test conducted automatically by software.
 - 8) Pre-alarm for advanced fire warning.
 - 9) Counting/Cross Zoning with the capability of: counting 2 detectors in alarm, 2 software zones in alarm, or 1 smoke detector and 1 thermal detector in alarm.
 - 10) March time and temporal coding options.
 - 11) Walk Test
 - 12) Check for 2 detectors set to same address.
 - 13) The real time clock may also be used to control non-fire functions at programmed time-of-day, day-of-week, and day-of-year.
 - 14) Day/Night automatic adjustment of detector sensitivity.
 - 15) Device Blink Control for sleeping areas.
 - 16) Discrete status LEDs for Alarm, Priority 2, Supervisory, Trouble, Alarm Silenced and AC power indications plus three additional programmable LEDs with associated control switches with provisions for custom labels.

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- 17) The control panel shall be capable of coding Notification circuits in Slow March Time (20 BPM), Fast March Time (120 BPM) and Temporal Code (NFPA 72).
39. Central Microprocessor:
- a. The microprocessor unit shall communicate with, monitor, and control all external interfaces with the control panel. It shall include system program storage in non- volatile memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.
 - b. The microprocessor unit shall contain and execute all control-by-event programs for specific action to be taken if an alarm condition is detected by the system. Such control- by-event programs shall be held in non-volatile programmable memory and shall not be lost even if system primary and secondary power failure occurs.
 - c. The microprocessor unit shall also provide a real-time clock for time annotation of system displays and history file.
40. Display:
- a. The touch screen display shall provide all the controls and indicators used by the system operator.
 - b. The display shall include status information and custom alphanumeric labels for all addressable and conventional detectors, addressable modules, and software zones.
 - c. The display shall by a 4.3 inch color touch screen display.
41. Signaling Line Circuit (SLC):
- a. The SLC interface called an IDNet+ circuit, shall provide power to and communicate with up to 250 addressable points which can include Photoelectric or Thermal detectors along with all monitoring and control points. This can be accomplished over one to three SLC loops and shall be capable of NFPA 72 Class A or B wiring.
 - b. The loop interface board(s) shall receive and process information from all detectors to determine whether normal, alarm, supervisory or trouble conditions exist for each detector. The software shall automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The information shall also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.

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- c. The detector software shall meet NFPA 72, requirements and be certified by UL as a calibrated sensitivity test instrument.
 - d. The detector software shall allow manual or automatic sensitivity adjustment.
42. Enclosures:
- a. The control panel shall be housed in a UL listed cabinet suitable for surface or semi-flush mounting. Cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
 - b. The door shall provide a key lock and include a glass or other transparent opening for viewing of all indicators.
43. All interfaces and associated equipment are to be protected so they will not be affected by voltage surges or line transients consistent with UL standard 864.
44. Optional modules shall be available for NFPA 72 supervising station and public emergency alarm reporting systems. The control panel shall have the ability to meet the latest requirements of UL 864 for delayed AC fail reporting.
45. Power Supply:
- a. The power supply shall operate on 120 or 240 VAC, 50/60 Hz, and shall provide all necessary power for the control panel. The power supply shall have a 6 A output rating which provides current for special application devices, IDNet devices, module currents and auxiliary output currents. When NACs are controlling regulated 24 DC appliances, total NAC current available shall be 3 A.
 - b. It shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge.
 - c. It shall provide an earth detection circuit capable of detecting earth faults on I/O modules field wired circuits connected to power supply.
 - d. It shall be power-limited using Positive Temperature Coefficient (PTC) resistors and solid state circuits.
46. Field Wiring Terminal Blocks:
- a. For ease of service, all panel I/O wiring terminal blocks shall have sufficient capacity for 18 to 12 AWG wire.
47. Field Programming:

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- a. All programming shall be accomplished through a standard PC laptop.
 - b. All field defined programs shall be stored in non-volatile memory.
 - c. The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Three levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable or manual on/off commands. A third level (higher-level) is used for actual change of program information.
 - d. A special program check function shall be provided to detect common operator errors.
 - e. For flexibility, an off-line programming function with batch upload/download shall also be available.
48. Specific System Operations:
- a. Smoke Detector Sensitivity Adjust: Means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the system keypad. Sensitivity range shall be within the allowed UL window.
 - b. Alarm Verification: Verification is implemented using zones with 512 zones available. The alarm verification delay shall be programmable from 5 to 30 seconds and each zone shall be able to be selected for verification. The control panel shall keep a count of the number of times that each zone has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.
 - c. Point Disable: Any device in the system may be Enabled or Disabled through the system keypad.
 - d. Point Read: The system shall be able to display or print the following point status diagnostic functions:
 - 1) Device status.
 - 2) Device type.
 - 3) Custom device label.
 - 4) View analog detector values.
 - 5) Device zone assignments.
 - 6) All program parameters.

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- e. System Status Reports: Upon command from a system operator, a status report will be generated and printed listing all system status provided an optional RS232 card is installed. The report must also be exportable to a USB device on the Z-20 USB port
 - f. System History Recording and Reporting: The control panel shall contain a history buffer that will be capable of storing up to 2000 events (1000 alarm and 1000 trouble). Each of these activations will be stored and time-and-date stamped with the actual time of the activation. The contents of the history buffer may be manually reviewed, one event at a time, exported to a USB device or printed (if optional RS232 module is provided) in its entirety.
 - 1) The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable.
 - g. Automatic Detector Maintenance Alert: The control panel shall automatically interrogate each intelligent smoke detector and analyze the detector responses over a period of time.
 - 1) If any intelligent smoke detector in the system responds with a reading that is below or above normal limits, the system will enter the trouble mode and the particular detector will be annunciated on the system display. This feature shall in no way inhibit the receipt of alarm conditions in the system nor shall it require any special hardware, special tools or computer expertise to perform.
 - h. Pre-Alarm Function: The system shall provide 2 levels of pre-alarm warning to give advance notice of a possible fire situation. Both pre-alarm levels shall be fully field adjustable. The first level shall give an audible indication at the panel. The second level shall give an audible indication and may also activate control relays. The system shall also have the ability to activate local detector sounder bases at the pre-alarm level to assist in avoiding nuisance alarms.
 - i. Software Zones: The control panel shall provide 512 programmable software zones. All addressable devices may be field programmed to be grouped into these zones for control activation and annunciation purposes.
49. Batteries:
- a. Batteries shall be 12 volt (2 required).

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- b. Batteries shall have sufficient capacity to power the fire alarm system for not less than 24 hours in standby plus 5 minutes of alarm upon a normal AC power failure.
 - c. Batteries are to be completely maintenance free. No liquids are required. Fluid level checks, refilling, spills and leakage shall not be accepted.
50. Programmable Electronic Sounder:
- a. Electronic sounders shall be UL Listed and FM Approved and operate on 24 VDC nominal.
 - b. Electronic sounders shall be field programmable without the use of special tools to choose 1 of 8 tones with an output sound level of at least 90 dBA measured at 10 ft (3.0 m) from the device.
 - c. Electronic sounders shall be flush or semi-flush mounted as shown on plans.
51. Visual Notification Appliances:
- a. Strobe lights shall operate on 24 VDC nominal.
 - b. Strobe lights shall meet the requirements of the ADA as defined in UL standard 1971 and shall meet the following criteria:
 - 1. The strobe intensity shall meet the requirements of UL 1971 and devices shall be multi-candela 15 cd – 110cd and higher intensity if required by the plans.
 - 2. The flash rate shall meet the requirements of UL 1971.
 - 3. The appliance shall be placed 80 in. (to the bottom of the appliance) to 96 in. (to the top of the appliance) above the finished floor within the space.
52. Audible/Visual Combination Devices:
- a. Audible/visual combination devices shall meet the applicable requirements of Section 3.5 listed above for audibility.
 - b. Audible/visual combination devices shall meet the requirements of Section 3.6 (listed above) for visibility.
53. Addressable Devices – General:
- a. Addressable devices shall provide an address-setting means using dip switches.

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- b. Detectors shall be intelligent and addressable, and shall connect with 2 wires to the fire alarm/release control panel signaling line circuits.
 - c. Addressable smoke and thermal detectors shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions indicating that the detector is operational and in regular communication with the control panel. Both LEDs shall be placed into steady illumination by the control panel indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs shall be optional through the system field program. An output connection shall also be provided in the base to connect an external remote alarm LED.
 - d. Smoke detector sensitivity shall be set through the control panel and shall be adjustable in the field through the field programming of the system. Sensitivity may be automatically adjusted by the panel on a time-of-day basis.
 - e. Using software in the control panel, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72.
 - f. The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper-proof feature. An optional base shall be available with a built-in (local) sounder rated at 85 dBA minimum.
 - g. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
 - h. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (PHOTO or THERMAL).
54. Addressable Manual Pull Station:
- a. Addressable manual pull station shall, on command from the control panel, send data to the panel representing the state of the manual switch. They shall use a key operated test-reset lock and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.

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- b. All operated stations shall have a positive, visual indication of operation and utilize a key-type reset.
 - c. Manual stations shall be clearly visible operating instructions provided on the cover. The word AGENT shall appear on the front and both sides of the stations.
 - d. Stations shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 in. (1.1 m), nor more than 48 in. (1.2 m) above the finished floor.
 - e. Operation shall require 2 actions.
55. ANALOG ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR
- a. The detectors shall use the photoelectric (light-scattering) principle to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.
56. ANALOG ADDRESSABLE HEAT DETECTOR
- a. Heat detectors shall be analog addressable devices rated at 135 °F (57 °C) and have a rate-of-rise element rated at 15 °F (9.4 °C) per minute. It shall connect via 2 wires to the control panel signaling line circuit. Up to 159 intelligent heat detectors may connect to one SLC loop.
 - b. The detectors shall use an electronic sensor to measure thermal conditions caused by a fire and shall, on command from the control panel, send data to the panel representing the analog level of such thermal measurements.
 - c. An optional, intelligent heat detector shall be available for applications which do not require a rate- of-rise element.

Analog Addressable Duct Smoke Detector:

- 57. In-duct smoke detector housing shall accommodate an intelligent photoelectric sensor which provides continuous analog monitoring and alarm verification from the panel.
- 58. When sufficient smoke is sensed, an alarm signal is initiated at the control panel and appropriate action is taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

Addressable Dry Contact Monitor Module:

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59. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the control panel SLC loops.
60. The monitor module shall mount in a 4 in. (102 mm) square, 2 1/8 in. (54 mm) deep electrical box.
61. The IDC zone may be wired for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions indicating that the monitor module is operational and in regular communication with the control panel.
62. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 in. x 1-1/4 in. x 1/2 in. (69.9 mm x 31.8 mm x 12.7 mm). This version need not include Style D or an LED.

Addressable Two-Wire Detector Monitor Module:

63. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional two-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).
64. The two-wire monitor module shall mount in a 4 in. (102 mm) square, 2 1/8 in. (54 mm) deep electrical box or with an optional surface back box.
65. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions indicating that the monitor module is operational and in regular communication with the control panel.
66. Smoke Detectors:
 - a. Smoke detectors shall be 24 VDC and shall be UL Listed and FM approved.
 - b. Each detector shall include a visual status indicator, provide remote LED output, and include a built-in test capability.
 - c. The sensitivity shall be factory set per UL 268.
 - d. The detector cover and screen shall be easily removable for field cleaning.
 - e. A special vandal-resistant locking screw shall be provided to lock the head to the base.
 - f. The head-to-base connection shall be made by use of bifurcated contacts. Terminal connections to the base shall be of the screw type that are accessible with the base installed on the mounting box.

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- g. Where specifically identified on the Contract Drawings, detector bases shall incorporate a relay with Form C contacts rated at 1 amp at 120 VAC and 2 amps at 28 VDC.
 - h. Photoelectric-type smoke detector shall be light reflective type and compatible with the AUTOPULSE control system. The detector shall have an LED in its base which is illuminated in a steady-on mode when in alarm and pulse mode when in standby. Reset of the detector shall be performed by the control unit reset switch.
 - i. The design of the photoelectric detector compensating circuits shall provide stable operation with regard to minor changes in temperature, humidity and atmospheric conditions.
 - j. Photoelectric-type smoke detector with heat detector shall be light reflective type and compatible with the AUTOPULSE control system. The detector shall have an LED in its base which is illuminated in a steady-on mode when in alarm and pulse mode when in standby. Reset of the detector shall be performed by the control unit reset switch.
67. Addressable Control Module:
- a. Addressable control modules shall be provided to supervise and control the operation of one conventional Notification Appliance Circuit (NAC) of compatible, 24 VDC powered, polarized audio/visual notification appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contact relay.
 - b. The control module shall mount in a standard 4 in. (102 mm) square, 2 1/8 in. (54 mm) deep electrical box, or to a surface mounted back box.
 - c. The control module NAC circuit may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation, or as a dry contact (Form C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements and to ensure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
 - d. Audio/visual power shall be provided by a separate supervised power loop from the main control panel or from a supervised, UL listed remote power supply.

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- e. The control module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the control panel shall use to identify the type of device. An LED shall be provided that shall flash under normal conditions indicating that the control module is operational and is in regular communication with the control panel.
 - f. A magnetic test switch shall be provided to test the module without opening or shorting its NAC wiring.
 - g. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.
68. Isolator Module:
- a. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop. At least one isolator module shall be provided for each floor or protected zone of the building.
 - b. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
 - c. The isolator module shall not require any address-setting and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
 - d. The isolator module shall mount in a standard 4 in. (102 mm) deep electrical box or in a surface mounted back box. It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.
69. Abort Switch:
- a. The abort switch shall be used where an investigative delay is desired between detection and actuation of the fire suppression system.
 - b. This switch shall be a momentary contact "dead-man" type switch requiring constant pressure to transfer one set of contacts. Clear operating instructions shall be provided at the abort switch.
 - c. This switch shall be rated for 2 A resistive @ 30 VDC.
 - d. The terminal connections shall be of the screw type.

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70. Maintenance Lock-Out Switch:
- a. The maintenance lock-out switch shall be used where it is desired to disable the fire suppression system during routine maintenance.
 - b. This switch shall be key operated allowing removal of the key only in "Normal" position. A red indicator lamp shall be included on the switch assembly to be illuminated when in the "Lock-Out" position. The control unit is used to indicate a supervisory condition when in the "Lock-Out" position.
 - c. The switch shall include 1 set of normally open and 1 set of normally closed control contacts rated for 2 A resistive @ 30 VDC.
 - d. The terminal connections shall be of the screw type.
71. Selector Switch:
- a. The selector switch shall be used where a connected reserve is required.
 - b. This switch shall be key operated allowing removal of the key in either the "Main" or "Reserve" position.
 - c. This switch shall be rated at 28 VDC @ 1.1 amp make/break or 6 amp continuous carry.
 - d. The terminal connections shall be of the screw type.
72. Color Touchscreen Remote Lcd Annunciator:
- a. The remote annunciator shall provide a 4.3" color touchscreen LCD display that is identical to the control panel user interface. The annunciator shall be capable of displaying a custom background image when the system status is normal.
 - b. The annunciator shall provide; a local sounder; discrete status LEDs for Alarm, Priority 2, Supervisory, Trouble, Alarm Silenced and AC power indications; and three programmable LEDs with associated control switches with provisions for custom labels. A lamp test feature shall be available from the display menu.
 - c. The remote annunciator shall provide access to all system status information, controls, diagnostics, and reports that are available on the control unit user interface. Protected access shall be provided to the following operator control functions and diagnostics; Alarm, Priority 2, Supervisory and Trouble Acknowledge; Alarm Silence; and System Reset; Hardware Reset; Point Disable/Enable; Annunciator Sounder Silence, Clear History Logs; Panel Setup; and

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System Diagnostics. Protection against unauthorized use shall be provided via a passcode, key switch, or both.

- e. The annunciator shall have the capability to support up to two languages with the ability to toggle between languages using one of the programmable control switches on the annunciator.
 - f. The annunciator shall connect to a two-wire Remote Unit Interface (RUI). The two-wire RUI connection shall be capable of distances of up to 2,500 feet (762 meters).
 - g. The system shall support up to 6 remote color touchscreen LCD annunciators.
73. Caution and advisory signs:
- a. Signs shall be provided to comply with NFPA 2001 and the recommendations of the FM- 200 agent equipment supplier:
 - 1. Entrance sign: 1 required at each entrance to a protected space.
 - 2. Manual discharge sign: 1 required at each manual discharge station.
 - 3. Flashing light sign: 1 required at each flashing light over each exit from a protected space.
74. System and Control Wiring:
- a. All system wiring shall be furnished and installed by the Contractor.
 - b. All wiring shall be installed in electrical metallic tubing (EMT or conduit) and must be installed and kept separate from all other building wiring.
 - c. All system components shall be securely supported independent of the wiring. Runs of conduit and wiring shall be straight, neatly arranged, properly supported, and installed parallel and perpendicular to walls and partitions.
 - d. The sizes of the conductors shall be those specified by the manufacturer. Color-coded wire shall be used. All wires shall be tagged at all junction points, and shall be free from shorts, earth connections (unless so noted on the system drawings), and crosses between conductors. Final terminations between the control panel and the system field wiring shall be made under the direct supervision of a factory-trained representative.
 - e. All wiring shall be installed by qualified individuals in a neat and workmanlike manner to conform to the National Electrical Code, Article 725 and Article 760, except as otherwise permitted for

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limited energy circuits, as described in NFPA 72. Wiring installation shall meet all local, state, province, and/or country codes.

- f. The complete system electrical installation and all auxiliary components shall be connected to earth ground in accordance with the National Electrical Code.

75. Purge Switch:

- a. Provide purge switch and type in accordance with local Fire Department regulations. Purge switch shall be wired to the control panel and to the room's HVAC equipment to allow the room to be purged entirely of FM200 after a discharge has occurred.
- b. A purge switch shall be provided adjacent to each egress door, on the outside of the room, to allow the Fire Department the ability to activate the purge system without entering into the protected room(s).
- c. Provide additional purge switches for each protected room, if there is more than one room being protected by FM200.

2.03 FABRICATION / ASSEMBLING / FINISHES

Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

Examine areas and conditions, with Installer present, for compliance with enclosure integrity requirements, installation tolerances, and other conditions affecting performance of the Work in accordance with NFPA 2001.

Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 HFC 227EA AGENT PIPING APPLICATIONS

Flanged pipe and fittings and flanged joints may be used to connect to specialties and accessories and where required for maintenance.

NPS 2 (DN 50) and Smaller: Schedule 40, steel pipe; malleable-iron threaded fittings; and threaded joints.

NPS 2-1/2 (DN 65) and Larger: Schedule 40, steel pipe; steel, grooved-end fittings; steel, keyed couplings; and grooved joints.

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3.03 INSTALLATION

Clean-Agent System Installation

1. Install clean-agent containers, piping, and other components level and plumb, in accordance with manufacturers' written instructions.

Clean-Agent Container Mounting:

2. Install clean-agent containers on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
3. Comply with requirements for vibration isolation and seismic-control devices specified in Section 210529 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."

Grooved Piping Joints: Groove pipe ends in accordance with AWWA C606 dimensions. Assemble grooved-end steel pipe and steel, grooved-end fittings with steel, keyed couplings and lubricant in accordance with manufacturer's written instructions.

Install pipe and fittings, valves, and discharge nozzles in accordance with requirements listed in NFPA 2001, Section "Distribution."

4. Install valves designed to prevent entrapment of liquid, or install pressure relief devices in valved sections of piping systems.
5. Support piping using supports and methods in accordance with NFPA 13.
6. Install seismic restraints for extinguishing-agent piping systems.
7. Install control panels, detection system components, alarms, and accessories, in accordance with requirements listed in NFPA 2001, Section "Detection, Actuation, and Control Systems," as required for supervised system application.

Piping Connections:

8. Drawings indicate general arrangement of piping, fittings, and specialties.
9. Where installing piping adjacent to equipment, allow space for service and maintenance.

Electrical Connections:

10. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
11. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

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12. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.
13. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
14. Connect electrical devices to control panel and to building's fire-alarm system. Electrical power, wiring, and devices are specified in Section 284621.11 "Addressable Fire-Alarm Systems" or Section 284621.13 "Conventional Fire-Alarm Systems."

Control Connections:

15. Install control and electrical power wiring to field-mounted control devices.
16. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

3.04 IDENTIFICATION

Identify system components and equipment. Comply with requirements for identification specified in Section 210553 "Identification for Fire-Suppression Piping and Equipment."

Identify piping, extinguishing-agent containers, other equipment, and panels in accordance with NFPA 2001.

Install signs at entry doors for protected areas to warn occupants that they are entering a room protected with a clean-agent fire-extinguishing system.

Install signs at entry doors to advise persons outside the room the meaning of horn(s), bell(s), and strobe light(s) outside the protected space.

3.05 FIELD TESTING / QUALITY CONTROL

SYSTEM INSPECTION AND CHECKOUT:

1. After the system installation has been completed, the entire system shall be checked out, inspected, and functionally tested by qualified, trained personnel, in accordance with the manufacturer's recommended procedures and NFPA standards:
 - a. All containers and distribution piping shall be checked for proper mounting and installation.
 - b. All electrical wiring shall be tested for proper connection, continuity, and resistance to earth.
 - 1) The complete system shall be functionally tested in the presence of the Owner or his representative, and all functions, including system and equipment interlocks, must

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be operational at least 5 days prior to the Final Acceptance tests:

- a) Each detector shall be tested in accordance with the manufacturer's recommended procedures, and test values recorded.
- b) All system and equipment interlocks, such as door release devices, audible and visual devices, equipment shutdowns, local and remote alarms, etc. shall function as required and designed.
- c) Each control panel circuit shall be tested for trouble by inducing a trouble condition into the system.

TRAINING REQUIREMENTS:

2. Prior to Final Acceptance, the installing contractor shall provide operational training to each shift of the Owner's personnel. Each training session shall include control panel operation, manual and (optional) abort functions, trouble procedures, supervisory procedures, auxiliary functions, and emergency procedures.

OPERATION AND MAINTENANCE:

3. Prior to Final Acceptance, the installing contractor shall provide complete operation and maintenance instruction manuals, four copies of the instruction manuals shall be provided for each system to the Owner. All aspects of system operation and maintenance shall be detailed, including piping isometrics, wiring diagrams of all circuits, a written description of the system design, sequence of operation and drawing(s) illustrating control logic, and equipment used in the system. Checklists and procedures for emergency situations, troubleshooting techniques, maintenance operations and procedures shall be included in the manual.

AS-BUILT DRAWINGS:

4. Upon completion of each system, the installing contractor shall provide 4 copies of system "As-Built" drawings to the Owner. The drawings shall show actual installation details, including all equipment locations (i.e.: control panel(s), agent container(s), detectors, alarms, manuals, and aborts, etc.) as well as piping and conduit routing details. The drawings shall show all room or facilities modifications, including door and/or damper installations completed. One copy of reproducible engineering drawings shall be provided reflecting all actual installation details.

ACCEPTANCE TESTS:

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5. At the time “As-Built” drawings and maintenance/operations manuals are submitted, the installing contractor shall submit a “Test Plan” describing procedures to be used to test the control system(s). The Test Plan shall include a step-by-step description of all tests to be performed, and shall indicate the type and location of test apparatus to be employed. The tests shall demonstrate that the operational and installation requirements of this specification have been met. All tests shall be conducted in the presence of the Owner and shall not be conducted until the Test Plan has been approved.
6. The tests shall demonstrate that the entire control system functions as designed and intended. All circuits shall be tested: automatic actuation, solenoid and manual actuation, HVAC and power shutdowns, audible and visual alarm devices, and manual override of abort functions. Supervision of all panel circuits, including AC power and battery power supplies, shall be tested and qualified.
7. A room pressurization test shall be conducted, in each protected space, to determine the presence of openings that could affect the agent concentration levels. The test(s) shall be conducted using the Retro-tec Corp. Door Fan system, or equivalent, with integrated computer program. All testing shall be in accordance with NFPA 2001, Appendix C.
8. If room pressurization testing indicates that openings exist, which would result in leakage and/ or loss of the extinguishing agent, the installing contractor shall be responsible for coordinating the proper sealing of the protected space(s) by the general contractor, or his sub-contractor, or agent. The general contractor shall be responsible for adequately sealing all protected space(s) against agent loss or leakage. The installing contractor shall inspect all Work to ascertain that the protected space(s) have been adequately and properly sealed. THE SUPPRESSION SYSTEM INSTALLING CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUCCESS OF THE ROOM PRESSURIZATION TESTS. If the first room pressurization test is not successful, in accordance with these specifications, the installing contractor shall direct the general contractor to determine and correct, the cause of the test failure. The installing contractor shall conduct additional room pressurization tests, at no additional cost to the Owner, until a successful test is obtained. Copies of successful test results shall be submitted to the Owner for record. Upon acceptance by the Owner, the completed system(s) shall be placed into service.

Systems Inspections:

9. The installing contractor shall provide 2 inspections of each system, installed under this contract, during the one-year warranty period. The first inspection shall be at the 6 month interval, and the second inspection at the

SECTION 21 22 00 – CLEAN-AGENT FIRE-EXTINGUISHING SYSTEMS
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12 month interval after system acceptance. Inspections shall be conducted in accordance with the manufacturer's guidelines and the recommendations of NFPA 2001.

10. Documents certifying satisfactory system(s) operation shall be submitted to the Owner upon completion of each inspection.

3.06 STARTUP / DEMONSTRATION

Not Used

3.07 ADJUSTING / PROTECTION / CLEANUP

Cleaning:

1. Each pipe section shall be cleaned internally after preparation and before assembly by means of swabbing, using a suitable nonflammable cleaner. Pipe network shall be free of particulate matter and oil residue before installing nozzles or discharge devices.

END OF SECTION

**SECTION 22 05 17 – SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all sleeves and sleeve seals for plumbing piping, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 61 50 – General Product Requirements

SECTION 22 05 17 – SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
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1.04 REFERENCES

A. Reference Standards:

1. ASTM A53/A53M Steel Pipe Sleeves
2. ASTM D1785 PVC Pipe Sleeves
3. New York State Building Code.

1.05 DESCRIPTION

A. This Section includes requirements for providing sleeves and sleeve seals in accordance with applicable standards and regulations. In addition:

1. Sleeves and sleeve seals shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
2. Sleeves and sleeve seals shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

A. The Work of this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Product data:
 - a. Provide catalogue cuts of all sleeves and sleeve seals, showing: sizes, rough-in dimensions.

1.08 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

1. Equipment shall be delivered to the Site to ensure uninterrupted progress of the Work.

B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:

1. Sleeves and sleeve seals shall be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
2. Sleeves and sleeve seals shall be protected from corrosion and deterioration, and shall be stored in a dry area.

SECTION 22 05 17 – SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
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- 3. Sleeves and sleeve seals shall be properly protected from damage during construction, and shall be cleaned in accordance with manufacturer's instructions prior to installation.
 - C. To avoid unnecessary handling, sleeves and sleeve seals shall be unloaded as close to the place where they are to be installed as is practical. Interiors shall be kept free from dirt and foreign matter.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used
- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
- A. Wall sleeve annular seals shall be as manufactured by:
 - 1. Link Seal®, as manufactured by Thunderline Corp., Stafford, TX.
 - 2. MetraSeal, as manufactured by The Metraflex Corp., Chicago, IL.
 - 3. The Pipe Seal, as manufactured by Flexicraft Industries, Chicago, IL.
 - 4. Or approved equal.
- 2.02 MATERIALS / EQUIPMENT
- A. Sleeves:
 - 1. Materials of construction:
 - a. Cast-Iron Pipe Sleeves: Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop.
 - b. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
 - c. PVC Pipe Sleeves: ASTM D1785, Schedule 40.
 - d. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.
 - e. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
 - B. Sleeve-Seal Systems:
 - 1. General:

SECTION 22 05 17 – SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
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- a. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
- b. Designed to form a hydrostatic seal of 20 psig minimum.
- 2. Materials of Construction:
 - a. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size.
 - b. Pressure Plates: Carbon steel.
 - c. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, ASTM B633 of length required to secure pressure plates to sealing elements.
- C. Sleeve-Seal Fittings:
 - 1. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.
 - 2. Plastic or rubber waterstop collar with center opening to match piping OD.
- D. Grout:
 - 1. General:
 - a. Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
 - 2. Materials of Construction:
 - a. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
 - b. Design Mix: 5000-psi, 28-day compressive strength.
 - c. Packaging: Premixed and factory packaged.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Not Used

SECTION 22 05 17 – SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
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3.02 INSTALLATION

A. Sleeve Installation:

1. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
2. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
 - a. Sleeves are not required for core-drilled holes.
3. Install sleeves in concrete walls as new walls are constructed.
 - a. Cut sleeves to length for mounting flush with both surfaces.
 - b. Using grout seal the space outside of sleeves in walls without sleeve-seal system.
4. Install sleeves for pipes passing through interior partitions.
 - a. Cut sleeves to length for mounting flush with both surfaces.
 - b. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - c. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.
5. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 079000 "Joint Protection."

B. Sleeve-Seal-System

1. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
2. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

C. Sleeve-Seal-Fitting Installation

1. Install sleeve-seal fittings in new walls and slabs as they are constructed.

SECTION 22 05 17 – SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
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2. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
3. Secure nailing flanges to concrete forms.
4. Use grout to seal the space around outside of sleeve-seal fittings.

D. Sleeve and Sleeve-Seal Schedule

1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6 : Steel pipe sleeves.
 - b. Piping NPS 6 and Larger: Steel pipe sleeves.
2. Interior Partitions:
 - a. Piping Smaller Than NPS 6: Steel pipe sleeves.
 - b. Piping NPS 6 and Larger: Galvanized-steel sheet sleeves.

3.03 FIELD TESTING / QUALITY CONTROL

A. Perform the following tests and inspections:

1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

1. All parts and components shall be adjusted as required to provide correct operation.

END OF SECTION

**SECTION 22 05 18 – ESCUTCHEONS FOR PLUMBING PIPING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all escutcheons for plumbing piping, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 61 50 – General Product Requirements

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1.04 REFERENCES

- A. Abbreviations and Acronyms:
 - 1. Not Used.
- B. Reference Standards:
 - 1. New York State Building Code.

1.05 DESCRIPTION

- A. This Section includes requirements for escutcheons in accordance with applicable standards and regulations. In addition:
 - 1. Escutcheons shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
 - 2. Escutcheons shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

- A. The Work in this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

- A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:
 - 1. Product data:
 - a. Provide catalogue cuts of all escutcheons, showing: sizes, rough-in dimensions.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:
 - 1. Equipment shall be delivered to the Site to ensure uninterrupted progress of the Work.
- B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:
 - 1. Escutcheons shall be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
 - 2. Escutcheons shall be protected from corrosion and deterioration, and shall be stored in a dry area.

SECTION 22 05 18 – ESCUTCHEONS FOR PLUMBING PIPING
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- 3. Escutcheons shall be properly protected from damage during construction, and shall be cleaned in accordance with manufacturer's instructions prior to installation.
- C. To avoid unnecessary handling, escutcheons shall be unloaded as close to the place where they are to be installed as is practical. Interiors shall be kept free from dirt and foreign matter.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
 - A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
 - A. Not Used
- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
 - 1. Not Used
- 2.02 MATERIALS / EQUIPMENT
 - A. Escutcheons:
 - 1. Materials of construction:
 - a. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
 - b. One-Piece, Stainless-Steel Type: With polished stainless-steel finish.
 - c. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
 - d. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished, chrome-plated finish and spring-clip fasteners.
 - e. One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.
 - f. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed hinge; and spring-clip fasteners.
- 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used.
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

SECTION 22 05 18 – ESCUTCHEONS FOR PLUMBING PIPING
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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

A. Not Used

3.02 INSTALLATION

A. Escutcheons

1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
 - b. Chrome-Plated Piping: One-piece cast brass with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece steel with polished, chrome-plated finish.
 - d. Insulated Piping: One-piece stainless steel with polished stainless-steel finish.
 - e. Insulated Piping: One-piece cast brass with polished, chrome-plated finish.
 - f. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
 - g. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece stainless steel with polished stainless-steel finish.
 - h. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece cast brass with polished, chrome-plated finish.
 - i. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
 - j. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
 - k. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece stainless steel with polished stainless-steel finish.
 - l. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece cast brass with polished, chrome-plated finish.
 - m. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.

SECTION 22 05 18 – ESCUTCHEONS FOR PLUMBING PIPING
CONTRACT KENS-EAST-2

- n. Bare Piping in Unfinished Service Spaces: One-piece steel with polished, chrome-plated finish.
- o. Bare Piping in Unfinished Service Spaces: One-piece cast brass with polished, chrome-plated finish.
- p. Bare Piping in Unfinished Service Spaces: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
- q. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.
- r. Bare Piping in Equipment Rooms: One-piece cast brass with polished, chrome-plated finish.
- s. Bare Piping in Equipment Rooms: One-piece stamped steel or split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- 1. All parts and components shall be adjusted as required to provide correct operation.

END OF SECTION

SECTION 22 05 18 – ESCUTCHEONS FOR PLUMBING PIPING
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NO TEXT ON THIS PAGE

**SECTION 22 05 19 – METERS AND GAGES FOR PLUMBING PIPING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- a. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all meters and gages for plumbing piping, complete and operational.
- b. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- a. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- a. Section 01 61 50 – General Product Requirements

SECTION 22 05 19 – METERS AND GAGES FOR PLUMBING PIPING
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- b. Section 22 11 13 "Facility Water Distribution Piping" for domestic water meters and combined domestic and fire-protection water-service meters outside the building.
- c. Section 22 11 19 "Domestic Water Piping Specialties" for water meters.

1.04 REFERENCES

- a. Reference Standards:
 - 1. ASME B40.200 Threads for threaded end valves.
 - 2. ASME B16.1 Flanges on iron valves.
 - 3. ASME B16.5 Flanges on steel valves.
 - 4. ASME B16.10 and ASME B16.34 Ferrous valve dimensions and design criteria.
 - 5. ASME B16.18 Solder-joint connections.
 - 6. ASME B31.9 Building services piping valves.
 - 7. NSF 61 and NSF 372 Valve materials for potable-water service.

1.05 DESCRIPTION

- a. This Section includes requirements for providing ball valves in accordance with applicable standards and regulations. In addition:
 - 1. Meters and gages shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
 - 2. Meters and gages shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

- a. The Work of this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

- a. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:
 - 1. Product data:
 - a. Provide catalogue cuts of all meters and gages, showing: sizes, rough-in dimensions.
 - b. Informational Submittals
 - 1. Product Certificates: For each type of meter and gage.
- c. CLOSEOUT SUBMITTALS

SECTION 22 05 19 – METERS AND GAGES FOR PLUMBING PIPING
CONTRACT KENS-EAST-2

- 1. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - a. Nots used.
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
 - a. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
 - a. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- a. Direct-Mounted, Metal-Case, Dial Type Pressure Gages shall be as manufactured by:
 - 1. AMETEK, Inc.; U.S. Gauge
 - 2. Ashcroft Inc.
 - 3. Marsh Bellofram
 - 4. Terice, H.O. Co.
 - 5. Weiss Instruments, Inc.
 - 6. Or approved equal.
- b. Test Plugs shall be manufactured by:
 - 1. Flow Design, Inc.
 - 2. Terice. H.O. Co.
 - 3. Weiss Instruments, Inc.
 - 4. Or approved equal.

Mueller Industries, Inc., Memphis, TN

2.02 MATERIALS / EQUIPMENT

a. PRESSURE GAGES

- 1. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:
 - a. Standard: ASME B40.100.
 - b. Case: Liquid-filled type(s); cast aluminum or drawn steel; 6-inch nominal diameter.

SECTION 22 05 19 – METERS AND GAGES FOR PLUMBING PIPING
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- c. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
- d. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
- e. Movement: Mechanical, with link to pressure element and connection to pointer.
- f. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi and kPa.
- g. Pointer: Dark-colored metal.
- h. Window: Glass.
- i. Ring: Stainless steel.
- j. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

b. **GAGE ATTACHMENTS**

- 1. Snubbers: ASME B40.100, brass; with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and piston-type surge-dampening device. Include extension for use on insulated piping.
- 2. Valves: Brass or stainless-steel needle, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads

c. **TEST PLUGS**

- 1. Description: Test-station fitting made for insertion into piping tee fitting.
- 2. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.
- 3. Thread Size: NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe thread.
- 4. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F
- 5. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber

2.03 **FABRICATION / ASSEMBLING / FINISHES**

- a. Not Used.

2.04 **SOURCE QUALITY CONTROL / SHOP TESTS**

- a. Not Used

**SECTION 22 05 19 – METERS AND GAGES FOR PLUMBING PIPING
CONTRACT KENS-EAST-2**

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- a. Not Used.

3.02 INSTALLATION

- a. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.
- b. Install valve and snubber in piping for each pressure gage for fluids.
- c. Install pressure gages in the following location:
 - 1. Building water service entrance into building.

- d. CONNECTIONS

- 1. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.
- e. PRESSURE-GAGE SCHEDULE
 - 1. Pressure gages at discharge of each water service into building shall be one of the following:
 - 2. Liquid-filled, direct-mounted, metal case.
 - 3. Sealed, direct-mounted, plastic case.

- f. PRESSURE-GAGE SCALE-RANGE SCHEDULE

- 1. Scale Range for Domestic Water Service Piping: 0 to 100 psi and 0 to 600Kpa.

3.03 FIELD TESTING / QUALITY CONTROL

- a. Not Used.

3.04 STARTUP / DEMONSTRATION

- a. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- a. Adjust faces of meters and gages to proper angle for best visibility.

END OF SECTION

SECTION 22 05 19 – METERS AND GAGES FOR PLUMBING PIPING
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NO TEXT ON THIS PAGE

**SECTION 22 05 23.12 – BALL VALVES FOR PLUMBING PIPING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all ball valves for plumbing piping, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 61 50 – General Product Requirements

SECTION 22 05 23.12 – BALL VALVES FOR PLUMBING PIPING
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1.04 REFERENCES

A. Abbreviations and Acronyms:

- | | | |
|----|------|---|
| 1. | CWP | Cold working pressure: |
| 2. | CABO | Council of American Building Officials |
| 3. | GPF | Gallons per Flush |
| 4. | USCS | U.S. Department of Commerce Commercial Standard |

B. Reference Standards:

- | | | |
|----|-----------------------------|---|
| 1. | ASME B1.20.1 | Threads for threaded end valves. |
| 2. | ASME B16.1 | Flanges on iron valves. |
| 3. | ASME B16.5 | Flanges on steel valves. |
| 4. | ASME B16.10 and ASME B16.34 | Ferrous valve dimensions and design criteria. |
| 5. | ASME B16.18 | Solder-joint connections. |
| 6. | ASME B31.9 | Building services piping valves. |
| 7. | NSF 61 and NSF 372 | Valve materials for potable-water service. |

1.05 DESCRIPTION

A. This Section includes requirements for providing ball valves in accordance with applicable standards and regulations. In addition:

1. Ball valves shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
2. Ball valves shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

A. The Work of this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Product data:
 - a. Provide catalogue cuts of all ball valves, showing: sizes, rough-in dimensions.

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- 1) Certification that products comply with NSF 61 and NSF 372

1.08 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, and soldered ends.
3. Set ball valves open to minimize exposure of functional surfaces.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Not Used

2.02 MATERIALS / EQUIPMENT

A. GENERAL REQUIREMENTS FOR VALVES

1. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
2. ASME Compliance:
 - a. ASME B1.20.1 for threads for threaded end valves.
 - b. ASME B16.1 for flanges on iron valves.
 - c. ASME B16.5 for flanges on steel valves.
 - d. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - e. ASME B16.18 for solder-joint connections.
 - f. ASME B31.9 for building services piping valves.

SECTION 22 05 23.12 – BALL VALVES FOR PLUMBING PIPING
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- g. NSF Compliance: NSF 61 and NSF 372 for valve materials for potable-water service.
- 3. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- 4. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- 5. Valve Sizes: Same as upstream piping unless otherwise indicated.
- 6. Valve Actuator Types:
 - a. Gear Actuator: For quarter-turn valves NPS 4 and larger.
 - b. Handlever: For quarter-turn valves smaller than NPS 4.
- 7. Valves in Insulated Piping:
 - a. Include 2-inch stem extensions.
 - b. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 - c. Memory stops that are fully adjustable after insulation is applied.

B. BRASS BALL VALVES

- 1. Brass Ball Valves, One-Piece:
 - a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 400 psig.
 - 3) Body Design: One piece.
 - 4) Body Material: Forged brass or bronze.
 - 5) Ends: Threaded and soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Brass or stainless steel.
 - 8) Ball: Chrome-plated brass or stainless steel.
 - 9) Port: Reduced.
- 2. Brass Ball Valves, Two-Piece with Full Port and Brass Trim, Threaded or Soldered Ends:
 - a. Description:
 - 1) Standard: MSS SP-110 or MSS SP-145.

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- 2) CWP Rating: 600 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Forged brass.
 - 5) Ends: Threaded and soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Brass.
 - 8) Ball: Chrome-plated brass.
 - 9) Port: Full.
3. Brass Ball Valves, Two-Piece with Full Port and Brass Trim, Press Ends:
- a. Description:
- 1) Standard: MSS SP-110 or MSS SP-145.
 - 2) CWP Rating: Minimum 200 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Forged brass.
 - 5) Ends: Press.
 - 6) Press Ends Connections Rating: Minimum 200 psig.
 - 7) Seats: PTFE or RPTFE.
 - 8) Stem: Brass.
 - 9) Ball: Chrome-plated brass.
 - 10) Port: Full.
 - 11) O-Ring Seal: Buna-N or EPDM.
4. Brass Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim, Threaded or Soldered Ends:
- a. Description:
- 1) Standard: MSS SP-110 or MSS SP-145.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Forged brass.
 - 5) Ends: Threaded and soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Stainless steel.
 - 8) Ball: Stainless steel, vented.

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- 9) Port: Full.
5. Brass Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim, Press Ends:
 - a. Description:
 - 1) Standard: MSS SP-110 or MSS SP-145.
 - 2) CWP Rating: Minimum 200 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Forged brass.
 - 5) Ends: Press.
 - 6) Press Ends Connections Rating: Minimum 200 psig.
 - 7) Seats: PTFE or RPTFE.
 - 8) Stem: Stainless steel.
 - 9) Ball: Stainless steel, vented.
 - 10) Port: Full.
 - 11) O-Ring Seal: Buna-N or EPDM.
6. Brass Ball Valves, Two-Piece with Regular Port and Brass Trim:
 - a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Forged brass.
 - 5) Ends: Threaded and soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Brass.
 - 8) Ball: Chrome-plated brass.
 - 9) Port: Regular.
7. Brass Ball Valves, Two-Piece with Regular Port and Stainless-Steel Trim:
 - a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Brass or bronze.

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- 5) Ends: Threaded and soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Stainless steel.
 - 8) Ball: Stainless steel, vented.
 - 9) Port: Regular.
8. Brass Ball Valves, Three-Piece with Full Port and Brass Trim:
- a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Three piece.
 - 4) Body Material: Forged brass.
 - 5) Ends: Threaded and soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Brass.
 - 8) Ball: Chrome-plated brass.
 - 9) Port: Full.
9. Brass Ball Valves, Three-Piece with Full Port and Stainless-Steel Trim:
- a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Three piece.
 - 4) Body Material: Forged brass.
 - 5) Ends: Threaded and soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Stainless steel.
 - 8) Ball: Stainless steel, vented.
 - 9) Port: Full.
- C. BRONZE BALL VALVES
1. Bronze Ball Valves, One-Piece with Bronze Trim:
 - a. Description:
 - 1) Standard: MSS SP-110.

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- 2) CWP Rating: 400 psig.
 - 3) Body Design: One piece.
 - 4) Body Material: Bronze.
 - 5) Ends: Threaded.
 - 6) Seats: PTFE.
 - 7) Stem: Bronze.
 - 8) Ball: Chrome-plated brass.
 - 9) Port: Reduced.
2. Bronze Ball Valves, One-Piece with Stainless-Steel Trim:
- a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: One piece.
 - 4) Body Material: Bronze.
 - 5) Ends: Threaded.
 - 6) Seats: PTFE.
 - 7) Stem: Stainless steel.
 - 8) Ball: Stainless steel, vented.
 - 9) Port: Reduced.
3. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim, Threaded or Soldered Ends:
- a. Description:
 - 1) Standard: MSS SP-110 or MSS-145.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Bronze.
 - 5) Ends: Threaded and soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Bronze or brass.
 - 8) Ball: Chrome-plated brass.
 - 9) Port: Full.

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4. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim, Press Ends:
 - a. Description:
 - 1) Standard: MSS SP-110 or MSS-145.
 - 2) CWP Rating: Minimum 200 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Bronze.
 - 5) Ends: Press.
 - 6) Press Ends Connections Rating: Minimum 200 psig.
 - 7) Seats: PTFE or RTPFE.
 - 8) Stem: Bronze or brass.
 - 9) Ball: Chrome-plated brass.
 - 10) Port: Full.
 - 11) O-Ring Seal: EPDM or Buna-N.
5. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:
 - a. Description:
 - 1) Standard: MSS SP-110 or MSS-145.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Bronze.
 - 5) Ends: Threaded or soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Stainless steel.
 - 8) Ball: Stainless steel, vented.
 - 9) Port: Full.
6. Bronze Ball Valves, Two-Piece with Regular Port and Bronze or Brass Trim:
 - a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Bronze.

SECTION 22 05 23.12 – BALL VALVES FOR PLUMBING PIPING
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- 5) Ends: Threaded.
 - 6) Seats: PTFE.
 - 7) Stem: Bronze or brass.
 - 8) Ball: Chrome-plated brass.
 - 9) Port: Regular.
7. Bronze Ball Valves, Two-Piece with Regular Port and Stainless-Steel Trim:
- a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Two piece.
 - 4) Body Material: Bronze.
 - 5) Ends: Threaded.
 - 6) Seats: PTFE.
 - 7) Stem: Stainless steel.
 - 8) Ball: Stainless steel, vented.
 - 9) Port: Regular.
8. Bronze Ball Valves, Three-Piece with Full Port and Bronze or Brass Trim:
- a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Three piece.
 - 4) Body Material: Bronze.
 - 5) Ends: Threaded.
 - 6) Seats: PTFE.
 - 7) Stem: Bronze or brass.
 - 8) Ball: Chrome-plated brass.
 - 9) Port: Full.
9. Bronze Ball Valves, Three-Piece with Full Port and Stainless-Steel Trim:
- a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.

SECTION 22 05 23.12 – BALL VALVES FOR PLUMBING PIPING
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- 3) Body Design: Three piece.
 - 4) Body Material: Bronze.
 - 5) Ends: Threaded.
 - 6) Seats: PTFE.
 - 7) Stem: Stainless steel.
 - 8) Ball: Stainless steel, vented.
 - 9) Port: Full.
10. Bronze Ball Valves, Three-Piece with Regular Port and Bronze Trim:
- a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Three piece
 - 4) Body Material: Bronze
 - 5) Ends: Threaded or soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Bronze.
 - 8) Ball: Chrome-plated brass.
 - 9) Port: Regular.
11. Bronze Ball Valves, Three-Piece with Regular Port and Stainless-Steel Trim:
- a. Description:
 - 1) Standard: MSS SP-110.
 - 2) CWP Rating: 600 psig.
 - 3) Body Design: Three piece.
 - 4) Body Material: Bronze.
 - 5) Ends: Threaded or soldered.
 - 6) Seats: PTFE.
 - 7) Stem: Stainless steel.
 - 8) Ball: Stainless steel, vented.
 - 9) Port: Regular.
12. Bronze Ball Valves, Two-Piece, Safety-Exhaust:
- a. Description:

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- b. Standard: MSS SP-110.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze, ASTM B584, Alloy C844.
- f. Ends: Threaded.
- g. Seats: PTFE.
- h. Stem: Stainless steel.
- i. Ball: Chrome-plated brass, with exhaust vent opening for pneumatic applications.
- j. Port: Full.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves, at no extra cost to the City.

3.02 INSTALLATION

A. VALVE INSTALLATION

- 1. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- 2. Locate valves for easy access and provide separate support where necessary.

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3. Install valves in horizontal piping with stem at or above center of pipe.
4. Install valves in position to allow full stem movement.
5. Install valve tags. Comply with requirements in Section 40 05 97 - Identification for Process Equipment KEC-2 for valve tags and schedules.

B. GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

1. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
2. Select valves with the following end connections:
 - a. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.
 - b. For Copper Tubing, NPS 2-1/2 to NPS 4 : Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 - c. For Copper Tubing, NPS 5 and Larger: Flanged ends.
 - d. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 - e. For Steel Piping, NPS 2-1/2 to NPS 4 : Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 - f. For Steel Piping, NPS 5 and Larger: Flanged ends

C. DOMESTIC COLD-WATER VALVE SCHEDULE

1. Pipe NPS 2 and Smaller:
 - a. Brass ball valve, one piece. Provide with threaded-joint ends.
 - b. Bronze ball valve, one piece with bronze trim. Provide with threaded-joint ends.
 - c. Brass ball valves, two-piece with full port and brass trim. Provide with threaded or press connection-joint ends.
 - d. Bronze ball valves, two-piece with full port and bronze or brass trim. Provide with threaded or press connection-joint ends.
 - e. Brass ball valves, three-piece with full port and brass trim.
 - f. Bronze ball valves, three-piece with full port and bronze or brass trim.
 - g. Bronze ball valves, two-piece with regular port and bronze trim.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Perform the following tests and inspections:**

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1. Leak Test: After allowing for a full cure, test ball valves for leaks. Repair leaks and retest until no leaks exist.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

1. All parts and components shall be adjusted as required to provide correct operation.

END OF SECTION

**SECTION 22 05 23.14 – CHECK VALVES FOR PLUMBING PIPING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all check valves for plumbing piping, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 01 61 50 – General Product Requirements

SECTION 22 05 23.14 – CHECK VALVES FOR PLUMBING PIPING
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1.04 REFERENCES

A. Abbreviations and Acronyms:

1. CWP Cold working pressure:

B. Reference Standards:

1. ASME B1.20.1 Threads for threaded end valves.
2. ASME B16.1 Flanges on iron valves.
3. ASME B16.5 Flanges on steel valves.
4. ASME B16.10 and ASME B16.34 Ferrous valve dimensions and design criteria.
5. ASME B16.18 Solder-joint connections.
6. ASME B31.9 Building services piping valves.
7. NSF 61 and NSF 372 Valve materials for potable-water service.

1.05 DESCRIPTION

A. This Section includes requirements for providing check valves in accordance with applicable standards and regulations. In addition:

1. Ball valves shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
2. Ball valves shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

A. The Work of this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:

1. Product data:
 - a. Provide catalogue cuts of all ball valves, showing: sizes, rough-in dimensions.
 - 1) Certification that products comply with NSF 61 and NSF 372

1.08 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

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1. Protect internal parts against rust and corrosion.
 2. Protect threads, flange faces, and soldered ends.
 3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
1. Maintain valve end protection.
 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points
- 1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used
- 1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS
- A. Not Used
- PART 2 PRODUCTS
- 2.01 MANUFACTURERS
- A. Bronze swing check valves shall be as manufactured by:
1. Crane Co.; Crane Valve Group; Crane Valves.
 2. Crane Co.; Crane Valve Group; Jenkins Valves.
 3. Crane Co.; Crane Valve Group; Stockham Division.
 4. Milwaukee Valve Company.
 5. Red-White Valve Corporation.
 6. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 7. Or approved equal.
- 2.02 MATERIALS / EQUIPMENT
- A. GENERAL REQUIREMENTS FOR VALVES
1. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
 2. ASME Compliance:
 - a. ASME B1.20.1 for threads for threaded end valves.
 - b. ASME B16.1 for flanges on iron valves.

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- c. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - d. ASME B16.18 for solder-joint connections.
 - e. ASME B31.9 for building services piping valves.
 - 3. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.
 - 4. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.
 - 5. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
 - 6. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
 - 7. Valve Sizes: Same as upstream piping unless otherwise indicated.
 - 8. Valve Bypass and Drain Connections: MSS SP-45.
- B. BRONZE SWING CHECK VALVES**
- 1. Bronze Swing Check Valves with Bronze Disc, Class 125:
 - a. Description:
 - 1) Standard: MSS SP-80, Type 3.
 - 2) CWP Rating: 200 psig.
 - 3) Body Design: Horizontal flow.
 - 4) Body Material: ASTM B62, bronze.
 - 5) Ends: Threaded or soldered. See valve schedule articles.
 - 6) Disc: Bronze.
 - 2. Bronze Swing Check Valves with Nonmetallic Disc, Class 125:
 - a. Description:
 - 1) Standard: MSS SP-80, Type 4.
 - 2) CWP Rating: 200 psig.
 - 3) Body Design: Horizontal flow.
 - 4) Body Material: ASTM B62, bronze.
 - 5) Ends: Threaded or soldered. See valve schedule articles.
 - 6) Disc: PTFE.
 - 3. Bronze Swing Check Valves with Bronze Disc, Class 150:

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- a. Description:
 - 1) Standard: MSS SP-80, Type 3.
 - 2) CWP Rating: 300 psig.
 - 3) Body Design: Horizontal flow.
 - 4) Body Material: ASTM B62, bronze.
 - 5) Ends: Threaded or soldered. See valve schedule articles.
 - 6) Disc: Bronze.
- 4. Bronze Swing Check Valves with Nonmetallic Disc, Class 150:
 - a. Description:
 - 1) Standard: MSS SP-80, Type 4.
 - 2) CWP Rating: 300 psig.
 - 3) Body Design: Horizontal flow.
 - 4) Body Material: ASTM B62, bronze.
 - 5) Ends: Threaded or soldered. See valve schedule articles.
 - 6) Disc: PTFE.
- 5. Bronze Swing Check Valves, Press Ends:
 - a. Description:
 - 1) Standard: MSS SP-80 and MSS SP-139.
 - 2) CWP Rating: Minimum 200 psig.
 - 3) Body Design: Horizontal flow.
 - 4) Body Material: ASTM B584, bronze.
 - 5) Ends: Press.
 - 6) Press Ends Connection Rating: Minimum 200 psig.
 - 7) Disc: Brass or bronze.
- 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used.
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used

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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves, at no additional cost to the city.

3.02 INSTALLATION

A. VALVE INSTALLATION

- 1. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- 2. Locate valves for easy access and provide separate support where necessary.
- 3. Install valves in horizontal piping with stem at or above center of pipe.
- 4. Install valves in position to allow full stem movement.
- 5. Check Valves: Install check valves for proper direction of flow.
 - a. Swing Check Valves: In horizontal position with hinge pin level.
- 6. Install valve tags. Comply with requirements in Section 40 05 97 "Identification for Process Equipment" for valve tags and schedules.

B. GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- 1. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
- 2. Select valves with the following end connections:
 - a. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.
 - b. For Steel Piping, NPS 2 and Smaller: Threaded ends.
- 3. For Grooved-End Copper Tubing: Grooved.

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C. DOMESTIC COLD-WATER VALVE SCHEDULE

1. Pipe NPS 2 and Smaller:
 - a. Bronze swing check valves with bronze disc, Class 125, with threaded end connections.
 - b. Bronze swing check valves with press-end connections.

3.03 FIELD TESTING / QUALITY CONTROL

A. Perform the following tests and inspections:

1. Leak Test: After allowing for a full cure, test ball valves for leaks. Repair leaks and retest until no leaks exist.

3.04 STARTUP / DEMONSTRATION

A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

1. All parts and components shall be adjusted as required to provide correct operation.

END OF SECTION

SECTION 22 05 23.14 – CHECK VALVES FOR PLUMBING PIPING
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NO TEXT ON THIS PAGE

**SECTION 22 11 13 – FACILITY WATER DISTRIBUTION PIPING
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes water-distribution piping and related components outside the building for water service.
- B. Utility-furnished products include water meters that will be furnished to the Site, ready for installation.
- C. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Not Used.

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1.04 REFERENCES

- A. Abbreviations and Acronyms:
 - 1. EPDM: Ethylene propylene diene terpolymer rubber.
- B. Reference Standards:
 - 1. New York State Building Code.

1.05 DESCRIPTION

- A. This Section includes requirements for providing hangers and support in accordance with applicable standards and regulations. In addition:
 - 1. Hangers and support shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
 - 2. Hangers and support shall conform to the requirements of the New York State Building Code, and NFPA.

1.06 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with all requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 - 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 - 3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.07 SUBMITTALS

- A. ACTION SUBMITTALS
 - 1. Product Data: For each type of product indicated.
 - 2. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
 - 3. Wiring Diagrams: Power, signal, and control wiring for alarms.
- B. INFORMATIONAL SUBMITTALS

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1. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
 2. Field quality-control test reports.
- C. CLOSEOUT SUBMITTALS
1. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
1. Ensure that valves are dry and internally protected against rust and corrosion.
 2. Protect valves against damage to threaded ends and flange faces.
 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- 1.09 PROJECT CONDITIONS
- A. Not Used
- 1.10 COORDINATION
- A. Coordinate connection to water main with utility company.
- 1.11 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES
- A. Not Used

SECTION 22 11 13 – FACILITY WATER DISTRIBUTION PIPING
CONTRACT KENS-EAST-2

1.12 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Water Meters shall be as manufactured by:

1. Badger Meter, Inc.
2. Hays Fluid Controls.
3. Master Meter, Inc.
4. Mueller Company; Water Products Division.
5. Schlumberger Limited; Water Division.
6. Sensus Metering Systems.
7. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. PIPING MATERIALS

1. Comply with requirements in "Piping Application" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
2. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

- B. COPPER TUBE AND FITTINGS

1. Hard Copper Tube: ASTM B88, Type K (ASTM B88M, Type A), water tube, drawn temper.
 - a. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
3. Copper Unions:
 - a. MSS SP-123.
 - b. Cast-copper-alloy, hexagonal-stock body.
 - c. Ball-and-socket, metal-to-metal seating surfaces.
 - d. Solder-joint or threaded ends.
4. Copper, Brass or Bronze, Pressure-Seal-Joint Fittings:

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- a. Fittings: Cast-brass, cast-bronze, or wrought-copper with EPDM O-ring seal in each end. Sizes NPS 2-1/2 and larger with stainless steel grip ring and EPDM O-ring seal.
- b. Minimum 200-psig working-pressure rating at 250 deg F.

C. JOINING MATERIALS

- 1. Refer to Section 330500 "Common Work Results for Utilities" for commonly used joining materials.
- 2. Brazing Filler Metals: AWS A5.8, BCuP Series.

D. PIPING SPECIALTIES

- 1. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- 2. Split-Sleeve Pipe Couplings:
 - a. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.
 - 1) Standard: AWWA C219.
 - 2) Sleeve Material: Carbon steel.
 - 3) Sleeve Dimensions: Of thickness and width required to provide pressure rating.
 - 4) Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.
 - 5) Pressure Rating: 150 psig minimum.
 - 6) Metal Component Finish: Corrosion-resistant coating or material.
- 3. Dielectric Fittings:
 - a. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
 - b. Dielectric Unions:
 - 1) Description:
 - a) Standard: ASSE 1079.
 - b) Pressure Rating: 150 psig at 180 deg F.
 - c) End Connections: Solder-joint copper alloy and threaded ferrous.

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- c. Dielectric Flanges:
 - 1) Description:
 - a) Standard: ASSE 1079.
 - b) Factory-fabricated, bolted, companion-flange assembly.
 - c) Pressure Rating: 175 psig minimum at 180 deg F.
 - d) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- d. Dielectric-Flange Insulating Kits:
 - 1) Description:
 - a) Nonconducting materials for field assembly of companion flanges.
 - b) Pressure Rating: 150 psig .
 - c) Gasket: Neoprene or phenolic.
 - d) Bolt Sleeves: Phenolic or polyethylene.
 - e) Washers: Phenolic with steel backing washers.
- e. Dielectric Nipples:
 - 1) Description:
 - a) Standard: IAPMO PS 66.
 - b) Electroplated steel nipple complying with ASTM F1545.
 - c) Pressure Rating: 300 psig at 225 deg F.
 - d) End Connections: Male threaded or grooved.
 - e) Lining: Inert and noncorrosive, propylene.

E. DETECTOR CHECK VALVES

- 1. Description: Galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded bypass taps in inlet and outlet for bypass meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.
 - a. Standards: UL 312 and FMG approved.
 - b. Pressure Rating: 175 psig.

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- c. Water Meter: AWWA C700, disc type, at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve.
 - 2. Description: Iron body, corrosion-resistant clapper ring and seat ring material, flanged ends, with connections for bypass and installation of water meter.
 - a. Standards: UL 312 and FMG approved.
 - b. Pressure Rating: 175 psig.
- F. WATER METERS
 - 1. Water meters will be furnished by utility company.
 - 2. Turbine-Type Water Meters:
 - 1) Description:
 - a) Standard: AWWA C701.
 - b) Pressure Rating: 150-psig working pressure.
 - c) Body Design: Turbine; totalization meter.
 - d) Registration: In gallons or cubic feet as required by utility company.
 - e) Case: Bronze.
 - f) End Connections for Meters NPS 2 and Smaller: Threaded.
 - g) End Connections for Meters NPS 2-1/2 and Larger: Flanged.
 - 3. Compound-Type Water Meters:
 - 1) Description:
 - a) Standard: AWWA C702.
 - b) Pressure Rating: 150-psig working pressure.
 - c) Body Design: With integral mainline and bypass meters; totalization meter.
 - d) Registration: In gallons or cubic feet as required by utility company.
 - e) Case: Bronze.
 - f) Pipe Connections: Flanged.
 - 4. Remote Registration System:

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- 1) Description: Utility company standard; direct-reading type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - a) Standard: AWWA C706.
 - b) Registration: Flow in gallons or cubic feet.
 5. Remote Registration System:
 - 1) Description: Utility company standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - a) Standard: AWWA C707.
 - b) Registration: Flow in gallons or cubic feet.
 6. Data-Acquisition Units: Comply with utility company requirements for type and quantity.
 7. Visible Display Units: Comply with utility company requirements for type and quantity.
- G. DETECTOR-TYPE WATER METERS**
1. Description: Main line, proportional meter with second meter on bypass. Register flow in [gallons (liters)] [cubic feet (cubic meters)].
 - a. Standards: AWWA C703, UL listed, and FMG approved.
 - b. Pressure Rating: 150 psig (1035 kPa).
 - c. Bypass Meter: [AWWA C701, turbine] [AWWA C702, compound]-type, bronze case.
 - 1) Size: At least one-half nominal size of main-line meter.
 2. Description: Main-line turbine meter with strainer and second meter on bypass. Register flow in [gallons (liters)] [cubic feet (cubic meters)].
 - a. Standards: AWWA C703, UL listed, and FMG approved.
 - b. Pressure Rating: 175 psig (1207 kPa).
 - c. Bypass Meter: AWWA C701, turbine-type, bronze case.
 - 1) Size: At least NPS 2 (DN 50).
 3. Remote Registration System:
 - a. Description: Utility company standard; direct-reading type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.

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- 1) Standard: AWWA C706.
 - 2) Registration: Flow in [gallons (liters)] [cubic feet (cubic meters)].
4. Remote Registration System:
- a. Description: Utility company standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - 1) Standard: AWWA C707.
 - 2) Registration: Flow in [gallons (liters)] [cubic feet (cubic meters)].
 - 3) Data-Acquisition Units: Comply with utility company requirements for type and quantity.
 - 4) Visible Display Units: Comply with utility company requirements for type and quantity.
- H. Water Control Valves:
1. Description: Pilot-operation, diaphragm-type, single-seated main water control valve with AWWA C550 or FDA-approved, interior epoxy coating. Include small pilot control valve, restrictor device, specialty fittings, and sensor piping.
 2. Pressure Rating: Initial pressure of 150 psig minimum.
 3. Main Valve Body: Cast- or ductile-iron body with AWWA C550 or FDA-approved, interior epoxy coating; or stainless-steel body.
 4. Pattern: Globe-valve design.
 5. Trim: Stainless steel.
 6. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
- I. BACKFLOW PREVENTERS
1. Reduced-Pressure-Principle Backflow Preventers:
 - a. Standard: ASSE 1013 or AWWA C511.
 - b. Operation: Continuous-pressure applications.
 - c. Pressure Loss: 12 psig maximum, through middle 1/3 of flow range.
 - d. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
 - e. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 (DN 65) and larger.

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- f. Configuration: Designed for horizontal, straight through flow.
- g. Accessories:
- h. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; OS&Y gate type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
- i. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.

J. PROTECTIVE ENCLOSURES

1. Freeze-Protection Enclosures:

- a. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40 deg F when external temperatures reach as low as minus 34 deg F.
 - 1) Standard: ASSE 1060.
 - 2) Class I-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.
- b. Housing: Reinforced aluminum construction.
 - 1) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
 - 2) Drain opening for units with drain connection.
 - 3) Access doors with locking devices.
 - 4) Insulation inside housing.
 - 5) Anchoring devices for attaching housing to concrete base.
- c. Electric heating cable or heater with self-limiting temperature control.

K. Enclosure Bases:

- 1. Description: 4-inch minimum thickness precast concrete, of dimensions required to extend at least 6 inches beyond edges of enclosure housings. Include openings for piping.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

SECTION 22 11 13 – FACILITY WATER DISTRIBUTION PIPING
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PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.02 INSTALLATION

- A. Piping Installation:
 - 1. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
 - 2. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
 - 3. Make connections larger than NPS 2 with tapping machine according to the following:
 - 4. Install tapping sleeve and tapping valve according to MSS SP-60.
 - 5. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 - 6. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
 - 7. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
 - 8. Make connections NPS 2 and smaller with drilling machine according to the following:
 - 9. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
 - 10. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
 - 11. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
 - 12. Install corporation valves into service-saddle assemblies.
 - 13. Install manifold for multiple taps in water main.
 - 14. Install curb valve in water-service piping with head pointing up and with service box.

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15. Comply with NFPA 24 for fire-service-main piping materials and installation.
16. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
17. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
18. Install fiberglass AWWA pipe according to AWWA M45.
19. Bury piping with depth of cover over top at least 30 inches, with top at least 12 inches below level of maximum frost penetration, and according to the following:
 20. Under driveways: With at least 36 inches cover over top.
 21. Under railroad tracks: With at least 48 inches cover over top.
 22. In loose gravelly soil and rock: With at least 12 inches additional cover.
23. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
24. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
25. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
26. Sleeves are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
27. Mechanical sleeve seals are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
28. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
29. See Section 221116 "Domestic Water Piping" for potable-water piping inside the building.

B. Hangers and Support Installation

1. Install seismic-restraint devices, hangers, supports, and anchor devices in accordance with the requirements of the following Section(s):
 - a. Section 23 05 48 "Vibration and Seismic Controls for HVAC."
2. Install the following pipe attachments:

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- a. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
 - b. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer.
 - c. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 - d. Spring hangers to support vertical runs.
3. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
 4. Install hangers for copper tubing with maximum spacing and minimum rod diameters to comply with MSS-58, local codes, and authorities having jurisdiction requirements, whichever are most stringent.
 5. Install hangers for PVC piping with maximum horizontal spacing and minimum rod diameters to comply with manufacturer's written instructions, local codes, and authorities having jurisdiction requirements, whichever are most stringent.
 6. Install hangers for fiberglass piping with maximum horizontal spacing and minimum rod diameters to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
 7. Support horizontal piping within 12 inches of each fitting and coupling.
 8. Support vertical runs of copper tubing to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. JOINT CONSTRUCTION
1. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.
 2. Make pipe joints according to the following:
 3. Copper-Tubing, Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools and procedures recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.
 4. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
 5. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
 6. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.

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7. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
8. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
9. Dielectric Fittings for NPS 2-1/2 to NPS 4 : Use dielectric flange kits.
10. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

D. ANCHORAGE INSTALLATION

1. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
 2. Concrete thrust blocks.
 3. Locking mechanical joints.
 4. Set-screw mechanical retainer glands.
 5. Bolted flanged joints.
 6. Heat-fused joints.
 7. Pipe clamps and tie rods.
8. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 9. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
 10. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

11. VALVE INSTALLATION

12. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
13. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
14. MSS Valves: Install as component of connected piping system.
15. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.
16. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves. Install full-size valved bypass.
17. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

E. WATER METER INSTALLATION

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1. Install water meters, piping, and specialties according to utility company's written instructions.
 2. Water Meters: Install turbine-type water meters, NPS 2 and smaller, in meter boxes with shutoff valves on water meter inlets. Include valves on water meter outlets and valved bypass around meters unless prohibited by authorities having jurisdiction.
 3. Water Meters: Install turbine-type water meters, NPS 3 and larger, in meter vaults. Include shutoff valves on water meter inlets and outlets and valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.
 4. Water Meters: Install detector-type water meters in meter vault according to AWWA M6. Include shutoff valves on water meter inlets and outlets and full-size valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.
- F. ROUGHING-IN FOR WATER METERS
1. Rough-in piping and specialties for water meter installation according to utility company's written instructions.
- G. BACKFLOW PREVENTER INSTALLATION
1. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
 2. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
 3. Do not install bypass piping around backflow preventers.
 4. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.
- H. PROTECTIVE ENCLOSURE INSTALLATION
1. Install concrete base level and with top approximately 2 inches above grade.
 2. Install protective enclosure over valves and equipment.
 3. Anchor protective enclosure to concrete base.
- 3.03 FIELD TESTING / QUALITY CONTROL
- A. Not Used.
- 3.04 STARTUP / DEMONSTRATION
- A. Not Used
- 3.05 ADJUSTING / PROTECTION / CLEANUP
1. Clean and disinfect water-distribution piping as follows:

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2. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
4. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
 - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
5. Prepare reports of purging and disinfecting activities.

END OF SECTION

**SECTION 22 11 16 – DOMESTIC WATER PIPING
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes domestic water piping and related components.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 09 91 00 – Painting.
- B. Section 33 01 10.60 – Disinfection of Piping, Tanks, Structures, and Equipment.
- C. Section 33 05 05 – Buried Piping Installation.
- D. Section 33 06 01 – Schedule for Buried Piping.

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- E. Section 40 05 05 – Exposed Piping Installation.
- F. Section 40 05 06 – Couplings, Adapters, and Specials for Process Piping
- G. Section 40 05 07 – Hangers and Supports for Process Piping
- H. Section 40 06 01 – Schedule for Exposed Piping.
- I. Section 40 42 13 – Process Piping Insulation.

1.04 REFERENCES

A. Abbreviations and Acronyms:

- 1. EPDM: Ethylene propylene diene terpolymer rubber.

B. Reference Standards:

- 1. ASTM B32 Standard Specification for Solder Metal
- 2. ASTM B42 Standard Specification for Seamless Copper Pipe, Standard Sizes
- 3. ASTM B43 Standard Specification for Seamless Red Brass Pipe, Standard Sizes
- 4. ASTM B61 Standard Specification for Steam or Valve Bronze Castings
- 5. ASTM B62 Standard Specification for Composition Bronze or Ounce Metal Castings
- 6. ASTM B88 Standard Specification for Seamless Copper Water Tube
- 7. ASTM B251 Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
- 8. ASTM B302 Standard Specification for Threadless Copper Pipe, Standard Sizes
- 9. ASME B1.20.1 Pipe Threads, General Purpose, Inch
- 10. ASME B16.15 Cast Copper Alloy Threaded Fittings: Classes 125 and 250
- 11. ASME B16.18 Cast Copper Alloy Solder Joint Pressure Fittings
- 12. ASME B16.22 Wrought Copper and Copper Alloy Solder-Joint Pressure Fitting
- 13. ASME B16.24 Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves: Classes 150, 300, 600, 900, 1500 and 2500

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14. ASME B31.1 Power Piping
15. ASME Boiler and Pressure Vessel Code Section VIII – Rules for Construction of Pressure Vessels, Division 1, Appendix 26
16. NSF 61 Drinking Water System Components Health Effects
17. Standards of the EJMA.
18. New York State Building Code.

1.05 DESCRIPTION

- A. This Section includes requirements for providing domestic water piping and accessories in accordance with applicable standards and regulations. In addition:
1. Domestic water piping shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
 2. Domestic water piping shall conform to the requirements of the New York State Building Code.
 3. Domestic water piping, fittings, appurtenances, and specials shall be furnished and installed complete with all necessary jointing materials, wall castings, wall sleeves, specials, adapters, and other appurtenances as shown on the Contract Drawings, as specified herein, and/or as necessary and required for a complete installation.
 - a. Hangers and support for copper and brass iron process pipe shall be provided as specified in Section 40 05 07, Hangers and Supports for Process Piping.
 4. Where shown on the Contract Drawings, the Contractor shall provide all labor and materials for making connections between copper and brass process pipe and existing lines(s) installed under other contracts, including all specials required to connect copper and brass process pipe to pipe of dissimilar material(s).

1.06 QUALITY ASSURANCE

- A. Qualifications of Manufacturer:
1. The manufacturer shall have a minimum of five (5) years of experience in the design and fabrication of copper and brass process pipe, fittings, appurtenances, and specials of similar size, capacity, and type to those shown on the Contract Drawings and specified in the Contract Documents, and shall show evidence of at least five (5) substantially similar installations in satisfactory operation.
- B. Supply and Compatibility:

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1. All domestic water pipe, fittings, appurtenances, and specials included in this section shall be provided by the Contractor through a single, qualified copper and brass process pipe manufacturer.
2. The pipe and fittings shall be designed, fabricated, and installed in accordance with standards referenced herein.
3. The manufacturer shall verify compatibility between the copper and brass process pipe, fittings, appurtenances, specials, and other Work.

C. Regulatory Requirements:

1. Domestic water pipe and fittings shall conform to the New York State Plumbing Code.
2. Use only NSF61-approved materials in potable water lines.
3. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
4. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.

- D. Piping materials shall bear label, stamp, or other markings of specified testing agency.

1.07 SUBMITTALS

A. Action Submittals

1. Product Data: For each type of product indicated.
2. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
3. Wiring Diagrams: Power, signal, and control wiring for alarms.

B. Informational Submittals

1. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
2. Field quality-control test reports.

C. Closeout Submittals

1. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents.
- B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents.

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1.09 COORDINATION

- A. Coordinate connection to water main with utility company.

1.10 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.11 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Copper process pipe and fittings:
 - 1. Copper process pipe shall be as manufactured by:
 - a. Mueller Industries, Inc., Memphis, TN.
 - b. Or approved equal.
 - 2. Copper process fittings shall be as manufactured by:
 - a. NIBCO, Inc., Elkhart, IN.
 - b. Or approved equal.
 - 3. Flared Tube Fittings shall be as manufactured by:
 - a. Mueller Industries, Inc., Memphis, TN.
 - b. Or approved equal.
 - 4. Triple-Lok Style Fittings shall be as manufactured by:
 - a. Triple-Lok Fittings as manufactured by Parker Hannifin Corp., Cleveland, OH.
 - b. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Piping Materials
 - 1. Comply with requirements in "Piping Application" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
 - 2. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.
- B. Copper Tuber and Fittings
 - 1. Soft Copper Tube: ASTM B88, Type K water tube, annealed temper.

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- a. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
 2. Hard Copper Tube: ASTM B88, Type L (ASTM B88M, Type B), water tube, drawn temper.
 - a. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
 3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
 4. Copper Unions:
 - a. MSS SP-123.
 - b. Cast-copper-alloy, hexagonal-stock body.
 - c. Ball-and-socket, metal-to-metal seating surfaces.
 - d. Solder-joint or threaded ends.
 5. Copper, Brass or Bronze, Pressure-Seal-Joint Fittings:
 - a. Fittings: Cast-brass, cast-bronze, or wrought-copper with EPDM O-ring seal in each end. Sizes NPS 2-1/2 (DN 65) and larger with stainless steel grip ring and EPDM O-ring seal.
 - b. Minimum 200-psig working-pressure rating at 250 deg F (121 deg C).
- C. Joining Materials
1. Refer to Section 330500 "Common Work Results for Utilities" for commonly used joining materials.
 2. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8-inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.
 3. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
 4. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
 5. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
- D. Piping Specialties
1. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

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E. Split-Sleeve Pipe Couplings:

- a. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.
 - 1) Standard: AWWA C219.
 - 2) Sleeve Material: Manufacturer's standard.
 - 3) Sleeve Dimensions: Of thickness and width required to provide pressure rating.
 - 4) Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.
 - 5) Pressure Rating: 150 psig minimum.
 - 6) Metal Component Finish: Corrosion-resistant coating or material.

2. Dielectric Fittings:

- a. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

b. Dielectric Unions:

- 1) Description:
 - a) Standard: ASSE 1079.
 - b) Pressure Rating: 150 psig at 180 deg F.
 - c) End Connections: Solder-joint copper alloy and threaded ferrous.

c. Dielectric Flanges:

- 1) Description:
 - a) Standard: ASSE 1079.
 - b) Factory-fabricated, bolted, companion-flange assembly.
 - c) Pressure Rating: 175 psig minimum at 180 deg F .
 - d) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

d. Dielectric-Flange Insulating Kits:

- 1) Description:

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- a) Nonconducting materials for field assembly of companion flanges.
 - b) Pressure Rating: 150 psig.
 - c) Gasket: Neoprene or phenolic.
 - d) Bolt Sleeves: Phenolic or polyethylene.
 - e) Washers: Phenolic with steel backing washers.
- e. Dielectric Nipples:
- 1) Description:
 - a) Standard: IAPMO PS 66.
 - b) Electroplated steel nipple complying with ASTM F1545.
 - c) Pressure Rating: 300 psig at 225 deg F.
 - d) End Connections: Male threaded or grooved.
 - e) Lining: Inert and noncorrosive, propylene.

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Damaged pipe will be rejected and shall be replaced at the Contractor's expense.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.02 INSTALLATION

- A. Piping Installation:
 - 1. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
 - 2. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.

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3. Make connections larger than NPS 2 with tapping machine according to the following:
4. Install tapping sleeve and tapping valve according to MSS SP-60.
5. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
6. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
7. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
8. Make connections NPS 2 and smaller with drilling machine according to the following:
9. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
10. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
11. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
12. Install corporation valves into service-saddle assemblies.
13. Install manifold for multiple taps in water main.
14. Install curb valve in water-service piping with head pointing up and with service box.
15. Comply with NFPA 24 for fire-service-main piping materials and installation.
16. Install PE corrosion-protection encasement according to ASTM A674 or AWWA C105.
17. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
18. Bury piping with depth of cover over top at least 30 inches, with top at least 12 inches below level of maximum frost penetration, and according to the following:
19. Under Driveways: With at least 36 inches cover over top.
20. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
21. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.

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22. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
 23. Sleeves are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
 24. Mechanical sleeve seals are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
 25. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
- B. Installations of hangers and supports:
1. Install the following pipe attachments:
 2. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
 3. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer.
 4. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 5. Spring hangers to support vertical runs.
 6. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
 7. Install hangers for copper tubing with maximum spacing and minimum rod diameters to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
 8. Support horizontal piping within 12 inches of each fitting and coupling.
 9. Support vertical runs of copper tubing to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Joint Construction:
1. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.
 2. Make pipe joints according to the following:
 - a. Copper-Tubing, Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools and procedures recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.

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3. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
4. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
5. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.
6. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
7. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
8. Dielectric Fittings for PS 2-1/2 to NPS 4: Use dielectric flange kits.
9. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Not Used.

3.04 STARTUP / DEMONSTRATION

- A. All potable water pipes shall be disinfected before they are placed into service, as specified in Section 33 01 10.60, Disinfection of Piping, Tanks, Structures, and Equipment.

3.05 ADJUSTING / PROTECTION / CLEANUP

1. During construction, all piping shall be thoroughly cleaned before placement and the lines kept free from foreign matter of whatever origin. The pipes shall be left thoroughly clean to the satisfaction of the Engineer.
2. Clean and disinfect water-distribution piping as follows:
3. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
4. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
5. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.

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- c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
6. Prepare reports of purging and disinfecting activities.

END OF SECTION

**SECTION 22 11 19 – DOMESTIC WATER PIPING SPECIALTIES
CONTRACT KENS-EAST-2**

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all plumbing fixtures, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 09 91 00 – Painting.

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- B. Section 22 05 19 - "Meters and Gauges for Plumbing Piping" for thermometers, pressure gauges, and flow meters in domestic water piping.
- C. Section 22 11 16 "Domestic Water Piping" for water meters.
- D. Section 22 40 00 "Plumbing Fixtures" for water tempering equipment.
- E. Section 33 01 10.60 – Disinfection of Piping, Tanks, Structures, and Equipment.
- F. Section 33 05 05 – Buried Piping Installation.
- G. Section 33 06 01 – Schedule for Buried Piping.
- H. Section 40 05 05 – Exposed Piping Installation.
- I. Section 40 05 06 – Couplings, Adapters, and Specials for Process Piping
- J. Section 40 05 07 – Hangers and Supports for Process Piping
- K. Section 40 06 01 – Schedule for Exposed Piping.
- L. Section 40 42 13 – Process Piping Insulation.

1.04 REFERENCES

- A. Referenced Standards:
 - 1. NSF 61 Drinking Water System Components Health Effects
 - 2. New York State Building Code.

1.05 DESCRIPTION

- A. This Section includes requirements for providing domestic water piping specialties in accordance with applicable standards and regulations. In addition:

Domestic water piping specialties shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.

Domestic water piping specialties shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

- A. Qualifications of Manufacturer:
 - 1. The manufacturer shall have a minimum of five (5) years of experience in the design and fabrication of copper and brass process pipe, fittings, appurtenances, and specials of similar size, capacity, and type to those shown on the Contract Drawings and specified in the Contract Documents, and shall show evidence of at least five (5) substantially similar installations in satisfactory operation.
- B. Supply and Compatibility:

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1. All domestic water pipe, fittings, appurtenances, and specials included in this section shall be provided by the Contractor through a single, qualified copper and brass process pipe manufacturer.
 2. The pipe and fittings shall be designed, fabricated, and installed in accordance with standards referenced herein.
- C. Regulatory Requirements:
- Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
- Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
- Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- D. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. Comply with ASTM F645 for selection, design, and installation of thermoplastic water piping.
- 1.07 SUBMITTALS
- A. ACTION SUBMITTALS
- Product Data: For each type of product.
- Shop Drawings: For domestic water piping specialties.
- Include diagrams for power, signal, and control wiring.
- B. INFORMATIONAL SUBMITTALS
- Test and inspection reports.
- Field quality-control reports.
- C. CLOSEOUT SUBMITTALS
- Operation and Maintenance Data: For domestic water piping specialties, including emergency, operation, and maintenance manuals
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Not Used.
- 1.09 COORDINATION
- A. Coordinate connection to water main with utility company.

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1.10 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

A. Not Used

1.11 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

A. Not Used

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Backflow Preventers:

Reduced-Pressure-Principle Backflow Preventers:

- a. Ames Co.
- b. Conbraco Industries, Inc.
- c. FEBCO; SPX Valve & Control
- d. Watts Industries, Inc.; Water Product Div.
- e. Zurn Plumbing Products Group; Wilkins Div.
- f. Or approved equal.

B. Water Pressure-Reducing Valves:

- a. Ames Co.
- b. Conbraco Industries, Inc.
- c. FEBCO; SPX Valve & Control
- d. Watts Industries, Inc.; Water Product Div.
- e. Zurn Plumbing Products Group; Wilkins Div.
- f. Or approved equal.

C. Strainers for Domestic Water Piping

D. Y-Pattern Strainers

- a. Ames Co.
- b. Conbraco Industries, Inc.
- c. FEBCO; SPX Valve & Control
- d. Watts Industries, Inc.; Water Product Div.
- e. Zurn Plumbing Products Group; Wilkins Div.
- f. Or approved equal.

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E. Yard Hydrants

Nonfreeze Yard Hydrants : YH

- a. Jay R. Smith Mfg. Co.;
- b. Woodford Co.;
- c. Watts Industries, Inc.; Water Product Div.;
- d. Zurn Plumbing Products Group; Wilkins Div.
- e. Or approved equal.

F. Water Meters

1. Water meters will be furnished by utility company.
2. Manufacturers:
 - a. Elster Amco Water, LLC;
 - b. Badger Meter, Inc.;
 - c. Hays Fluid Controls;
 - d. Master Meter, Inc.;
 - e. Mueller Company; Water Products Division;
 - f. Schlumberger Limited; Water Division;
 - g. Sensus Metering Systems;
 - h. Or approved equal.

G. Protective Enclosures

Freeze-Protection Enclosures

- a. Hubbell Hot-Box;
- b. Or approved equal

2.02 MATERIALS / EQUIPMENT

A. General Requirements for Piping Specialties

Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards

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Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. Performance Requirements:

Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

C. Backflow Preventers

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following (or an approved equal):
 - 1) Ames Co.
 - 2) Conbraco Industries, Inc.
 - 3) FEBCO; SPX Valve & Control
 - 4) Watts Industries, Inc.; Water Product Div.
 - 5) Zurn Plumbing Products Group; Wilkins Div.
- b. Reduced-Pressure-Principle Backflow Preventers.
- c. Standard: ASSE 1013.
- d. Operation: Continuous-pressure applications.
- e. Pressure Loss: 12 psig maximum, through middle 1/3 of flow range.
- f. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
- g. Configuration: Designed for horizontal, straight through.
- h. Accessories:
- i. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; OS&Y gate type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
- j. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.

CI. Water Pressure-Reducing Valves

Water Regulators:

- a. Standard: ASSE 1003.
- b. Pressure Rating: Initial working pressure of 150 psig (1035 kPa).
- c. Size: 2" NPS
- d. Design Flow Rate: 27 gpm
- e. Design Inlet Pressure: 140 psig.
- f. Design Outlet Pressure Setting: 80 psig
- g. Body: Bronze with chrome-plated finish for NPS 2 and smaller.

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- h. End Connections: Threaded or solder for NPS 2 and smaller; flanged or solder for NPS 2-1/2 and NPS 3.
- E. Strainers for Domestic Water Piping
- F. Y-Pattern Strainers
 - Pressure Rating: 125 psig minimum unless otherwise indicated.
 - Body: Bronze for NPS 2 and smaller
 - End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
 - Screen: Stainless steel with round perforations unless otherwise indicated.
 - Perforation Size:
 - a. Strainers NPS 2 and Smaller: 0.020 inch
 - Drain: Pipe plug.
- G. Yard Hydrants
 - Nonfreeze Yard Hydrants : YH
 - a. Standard: ASME 1057.
 - b. Type: Nonfreeze, exposed.
 - c. Operation: Wheel handle or lever.
 - d. Head: Cast iron or brass, with pail hook.
 - e. Inlet: NPS 3/4.
 - f. Length: As required for burial of valve and canister below frost line.
 - g. Outlet: Garden-hose thread complying with ASME B1.20.7.
 - h. Drain: Designed with hole to drain into ground when shut off.
 - i. Vacuum Breaker:
 - 1) Removable hose-connection backflow preventer complying with ASSE 1052.
 - 2) Garden-hose thread complying with ASME B1.20.7 on outlet for field installation.
- H. Water Meters
 - 1. Water meters will be furnished by utility company.
 - 2. Manufacturers:
 - a. Elster Amco Water, LLC
 - b. Badger Meter, Inc.
 - c. Hays Fluid Controls.

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- d. Master Meter, Inc.
 - e. Mueller Company; Water Products Division.
 - f. Schlumberger Limited; Water Division.
 - g. Sensus Metering Systems.
 - h. Or approved equal.
3. Turbine-Type Water Meters:
- 1) Description:
 - a) Standard: AWWA C701.
 - b) Pressure Rating: 150-psig working pressure.
 - c) Body Design: Turbine; totalization meter.
 - d) Registration: In gallons or cubic feet as required by utility company.
 - e) Case: Bronze.
 - f) End Connections for Meters NPS 2 and Smaller: Threaded.
 - g) End Connections for Meters NPS 2-1/2 and Larger: Flanged.
4. Compound-Type Water Meters:
- 1) Description:
 - a) Standard: AWWA C702.
 - b) Pressure Rating: 150-psig working pressure.
 - c) Body Design: With integral mainline and bypass meters; totalization meter.
 - d) Registration: In gallons or cubic feet as required by utility company.
 - e) Case: Bronze.
 - f) Pipe Connections: Flanged.
5. Remote Registration System:
- 1) Description: Utility company standard; direct-reading type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - a) Standard: AWWA C706.

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- b) Registration: Flow in gallons or cubic feet.
 - 6. Remote Registration System:
 - 1) Description: Utility company standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - a) Standard: AWWA C707.
 - b) Registration: Flow in gallons or cubic feet.
 - 7. Data-Acquisition Units: Comply with utility company requirements for type and quantity.
 - 8. Visible Display Units: Comply with utility company requirements for type and quantity.
- I. Protective Enclosures
- 1. Freeze-Protection Enclosures:
 - a. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40 deg F when external temperatures reach as low as minus 34 deg F.
 - 1) Standard: ASSE 1060.
 - 2) Class I-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.
 - b. Housing: Reinforced aluminum construction.
 - 1) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
 - 2) Drain opening for units with drain connection.
 - 3) Access doors with locking devices.
 - 4) Insulation inside housing.
 - 5) Anchoring devices for attaching housing to concrete base.
 - c. Electric heating cable or heater with self-limiting temperature control.
- J. Enclosure Bases:
- 1. Description: 4-inch minimum thickness precast concrete, of dimensions required to extend at least 6 inches beyond edges of enclosure housings. Include openings for piping.

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2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Not Used

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb .

3.02 INSTALLATION

- A. Valve installation:
 - 1. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
 - 2. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
 - 3. MSS Valves: Install as component of connected piping system.
 - 4. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.
- B. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves. Install full-size valved bypass.
- C. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.
- D. Water Meter Installation
 - 1. Install water meters, piping, and specialties according to utility company's written instructions.
 - 2. Water Meters: Install detector-type water meters in meter vault according to AWWA M6. Include shutoff valves on water meter inlets and outlets and full-size valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.
- E. Rough-in for Water Meters

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1. Rough-in piping and specialties for water meter installation according to utility company's written instructions.
- F. Backflow Preventer Installation
1. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
 2. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
 3. Do not install bypass piping around backflow preventers.
 4. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.
- G. Protective Enclosure Installation
1. Install concrete base level and with top approximately 4 inches above grade.
 2. Install protective enclosure over valves and equipment.
 3. Anchor protective enclosure to concrete base.
- H. Yard Hydrants: Install with 1 cu. yd. of crushed gravel around drain hole. Set yard hydrants with riser pipe in concrete or pavement.
- I. Piping Connections
- Drawings indicate general arrangement of piping, fittings, and specialties.
- When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.
- J. Electrical Connections
- Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.
- K. Control Connections
- Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."
- L. Identifications
- Plastic Labels for Equipment: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
- a. Yard hydrants.

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Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 400597 "Identification for Piping and Equipment."

3.03 FIELD TESTING / QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative.
- D. Test each pressure vacuum breaker and reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.
- E. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- F. Operational Test: After electrical circuitry has been energized, start units to confirm unit operation.
- G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- H. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- I. Prepare test and inspection reports.

3.04 STARTUP / DEMONSTRATION

- A. Not Used

3.05 ADJUSTING / PROTECTION / CLEANUP

- A. ADJUSTING

Set field-adjustable pressure set points of water pressure-reducing valves.

Set field-adjustable flow set points of balancing valves.

Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

Adjust each pressure vacuum breaker and reduced-pressure-principle backflow preventer in accordance with manufacturer's written instructions, authorities having jurisdiction and the device's reference standard.

END OF SECTION

SECTION 22 33 30 – ELECTRIC, DOMESTIC-WATER HEATERS
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PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes domestic water piping and related components.
- B. The following index of this Section is presented for convenience:

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1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

- A. Section 09 91 00 – Painting.
- B. Section 22 11 16 – Domestic Water Piping.
- C. Section 33 01 10.60 – Disinfection of Piping, Tanks, Structures, and Equipment.
- D. Section 33 05 05 – Buried Piping Installation.

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- E. Section 33 06 01 – Schedule for Buried Piping.
- F. Section 40 05 05 – Exposed Piping Installation.
- G. Section 40 05 06 – Couplings, Adapters, and Specials for Process Piping
- H. Section 40 05 07 – Hangers and Supports for Process Piping
- I. Section 40 06 01 – Schedule for Exposed Piping.
- J. Section 40 42 13 – Process Piping Insulation.

1.04 REFERENCES

A. Abbreviations and Acronyms:

- 1. Not Used.

B. Reference Standards:

- 1. NSF 61 Drinking Water System Components Health Effects
- 2. Standards of the EJMA.
- 3. New York State Building Code.

1.05 DESCRIPTION

A. This Section includes requirements for providing electric, domestic water-heaters and accessories in accordance with applicable standards and regulations. In addition:

- 1. Electric, domestic water-heaters shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
- 2. Electric, domestic water-heaters shall conform to the requirements of the New York State Building Code.
- 3. Electric, domestic water-heaters, fittings, appurtenances, and specials shall be furnished and installed complete with all necessary jointing materials, wall castings, wall sleeves, specials, adapters, and other appurtenances as shown on the Contract Drawings, as specified herein, and/or as necessary and required for a complete installation.
- 4. Where shown on the Contract Drawings, the Contractor shall provide all labor and materials for making connections between copper and brass process pipe and existing lines(s) installed under other contracts, including all specials required to connect copper and brass process pipe to pipe of dissimilar material(s).

1.06 QUALITY ASSURANCE

A. Qualifications of Manufacturer:

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1. The manufacturer shall have a minimum of five (5) years of experience in the design and fabrication of copper and brass process pipe, fittings, appurtenances, and specials of similar size, capacity, and type to those shown on the Contract Drawings and specified in the Contract Documents and shall show evidence of at least five (5) substantially similar installations in satisfactory operation.

B. Supply and Compatibility:

1. All electric, domestic-water heaters, appurtenances, and specials included in this section shall be provided by the Contractor through a single, qualified copper and brass process pipe manufacturer.
2. The domestic water heaters shall be designed, fabricated, and installed in accordance with standards referenced herein.
3. The manufacturer shall verify compatibility between the domestic water heater, fittings, appurtenances, specials, and other Work.

C. Regulatory Requirements:

1. Electric, domestic water heaters shall conform to the New York State Plumbing Code.
2. Use only NSF61-approved materials in potable water lines.

- D. Piping materials shall bear label, stamp, or other markings of specified testing agency.**

1.07 SUBMITTALS

A. Action Submittals

1. **Product Data:** For each type of product indicated.
2. **Shop Drawings:** Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
3. **Wiring Diagrams:** Power, signal, and control wiring for alarms.

B. Informational Submittals

1. **Coordination Drawings:** Equipment room drawing or BIM model, drawn to scale, on which the items described in this Section are shown and coordinated with all building trades.
2. **Seismic Qualification Data:** Certificates, for commercial domestic-water heaters, accessories, and components, from manufacturer.
 - a. **Basis for Certification:** Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - b. **Dimensioned Outline Drawings of Equipment Unit:** Identify center of gravity and locate and describe mounting and anchorage provisions.

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- c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- 3. Product Certificates: For each type of commercial and tankless, electric, domestic-water heater.
- 4. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.
- 5. Source quality-control reports.
- 6. Field quality-control reports.
- 7. Sample Warranty: For special warranty.
- C. Closeout Submittals
 - 1. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents.
- B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents.

1.09 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.10 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used

1.11 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Warranty: The Contractor shall obtain from the Manufacturer and provide to DEP the Manufacturer's standard warranty, in an acceptable form, warranting against defects in design, materials, abnormal aging, and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Electric, Tankless, Domestic-Water Heaters:
 - 1. Bradley Corporation Menomonee Falls, WI;
 - 2. Eemax, Inc., Waterbury, CT;
 - 3. Or approved equal.

2.02 MATERIALS / EQUIPMENT

- A. Electric Domestic-Water Heaters:
 - 1. Thermostat-Control, Electric, Tankless, Domestic-Water Heaters:

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2. Source Limitations: Obtain domestic-water heaters from single source from single manufacturer.
3. Standard: UL 499 for electric, tankless, (domestic-water-heater) heating appliance.
4. Construction: Copper piping or tubing complying with NSF 61 and NSF 372 barrier materials for potable water, without storage capacity.
 - a. Connections: ASME B1.20.1 pipe thread.
 - b. Pressure Rating: 150 psig.
 - c. Heating Element: Resistance heating system.
 - d. Temperature Control: Thermostat.
 - e. Safety Control: High-temperature-limit cutoff device or system.
 - f. Jacket: Aluminum or steel with enameled finish.
5. Support: Bracket for wall mounting.
6. Capacity and Characteristics:
 - a. Flow Rate: 20 gpm at 40 deg F temperature rise.
 - 1) Temperature Setting: 80 deg F:
 - a) Power Demand: 126 kW
 - b) Electrical Characteristics:
 - (1) Volts: 480 V.
 - (2) Phases: Three.
 - (3) Hertz: 60 Hz.
 - (4) Full-Load Amperes: 152 A.
 - B. Pressure-Reducing Valves: ASSE 1003 for water. Set at 25-psig- (172.5-kPa-) maximum outlet pressure unless otherwise indicated.
 - C. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of domestic-water heater. Select relief valves with sensing element that extends into storage tank.
 - D. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than working-pressure rating of domestic-water heater.
 - E. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.
 - F. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.
 - G. Domestic-Water Heater Stands: Manufacturer's factory-fabricated steel stand for floor mounting, capable of supporting domestic-water heater and water. Include

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dimension that will support bottom of domestic-water heater a minimum of 18 inches above the floor.

- H. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water

2.03 FABRICATION / ASSEMBLING / FINISHES

- A. Not Used.

2.04 SOURCE QUALITY CONTROL / SHOP TESTS

- A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, in accordance with ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test commercial domestic-water heaters to minimum of one and one-half times pressure rating before shipment.
- C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

PART 3 EXECUTION

3.01 EXAMINATION / PREPARATION

- A. Damaged equipment will be rejected and shall be replaced at the Contractor's expense.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.02 INSTALLATION

- A. Electric, Tankless, Domestic-Water Heater Mounting: Install electric, tankless, domestic-water heaters on wall bracket or with support legs.
 - 1. Maintain manufacturer's recommended clearances.
 - 2. Arrange units so controls and devices that require servicing are accessible.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 5. Anchor domestic-water heaters to substrate.

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- B. Install electric, domestic-water heaters level and plumb, in accordance with layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
 - 1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves.
 - C. Install combination temperature-and-pressure relief valves in water piping for electric, domestic-water heaters without storage. Extend domestic-water heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
 - D. Install thermometers on outlet piping of electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."
 - E. Assemble and install inlet and outlet piping manifold kits for multiple electric, domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each electric, domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each electric, domestic-water heater outlet. Comply with requirements for valves specified.
 - F. Fill electric, domestic-water heaters with water.
 - G. Install dielectric fittings in all locations where piping of dissimilar metals is to be joined. The wetted surface of the dielectric fitting contacted by potable water shall contain less than 0.25 percent of lead by weight.
- 3.03 PIPING CONNECTIONS:
- A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
 - B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.
- 3.04 FIELD TESTING / QUALITY CONTROL
- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 - B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
 - D. Perform tests and inspections with the assistance of a factory-authorized service representative.

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E. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

F. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports.

3.05 STARTUP / DEMONSTRATION

A. Engage a factory-authorized service representative to train owner's maintenance personnel to adjust, operate, and maintain commercial and tankless, electric, domestic-water heaters. Training shall be a minimum of one hour(s).

3.06 ADJUSTING / PROTECTION / CLEANUP

1. During construction, all equipment shall be thoroughly cleaned before placement and the lines kept free from foreign matter of whatever origin. The pipes shall be left thoroughly clean to the satisfaction of the Engineer.

END OF SECTION

SECTION 22 40 00 – PLUMBING FIXTURES
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PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment, incidentals, and appurtenances as shown, specified and required, to furnish, install and test all emergency plumbing fixtures, complete and operational.
- B. The following index of this Section is presented for convenience:

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1.02	Payment	1
1.03	Related Sections	1
1.04	References	2
1.05	Description	2
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PART 2	PRODUCTS	3
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2.02	Materials / Equipment	4
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3.04	Startup / Demonstration	7
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- C. Plumbing fixtures shall be as indicated in the Plumbing Fixture Schedule as shown on the Contract Drawings.

1.02 PAYMENT

- A. No separate payment shall be made for performing any Work required under this Section. All costs for Work required by this Section shall be included in the applicable lump sum, unit price(s) or allowance(s) as set forth in Section 01 27 00 – Measurement and Payment.

1.03 RELATED SECTIONS

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1.04 REFERENCES

- A. Accessible Fixture: Emergency plumbing fixture that can be approached, entered, and used by people with disabilities.
- B. Plumbed Emergency Plumbing Fixture: Fixture with fixed, potable-water supply.
- C. Tepid: Moderately warm.
- D. Reference Standards:
 - 1. ISEA Z358.1 Emergency Eyewash and Shower Equipment

1.05 DESCRIPTION

- A. This Section includes requirements for providing plumbing fixtures in accordance with applicable standards and regulations. In addition:
 - 1. Plumbing fixtures shall be furnished complete with all accessories, attachments, fastenings, and other appurtenances as specified and/or as may be required for a satisfactory installation.
 - 2. Plumbing fixtures shall be of the water conservation type and shall conform to the requirements of the New York State Building Code.

1.06 QUALITY ASSURANCE

- A. The Work of this Section shall be performed by a plumber licensed by the local authority having jurisdiction.

1.07 SUBMITTALS

- A. Submittals shall comply with the requirements of the Contract Documents. In addition, submittals shall include, but not be limited to:
 - 1. Action Submittals:
 - a. Product Data: For each type of product indicated. Include flow rates and capacities, furnished specialties, and accessories.
 - b. Shop Drawings: Include plans, elevations, sections, and mounting details.
 - c. Provide a list of manufacturer's recommended special tools and spare parts to be supplied.
 - 2. Informational Submittals:
 - a. Product Certificates: Submit certificates of performance testing specified in "Source Quality Control" Article.
 - b. Field quality-control test reports.
 - 3. Closeout Submittals
 - a. Operation and Maintenance Data: For emergency plumbing fixtures to include in operation and maintenance manuals.

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- 4. Maintenance Material Submittals
 - a. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall deliver materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:
 - 1. The cleaning, preservation and packing of the plumbing fixture for shipment shall be in accordance with the manufacturer's commercial practice subject to the approval of the Engineer.
- B. The Contractor shall store and handle materials provided under this Section in accordance with the requirements of the Contract Documents. In addition:
 - 1. Plumbing fixture shall be handled in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
 - 2. Plumbing fixture shall be protected from corrosion and deterioration, and plumbing fixtures shall be stored in a dry area.
 - a. Plumbing fixtures stored outdoors shall be supported above ground surfaces on wood runners and protected with effective and durable waterproof covers approved by the Engineer.
 - 3. Plumbing fixture interiors shall be kept free from dirt and foreign matter.
 - 4. Plumbing fixtures shall be properly protected from damage during construction and shall be cleaned in accordance with manufacturer's instructions prior to installation.
- C. To avoid unnecessary handling, plumbing fixtures shall be unloaded as close to the place where they are to be installed as is practical. Interiors shall be kept free from dirt and foreign matter.

1.09 SPARE PARTS, SPECIAL TOOLS, AND SUPPLIES

- A. Not Used.

1.10 SPECIAL WARRANTY PROVISIONS / GUARANTEE PERIODS

- A. Not Used.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Emergency Eyewash and Showers :
 - 1. Emergency Shower and Eyewash Station (Corrosion Resistant): ES-1:

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- a. Model S193140BCFEB00 as manufactured by Bradley Corporation Menomonee Falls, WI;
 - b. Model G1994 as manufactured by Guardian Equipment Chicago, IL;
 - c. Model No. 8330, as manufactured by Haws Drinking Co., Lane Sparks, NV,;
 - d. Model No. SE-626 as manufactured by Speakman Co., New Castle, DE,;
 - e. Model No. 8336, as manufactured by Haws Drinking Co., Lane Sparks, NV,;
 - f. Or approved equal.
2. Flow Switches, Audible and Visible Alarms:
- a. Bradley Corporation Menomonee Falls, WI;
 - b. Guardian Equipment Chicago, IL;
 - c. Haws Drinking Co., Lane Sparks, NV;
 - d. Speakman Co., New Castle, DE;
 - e. Or approved equal.

2.02 MATERIALS / EQUIPMENT

A. Emergency Eyewash and Showers:

1. Emergency Shower and Eyewash (Corrosion Resistant): EES-1:
- a. Type: Free standing corrosion resistant emergency shower and eyewash station.
 - b. Materials:
 - 1) Shower:
 - a) 10-in. diameter Stainless Steel shower head.
 - b) 1in. stay-open stainless steel ball valve.
 - c) 24-in. rigid pull rod.
 - 2) Eye/Face-Wash:
 - a) 304 Stainless Steel bowl with Cover
 - b) Halo eye/face wash system ABS heads.
 - c) ½” Stainless steel ball valve, stay open type.
 - 3) Pipe:
 - a) Type 304 Corrosion resistant stainless steel.

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- b) Painted yellow with bright yellow marking.
 - 4) Supply: 1¼-in. Stainless Steel.
 - c. Anchor water supply to construction.
 - d. Shower and eyewash must conform to ANSI Z358-1-2004 standards.
 - 2. Flow Switches, Audible and Visible Alarms:
 - a. Type:
 - 1) Single pole double throw.
 - 2) NEMA 4X.
 - 3) UL listed paddle type flow switch.
 - 4) Contacts to be rated for 5 amps at 120 vac.
 - b. Emergency flow switch equipment shall be nominal 120 vac, 1 phase, 60 Hz electrical service, in accordance with Section 26 29 13, Enclosed Controllers.
 - c. Flow switches shall only be furnished by emergency shower and eyewash manufacturer for each shower and/or eyewash station to ensure compatibility of flow switch operating in conjunction with shower or eyewash operation or operation of both units. If flow switch is not furnished by shower and eyewash manufacturer the Contractor shall assume complete responsibility for the proper operation of the flow sensing of the eyewash and shower units which shall include all additional conduit, wire and appurtenances, operation of flow switches shall be as stated below.
 - d. Flow switches shall sense flow for either showers and eyewashes. Flow switches shall be full line size so as not restrict water flow in order to detect flow. Provide a separate flow switch for each shower and each eyewash, if required, at each shower and eyewash station.
- 2.03 FABRICATION / ASSEMBLING / FINISHES
 - A. Not Used.
- 2.04 SOURCE QUALITY CONTROL / SHOP TESTS
 - A. Not Used
- PART 3 EXECUTION
- 3.01 EXAMINATION / PREPARATION
 - A. Inspection:
 - 1. All plumbing fixtures, water coolers and other related materials shall be inspected for chips, cracks, dents and other flaws. Only items free from

SECTION 22 40 00 – PLUMBING FIXTURES
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defects shall be installed in the work. All fixtures shall be furnished with all necessary supports, hangers, brackets, etc., for the proper installation of the fixtures. Such supports, etc., shall be in accordance with the manufacturer's recommendations.

2. No fixture will be accepted that shows cracks, blisters, thin spots, or other flaws.

B. Contractor shall install all Work in complete accordance with the manufacturer's instructions and recommendations, and the approved Shop Drawings.

1. Contractor shall not install damaged items until repairs are made in accordance with manufacturer's written instructions and approval by Engineer. Only minor repair work will be permitted in the field. All damaged items requiring remedial work shall be returned to the manufacturer for repair or replacement.

3.02 INSTALLATION

A. Install plumbing fixtures as shown on the Contract Drawings. The Contract Drawings are generally diagrammatic and installation of the plumbing fixtures in the allotted spaces shall be verified.

B. The Contractor shall review the Contract Drawings and any discrepancies shall be reported to the Engineer for clarification prior to starting installation.

C. General Installation Requirements:

1. Install fixtures in complete accordance with the manufacturer's printed instructions and the approved shop drawings.

2. Each fixture shall be separately trapped.

3. Pipe openings shall be closed with caps or plugs during installation. Fixtures shall be tightly covered and protected against dirt, water, chemicals and mechanical injury.

4. Plated or polished fittings, pipes and appliances shall be coated with protective material immediately after installation.

5. Confirm location, size of fixtures and openings before installation.

6. Layout fixtures as indicated on the drawings.

7. Carefully install fixtures in accordance with manufacturer's data with sufficient clearances to coordinate with accessories, specialties and equipment specified in other divisions of these specifications and/or as shown on the drawings.

8. Hangers and carriers shall be installed in accordance with manufacturer's recommendations and in accordance with good practice and workmanship.

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9. Upon completion of the work, all labels shall be removed, fixtures and trim shall be cleaned of all dirt, grease and markings and all valves properly adjusted.
10. Clean all exposed metal surfaces from grease, dirt, paint or other foreign material.
11. Fixtures shall be properly protected from damage during construction and shall be cleaned in accordance with manufacturer's instructions.
12. Fixtures, chrome-plated piping, fittings and trim shall be polished before requesting acceptance of the system.
13. The entire plumbing installation shall be in accordance with best standard practice and in conformance with requirements in New York State Code.

D. Fixture Heights:

1. The Contractor shall install fixtures to the heights above finished floor as specified, herein below. Installation of fixtures for use by the physically handicapped shall be in accordance with ANSI/CABO A117.1.
 - a. Emergency Shower and Eyewash:
 - b. Emergency shower 84 in. to bottom of shower head.

Emergency eyewash 38 in. to receptor rim.

3.03 FIELD TESTING / QUALITY CONTROL

- A. Contractor shall verify that all work furnished and installed conforms to the requirements the Contract Documents.
- B. The Contractor shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of the work.

3.04 STARTUP / DEMONSTRATION

A. Disinfection:

1. Prior to placing the potable water systems in service, they shall be disinfected in accordance with AWWA Standard C601, Section 33 01 10.60, Disinfection, and any additional requirements prescribed by the public health authorities having jurisdiction.

3.05 ADJUSTING / PROTECTION / CLEANUP

A. Adjusting:

1. Upon completion of the installation, the Contractor shall adjust all fixtures for their intended use.
2. The Contractor shall operate each fixture to ensure their performance without splashing, noise or overflow.

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B. Cleaning:

1. The Contractor shall thoroughly clean all surfaces of the installed fixtures and polish all chromed surfaces.
2. Remove and dispose of all debris and waste from the site resulting from installation.
3. Clean work as specified in the Contract Documents.

C. Protection of Finished Work:

1. Protect finished Work as specified in Contract Documents.
2. Fixture Use: Do not permit use of fixtures.

END OF SECTION

THE CITY OF NEW YORK
DEPARTMENT OF
ENVIRONMENTAL PROTECTION

**Invitation for Bids for Furnishing all Labor and Material
Necessary and Required for:**

KENS-EAST-2

KENSICO-EASTVIEW CONNECTION

KENSICO SITE PREPARATION

Volume 1 of 2
Contract Terms and Specifications
(with separate Bid Booklet)

April 2023