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SED NO. 44-03-01-06-0-006-015
44-03-01-06-0-002-017
44-03-01-06-0-001-030

CORNWALL CENTRAL SCHOOL DISTRICT

CORNWALL-ON-HUDSON, NEW YORK

PROJECT NO. 363579-22001.3

PHASE 3

RECONSTRUCTION TO

CORNWALL-ON-HUDSON ELEMENTARY SCHOOL
CORNWALL ELEMENTARY SCHOOL
CORNWALL CENTRAL MIDDLE SCHOOL

JUNE 28, 2024

The engineer that has signed this document certifies that to the best of their knowledge, information and belief, the asbestos plans and specifications are in accordance with applicable requirements of the New York State Uniform Fire Prevention and Building Code, Construction Standards of the Commissioner of Education, New York State Department of Labor Part 56 of Title 12, and the United States Environmental Protection Agency Hazard Emergency Response ACT Regulations. Paul R. Checco is accredited to the EPA and New York State under AHERA Regulations as an Asbestos Project Designer (Asbestos Handling Certificate Number 04-01754).

To the best of the Architect's knowledge, information and belief, the design of this project conforms to all applicable provisions of the New York State Uniform Fire Prevention and Building Code, the New York State Energy Conservation Construction Code, and the building standards of the New York State Education Department. It is a violation of the Education Law of the State of New York law for any person to alter or modify this document in any way unless acting under the direction of a licensed architect.

BID SET

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CORNWALL ELEMENTARY SCHOOL

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AG300	Site Code Compliance Plan

HAZARDOUS MATERIALS

AAA100	Second Floor Asbestos Abatement Plans

CIVIL

AC100	Site Demolition and Soil Erosion and Sediment Control Plan
AC120	Site Layout Plan
AC130	Site Grading and Utility Plan

ARCHITECTURAL

AA050	Key Plans and Code Compliance Review
AA400	Enlarged Plans / Interior Elevations
AA750	Miscellaneous Details / Door Schedule

MECHANICAL

AM050	Key and Toilet Room Plans
AM051	Roof Key Plan, Details, Schedule, and Control

ELECTRICAL

AE050	First and Second Floor Key Plans
AE160	Roof Plans
AE400	Enlarged Plans
AE500	Details

PLUMBING

AP050	First and Second Floor Key Plans
AP400	Enlarged Plans, Details, and Schedule

CORNWALL-ON-HUDSON-ELEMENTARY SCHOOL

HAZARDOUS MATERIALS

BAA100	First, Second, and Third Floor Asbestos Abatement Plans

ARCHITECTURAL

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BA100	Demolition Plans
BA200	Exterior Elevations

ARCHITECTURAL (cont'd)

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BA400	Enlarged Plans / Interior Elevations
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MECHANICAL

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BM103	Third Floor Plans
BM500	Details, Schedule and Controls

ELECTRICAL

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BE400	Enlarged Plans
BE401	Enlarged Plans
BE500	Details
BE600	Luminaire Schedule

PLUMBING

BP050	Key Plans
BP400	Enlarged First and Second Floor Plans
BP401	Enlarged Third Floor Plans
BP500	Details and Schedule

CORNWALL CENTRAL MIDDLE SCHOOL

CODE COMPLIANCE

DG300	Site Code Compliance Plan

HAZARDOUS MATERIALS

DAA100	Second Floor Asbestos Abatement Plans

CIVIL

DC100	Site Demolition and Soil Erosion and Sediment Control Plan
DC120	Site Layout Plan
DC130	Site Grading and Utility Plan

ARCHITECTURAL

DA050	Key Plans and Code Compliance Review
DA400	Enlarged Plans / Interior Elevations / Sections
DA401	Enlarged Plans / Interior Elevations / Details
DA402	Enlarged Plans / Interior Elevations
DA500	Plan Details
DA600	Door Schedule, Door Types, Window Types, and Details
DA700	Partition Types and Details
DA750	Miscellaneous Details

MECHANICAL

DM050	First and Second Floor Key Plans
DM051	Roof Key Plan
DM101	Partial First and Second Floor Plans
DM500	Details, Schedules and Controls

ELECTRICAL

DE050	First Floor Key Plan
DE051	Second Floor Key Plan
DE052	Roof Key Plan
DE400	Enlarged Plans
DE500	Details
DE600	Luminaire Schedule

PLUMBING

DP050	Key Plans and Schedule
DP400	Enlarged Plans and Details

COMMON DETAILS

CIVIL

ZC500	Site Details
ZC501	Site Details

All drawings dated June 28, 2024.

NOTICE TO BIDDERS

NOTICE IS HEREBY GIVEN, that sealed Bids, in duplicate, are sought and requested by the Board of Education, Cornwall Central School District (hereinafter called "Owner"), for Reconstruction to Cornwall Elementary School, Cornwall Central Middle School, and Cornwall-on-Hudson Elementary School (aka "Phase 3 Reconstruction" project or derivations thereof).

Separate Bids are requested for the following Contracts:

Contract 1 GC – General Construction Work
Contract 2 MPC – Mechanical & Plumbing Construction Work
Contract 3 EC – Electrical Construction Work
Contract 4 WC/AA – Window & Abatement of Hazardous Material Construction Work
Contract 5 SC – Site Construction Work

in accordance with the Drawings, Project Manual (including Conditions of the Contract and Specifications), and other Bidding and Contract Documents prepared by:

Tetra Tech Engineers, Architects & Landscape Architects, P.C. d/b/a
Tetra Tech Architects & Engineers
10 Brown Road
Ithaca, New York 14850

The Palombo Group
195 Front Street
First Floor
Newburgh, New York 12550

A pre-bid conference for potential Bidders and other interested parties will be held on September 12, 2024 at 10:00 AM local time, outside of the Cornwall CSD Buildings and Grounds Facility, 130 Main Street, Cornwall, New York 12518 Cornwall, Central Middle School, 122 Main St., Cornwall, New York 12518, Cornwall Elementary School and Cornwall-on-Hudson Elementary School, 234 Hudson Street, Cornwall-on-Hudson, New York 12520. Pre-bid conference is for all prime contracts.

Sealed Bids will be received by the Owner until October 2, 2024 at 10:00 AM local time at Cornwall CSD Buildings and Grounds Facility, 130 Main Street, Cornwall, New York 12518 at which time and place Bids received will be publicly opened and read aloud in the conference room. Allow sufficient time to check in to the building when dropping off bids and deliver sealed bids to the attention of Mr. Harvey Sotland, Assistant Superintendent for Business. The Cornwall CSD Buildings and Grounds Facility is accessed through the main loop and parking lot at Cornwall Central Middle School, 122 Main St., Cornwall, New York 12518.

For the convenience of potential Bidders and other interested parties, the Bidding Documents may be examined at the following locations:

Construction Market Data, 30 Technology Parkway South, Suite 100, Norcross, GA 30092
Eastern Contractors Association, Inc., 6 Airline Drive, Colonie, NY 12205
Mohawk Valley Builders Exchange, 10 Main Street, Suite 202, Whitesboro, NY 13492
Northern New York Builders Exchange, 22074 Fabco Road, Watertown, New York 13601
The Builders Exchange of the Southern Tier, Inc.-East, 15 Belden Street, Binghamton, New York 13903
Construction Exchange of Buffalo & Western NY, 2660 William Street, Cheektowaga, NY 14227
Rochester Builders Exchange, 180 Linden Oaks, Suite 100, Rochester, NY 14625

Syracuse Builders Exchange, 6563 Ridings Rd., Syracuse, NY 13206
McGraw Hill Construction/Dodge, c/o Dataflow, 2215 Central Ave, Schenectady NY 12304
The Builders Exchange of the Southern Tier, Inc.-West, 65 E. Main. St., Falconer, NY 14733
Cornwall Central School District, 24 Idlewild Avenue, Cornwall-On-Hudson, NY 12520
Tetra Tech Architects & Engineers, 10 Brown Road, Ithaca, New York 14850

Complete digital sets of Bidding Documents, drawings and specifications, may be obtained online as a download at www.tetratechaeplanroom.com 'public projects' for a non-refundable fee of $49.00 (Forty Nine Dollars).

Complete hard copy sets of Bidding Documents, drawings and specifications, may be obtained online at www.tetratechaeplanroom.com 'public projects'. Checks shall be made payable to **Cornwall Central School District** in the sum of $100.00 (One Hundred Dollars) for each set of documents. A scanned copy of the deposit check can be emailed to projects@revplans.com. Once the scanned copy of the executed deposit check is received, Bidding Documents will be shipped. Mail checks to **Lohrius Blueprint**, 226 Newtown Road, Plainview, New York 11803. Plan deposit is refundable in accordance with the terms in the Instructions to Bidders. Any bidder requiring documents to be shipped shall make arrangements with the printer and pay for all packaging and shipping costs (either by providing FedEX/UPS account number or being charged a flat rate by the printer).

Please note REV www.tetratechaeplanroom.com is the designated location and means for distributing and obtaining all bid package information, electronic or hard copy. Only those Contract Documents obtained in this manner will enable a prospective bidder to be identified as a registered plan holder. The Provider takes no responsibility for the completeness of Contract Documents obtained from other sources. Contract Documents obtained from other sources may not be accurate or may not contain addenda that may have been issued.

All bid addenda will be transmitted to registered plan holders, regardless of receiving electronic or hard copy Bid Documents, via email and will be available at www.tetratechaeplanroom.com. Registered plan holders who have paid for hard copies of the bid documents will need to make the determination if hard copies of the addenda are required for their use, and coordinate directly with REV for hard copies of addenda to be issued. There will be no charge for registered plan holders to obtain hard copies of the bid addenda.

As bid security, each Bid shall be accompanied by a certified check or Bid Bond made payable to the Owner, in accordance with the amounts and terms described in the Instructions to Bidders.

The Owner requires Bids comply with bidding requirements indicated in the Instructions to Bidders. The Owner may, at its discretion, waive informalities in Bids, but is not obligated to do so, nor does it represent that it will do so. The Owner also reserves the right to reject any and all Bids. The Owner will not waive informalities which would give one Bidder substantial advantage or benefit not enjoyed by all affected Bidders. Bids may not be withdrawn before 45 days following the Bid opening thereof unless an error is claimed by the Bidder in accordance with the Instructions to Bidders.

INSTRUCTIONS TO BIDDERS

ARTICLE 1
PROJECT AND BIDDING INFORMATION

1. Project Identification: Reconstruction to Cornwall Elementary School, Cornwall Central Middle School, and Cornwall-on-Hudson Elementary School (aka "Phase 3 Reconstruction" project or derivations thereof).

   a. Project Locations:

      1) Cornwall Elementary School: 99 Lee Road, Cornwall, New York 12518.
      2) Cornwall Central Middle School: 122 Main Street, Cornwall, New York 12518.
      3) Cornwall-on-Hudson Elementary School: 234 Hudson Street, Cornwall-on-Hudson, New York 12520.

2. Owner: Cornwall Central School District.

   a. Address: 24 Idlewild Avenue, Cornwall-On-Hudson, New York 12520.

3. **Bid Opening:** Bids will be received until the following Bid opening date and time, at the following location:

   a. Bid Opening Date and Time: October 2, 2024 at 10:00 AM, local time.

   b. Bid Opening Location: Cornwall CSD Buildings and Grounds Facility, 130 Main Street, Cornwall, New York 12518.

      1) Special Instructions: Sealed Bids will be publicly opened and read aloud in the Conference Room at the Buildings and Grounds Facility. Allow sufficient time to check in to the building when dropping off bids and deliver sealed bids to the attention of Mr. Harvey Sotland, Assistant Superintendent for Business.

4. Bidders are invited to submit Bids for any, or all of, the following Contracts:

   a. Contract 1 GC – General Construction Work
   b. Contract 2 MPC – Mechanical & Plumbing Construction Work
   c. Contract 3 EC – Electrical Construction Work
   d. Contract 4 WC/AA – Window & Abatement of Hazardous Material Construction Work
   e. Contract 5 SC – Site Construction Work

5. Access to the Project Site: Subject to Owner's prior approval of timing, Bidders will be permitted access to Project site on Monday through Friday, from 7:00 AM until 5 PM, except legal holidays.

   a. Contact Owner's representative designated below, prior to visiting Project site, to arrange access.
   b. Owner's Representative: Mr. William Devine, The Palombo Group; Email: wdevine@thepalombogroup.com; Cell Phone: (845) 554-7631.
   c. Special Instructions: Contact Owner's Representative to arrange access the project sites except for Pre-Bid Conference.

6. **Pre-Bid Conference**: A pre-bid conference for potential Bidders and other interested parties for all Contracts will be held as follows:

    a. Pre-Bid Conference Date and Time: September 12, 2024 at 10:00 AM, local time.

    b. Pre-Bid Conference Location: Outside of the Cornwall CSD Buildings and Grounds Facility, 130 Main Street, Cornwall, New York 12518

        1) Special Instructions: The Cornwall CSD Buildings and Grounds Facility is accessed through the main loop and parking lot at Cornwall Central Middle School, 122 Main Street, Cornwall, New York 12518.

7. Agreement Form: The following will be used as the basis for the form of agreement between the Owner and the Contractor (Owner-Contractor Agreement):

    a. Standard Form of Agreement Between Owner and Contractor, AIA Document A132.

ARTICLE 2
DEFINITIONS

1. Definitions in the General Conditions of the Contract for Construction, AIA Document A232, or in other Contract Documents are applicable to the Bidding Documents.

    a. "Addenda": Written or graphic instruments issued by the Architect prior to execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections.

    b. "Bid": Complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

        1) "Base Bid": Sum stated in the Bid for which Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated for Alternates.

    c. "Bidder": Person or entity who submits a Bid.

ARTICLE 3
BIDDING PROCEDURES

1. Bid Form: Complete the Bid Form provided, in duplicate, with all blank spaces for Base Bid and Alternates legibly completed in ink, or typewritten, in both words and figures.

    a. In the event of a discrepancy between amounts written in words and figures, the amount written in words shall govern.
    b. Bid Forms without amounts expressed both in words and figures will not be accepted.

2. Bid Attachments: Complete and submit the following attachments with the Bid Form:

    a. Attachment #1: Non-Collusive Bidding Certification.
    b. Attachment #2: Certified Corporate Resolution.
    c. Attachment #3: Iranian Energy Divestment Certification.
    d. Attachment #4: Certificate on Violations.

3. Bid Security:

    a. Submit, with the Bid Form, bid security in the amount of five percent of the Base Bid, in any of the following forms:

        1) Certified check, payable to the Owner; or

        2) Bid Bond, payable to the Owner, on Bid Bond, AIA Document A310, or standard bid bond form, duly executed by the Bidder as principal, with a surety company acceptable to the Owner.

            a) Affix a certified and current copy of the power of attorney for the attorney-in-fact who executes the required bond on behalf of the surety.

    b. Within three days following the Bid opening, bid security will be returned to all Bidders, except the three apparent lowest Bidders.

        1) Within three days following execution of the Owner-Contractor Agreement, bid security will be returned to the three apparent lowest Bidders.

        2) If the Owner-Contractor Agreement has not been executed within 45 days following the Bid opening, bid security will be returned to the three apparent lowest Bidders, except as noted below.

    c. Should the accepted Bidder, within 10 days following Notice of Award, fail or refuse to execute the Owner-Contractor Agreement and to provide the required performance and payment bonds, the accepted Bidder will be deemed to have abandoned the Contract and its bid security will be forfeited to the Owner.

4. Bid Submission: Submit each Bid, including attachments, in a sealed envelope bearing the Bidder's name and address, name of Contract, and name of Project. Deliver Bid to location specified no later than the Bid opening date and time indicated. Any Bid received after the Bid opening date and time indicated will be returned unopened.

5. Bid Withdrawal:

    a. Bid may be withdrawn by the Bidder up until the date and time specified for opening of Bids.

    b. Following the Bid opening, Bid may not be withdrawn before 45 days following the Bid opening, except in the case of Bidder error, as follows:

        1) If the Bidder claims an error in the Bid, submit a written notice to the Architect, within three days of the Bid opening, describing in detail the nature of the error, submitting documentary evidence or proof of such error.

            a) Failure to deliver such notice and evidence or proof, within the time frame required, constitutes a waiver of Bidder's right to claim error.

        2) Upon receipt of required notice and evidence or proof, the Owner, in consultation with the Architect, will determine if an excusable error has been made; and if so, the Owner may permit the Bid to be withdrawn. The Owner's determination will be conclusive upon the Bidder, its surety, and all who claim rights under the Bidder.

ARTICLE 4
BIDDING DOCUMENTS

1. Bidding Documents include the bidding requirements and the proposed Contract Documents, as follows:

    a. Bidding requirements consist of the following:

        1) Notice to Bidders.
        2) Instructions to Bidders.
        3) Bid Form, with attachments.
        4) Proposed Products Form.
        5) Proposed Subcontractors Form.
        6) Proposed Schedule of Values Form.
        7) Bidder's Qualifications Form.

    b. Proposed Contract Documents consist of the following:

        1) Owner-Contractor Agreement.
        2) Conditions of the Contract.
        3) Drawings.
        4) Specifications.
        5) Addenda.

2. Bidding Document Interpretations or Corrections:

    a. Submit requests for Bidding Document interpretation to the Architect, in writing using the provided Pre-Bid Request for Interpretation Form, at least five working days prior to the Bid opening.

    b. Interpretations or corrections will be issued in the form of written Addenda. The Architect will not make oral interpretations or corrections.

    c. Notification of addenda will be transmitted to registered plan holders via email and will be available to download at www.tetratechaeplanroom.com under "public projects".

        1) Failure of any Bidder to not download addenda and/or failure to receive any such Addendum by reason of not having registered as a plan holder in accordance with the bidding instructions, shall not relieve the Bidder from any obligation required by the Addendum.

3. Equivalents and Substitutions: The use of manufacturer's brand names, catalog numbers, and similar proprietary identifying data is intended to establish a standard of quality, appearance, and function for those items. It is not the intention of the Owner or the Architect to eliminate from consideration products that are equivalent in quality, appearance, and function to those identified.

    a. **Equivalents are pre-award and substitutions are post-award.**

    b. Equivalents:

        1) On Proposed Products Form provided, as post-Bid information, identify and list proposed equivalents to specified products as follows:

a) Applicable Specification Section and paragraph.
b) Proposed manufacturer's name, product brand name, and catalog number of proposed equivalent.
c) Note any aspect of the specified product that the proposed equivalent cannot meet.

2) Failure to identify and list proposed equivalents shall be deemed to mean the Bidder will furnish the materials or products indicated in the Contract Documents without exception.

c. Substitutions: Refer to Division 01 Specification Section "Substitution Procedures".

4. Any required plan deposit shall be refunded to Bidders who submit a bona fide Bid and return the hard copy (paper) Bidding Documents in full, and in good condition within thirty days following the award of the contract or the rejection of the bids covered by such Bid Documents. If the Bid Documents are not returned in full, or in good condition, the cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded. Partial reimbursement, in an amount equal to the full amount of such deposit for one set of Bid Documents per non-bidder less the actual cost of reproduction of the Bid Documents as determined by the Architect, shall be made for the return of all other copies of the Bid Documents in good condition within thirty days following the award of the contract or the rejection of the bids covered by such Bid Documents. If the Bid Documents are not returned in full, or in good condition, the cost to replace missing or damaged paper documents will be deducted from the deposit.

ARTICLE 5
BIDDER'S REPRESENTATIONS

1. By submitting a Bid, Bidder represents that:

   a. Bidder has visited and thoroughly inspected the Project site, and has become fully informed of the conditions relating to the Project;
   b. Bidder has received, read, and is thoroughly familiar with the Bidding Documents, including all Addenda issued; and
   c. Bidder has prepared its Bid based on the materials, equipment and systems required by the Bidding Documents or equivalents.

ARTICLE 6
BID CONSIDERATION

1. Opening of Bids: At the designated Bid opening date and time, Bids received will be publicly opened and read aloud.

2. Bid Rejection:

   a. The Owner requires Bids comply with bidding requirements; however, the Owner may, at its discretion, waive informalities in Bids. The Owner is not obligated to do so and does not represent that it will do so. The Owner will not waive informalities which would give one Bidder substantial advantage or benefit not enjoyed by all affected Bidders.

   b. The Owner reserves the right to reject any and all Bids not deemed in the best interests of the Owner, if in its judgment the public interest will be promoted thereby.

c. The Owner reserves the right to reject as "informal" any and all Bids which, in its opinion, are incomplete, conditional, obscure, or contain irregularities of any kind.

d. In rejecting a Bid, the Owner does not forfeit its right to accept the Bid for any other Contract contained in the Project; and the rejection of a Bid is not necessarily a finding by the Owner of any facts or circumstances which would preclude the Bidder from serving as a subcontractor on any portion of the Project.

3. Bid Acceptance: The Owner intends to award the Contract to the responsible Bidder whose Bid complies with conditions to render it formal, who is able to furnish approved surety bonds, and whose Bid is the lowest number of dollars as defined below, including any Alternates, if any.

   a. Lowest Bid may be Base Bid plus any Alternates the Owner desires to accept.
   b. If the acceptance of Alternates does not change the low Bidder, the Owner reserves the right to accept any or all Alternates within 45 days following Notice of Award.

ARTICLE 7
POST-BID INFORMATION

1. Contractor Qualifications: The Owner may make such investigations as it deems necessary to determine the ability of the Bidder to perform the Work.

   a. The Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request, including the provided Bidder's Qualifications Form.

   b. The Owner reserves the right to reject any Bid if the evidence submitted, or investigation of Bidder fails to satisfy the Owner that the Bidder is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.

2. Owner's Financial Capability: Successful Bidder may submit request to Owner for information regarding Owner's financial arrangements for this Project in accordance with the General Conditions, no later than 30 days following the Bid opening.

3. Post-Bid Submittals:

   a. The three apparent low Bidders shall submit the following completed forms within three days following the Bid opening:

      1) Proposed Products Form.
      2) Proposed Subcontractors Form.
      3) Proposed Schedule of Values Form.
      4) Upon request, Bidder's Qualifications Form.

ARTICLE 8
PERFORMANCE BOND AND PAYMENT BOND

1. Bond Requirements:

   a. The successful Bidder shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder.

b. Bonds shall be obtained from a surety satisfactory to the Owner, authorized and licensed to do business in the state where the Project is located, and listed in the latest issue of the U.S. Treasury Circular 570. The amount of each bond shall be equal to 100 percent of the Contract Sum. The sufficiency of the bonds is subject to the approval of the Owner and bonds deemed insufficient by the Owner may be rejected.

c. Affix a certified and current copy of the power of attorney for the attorney-in-fact who executes the required bonds on behalf of the surety.

2. Time of Delivery and Form of Bonds:

a. Deliver required bonds to the Owner not later than the date the Agreement in entered into.

b. Use Performance Bond and Payment Bond, AIA Document A312, unless otherwise approved by the Owner.

ARTICLE 9
MISCELLANEOUS PROVISIONS

1. All applicable laws, ordinances, rules, and regulations of Federal, State, and other authorities having jurisdiction over the Project shall apply to the Contract throughout, and will be deemed included in the Contract as though herein written out in full.

a. Sections of the New York State Labor Law (LL) and the New York State General Municipal Law (GML) include, but are not limited to, the following:

1) LL §220, subd. 2: Eight-hour day, 40-hour week.
2) LL §220, subd. 3 and LL §220-d: Minimum rate of wage and supplement.
3) LL §220-e: Prohibiting discrimination.
4) LL §222-a: Prevention of dust hazards.
5) GML §103-d: Statement of non-collusion in bids.
6) GML §106-b: Payment on public work contracts.
7) GML §108: Workmen's compensation insurance.
8) GML §109: Assignment of public contracts.

2. Time of Completion: Refer to Division 01 Section "Multiple Contract Project Summary – Project Schedule".

Attachment: Pre-Bid Request for Interpretation Form

END OF SECTION 00 21 13

TETRA TECH
ARCHITECTS & ENGINEERS

INSTRUCTIONS TO BIDDERS
ATTACHMENT #1:
PRE-BID REQUEST FOR INTERPRETATION FORM

SUBMIT FORM BY EMAIL TO INE.Cornwall@tetratech.com

Project No.: 363579-22001.3 **Date:**

Project Name: "Phase 3" Reconstruction to Cornwall Elementary School, Cornwall Central Middle School, and Cornwall-on-Hudson Elementary School.

Bidder Contact Person:
Bidder Company Name:
Bidder Phone:
Bidder Email Address:

Question Pertains to:

Drawing Number:
Plan Area:
Room Number:
Drawing Detail Number:
Specification Section:

Question: (Please be specific)

Review by Architect/Engineers: **Responded By:** _____ **Date:** _____

Submit requests not less than 5 working days prior to the specified Bid Opening date and time. In the event that this question requires clarification or modification of the Bidding Documents, such written information can only be provided by formal Addendum, distributed to all plan holders.

TETRA TECH
ARCHITECTS & ENGINEERS

10 Brown Road
Ithaca, New York 14850
(607) 277-7100

Ithaca, New York
Farmingdale, New York
Albany, New York

BID FROM (Bidder's Name) : _____

(Address) : _____

_____

Bidder's Telephone : _____

Bidder's Facsimile (Fax) : _____

Bidder's E-mail Address (if applicable) : _____

BID FORM
(submit in duplicate)

CONTRACT: CONTRACT 1 GC – GENERAL CONSTRUCTION WORK

PROJECT TITLE: PHASE 3 RECONSTRUCTION TO
CORNWALL-ON-HUDSON ELEMENTARY SCHOOL
CORNWALL ELEMENTARY SCHOOL
CORNWALL CENTRAL MIDDLE SCHOOL

DATE: JUNE 28, 2024

PROJECT NO.: 363579-22001.3

BID TO: CORNWALL CENTRAL SCHOOL DISTRICT
24 IDLEWILD AVE.
CORNWALL-ON-HUDSON, NEW YORK 12520

The Bidder hereby certifies that it has examined and fully understands the requirements and intent of the Bidding Documents, including the Bidding Requirements and proposed Contract Documents; and proposes to furnish all labor, materials, and equipment necessary to complete the Work on, or before, the dates specified in the Contract Documents for the **BASE BID** sum of:

_____
(words)

_____ ($_____)
(figures)

Show all amounts in both words and figures; in the event of a discrepancy between amounts written in words and figures, the amount written in words shall govern.

Refer to Division 01 Section "Allowances" for description of allowances to be included in the Base Bid above.

ALTERNATES

Indicate in the spaces provided below the amount to be added to or the amount to be deducted from (as applicable) the Base Bid if the Owner accepts the following Alternates described in Division 01 Section "Alternates".

Include in the amount of each Alternate, all labor, materials, overhead and profit, modification of Work specified in the Contract Documents, and additional work that may be required by acceptance of the Alternate.

ALTERNATE NO. B2 - SECOND & THIRD FLOOR RESTROOM RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

ALTERNATE NO. D1 - C-WING RESTROOMS RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

ALTERNATE NO. D2 - A-WING RESTROOMS RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

ALTERNATE NO. D3 - D-WING RESTROOMS RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

UNIT PRICES

Refer to Division 01 Section "Unit Prices" for description of unit prices.

Unit Price No. GC-UP-1 - Abatement Tents

Unit of Measure: Per one (1) tent measuring 10 ft. x 10 ft. x 10 ft

Cost per Unit:

_____ ($_____)
(words) (figures)

Unit Price No. GC-UP-2 - Glove Bag Removal

Unit of Measure: Per one (1) glove bag.

Cost per Unit:

_____ ($_____)
(words) (figures)

Unit Price No. GC-UP-3 - Pipe Abatement

Unit of Measure: Per one (1) linear foot.

Cost per Unit:

_____ ($_____)
(words) (figures)

Unit Price No. GC-UP-4 - Ceramic Mosaic Floor Tile

Unit of Measure: Per one (1) square foot installed.

Cost per Unit:

_____ ($_____)
(words) (figures)

Unit Price GC-UP-5 - Glazed Wall Tile

Unit of Measure: Per one (1) square foot installed.

Cost per Unit:

_____ ($_____)
(words) (figures)

Unit Price GC-UP-6 - Cast-In-Place Concrete

Unit of Measure: Per one (1) cubic yard installed.

Cost per Unit:

_____ ($_____)

(words) (figures)

Unit Price GC-UP-7 - Interior Painting

Unit of Measure: Per 500 sf. of interior painting.

Cost per Unit:

_____ ($_____)

(words) (figures)

LIST OF ADDENDA RECEIVED

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

BID ATTACHMENTS

Enclosed with this Bid are the following attachments:

Attachment #1 - Non-Collusive Bidding Certification.
Attachment #2 - Certified Corporate Resolution.
Attachment #3 – Iranian Energy Divestment Certification
Attachment #4 – Certification on Violations

BID SECURITY

Enclosed with this Bid is bid security in the amount of five percent of the Base Bid.

EXECUTION OF CONTRACT

If written notice of the acceptance of this Bid is transmitted to the undersigned within 45 days following the Bid opening, the undersigned will, within 10 days following the Notice of Award, execute and transmit a Contract in the form as required by the Architect.

This Bid may be withdrawn at any time prior to the Bid opening.

SIGNATURE

( ) NAME OF BIDDER (Corporate Name)
( )
( ) _____
(Corporate Seal)
( ) SIGNATURE (Corporate Officer)
( )
( ) _____
( )
( ) DATE: _____

BID FORM
ATTACHMENT #1

GENERAL CONDITIONS TO BID
NON-COLLUSIVE BIDDING CERTIFICATION

No bid will be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(a) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or any competitor;

(b) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor;

(c) No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition;

(d) The person signing this bid or proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in its behalf;

(e) That attached hereto (if corporate bidder) is a certified copy of resolution authorizing the execution of this certified by the signature of this bid or proposal in behalf of the corporate bidder.

_____
(Individual)

_____
(Corporation)

Dated:_____ By _____
(Signature of Officer)

This Non-Collusive Bidding Certificate must be submitted with the bid.

BID FORM
ATTACHMENT #2

CERTIFIED CORPORATE RESOLUTION

RESOLVED THAT _____ be authorized to sign and submit the bid or proposal of this corporation for the following project:

_____

_____

and to include in such bid or proposal the certificate as to non-collusion required by section one hundred three-d (103-d) of the general municipal law as to the act and deed of such corporation, and for any inaccuracies or mis-statements in such certificate this corporate bidder shall be liable under the penalties of perjury.

The foregoing is a true and correct copy of the resolution and adopted by

_____ at a meeting of its board of directors held on the

_____ day of _____ 20__ .

_____
(Secretary)

BID FORM
ATTACHMENT #3

IRANIAN ENERGY DIVESTMENT CERTIFICATION

Pursuant to Section 103-g
Of the New York State
General Municipal Law

A. By submission of this bid/proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.

B. A Bid/Proposal shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the bidder/proposer cannot make the foregoing certification set forth in Paragraph A above, the bidder/proposer shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid/proposal is made, or his designee, may award a bid/proposal, on a case-by-case business under the following circumstances:

1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or

2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

_____
Signature

_____
Title

_____ _____
Date Company

BID FORM
ATTACHMENT #4

CERTIFICATION ON VIOLATIONS

_____, a representative of _____, hereby swears to and certifies that, to the best of his or her knowledge and belief:

1. Neither _____, nor any substantially owned-affiliated entity of the Bidder (collectively the "Bidder"), has been found to be in violation of the Davis-Bacon Act pursuant to 40 U.S.C. 3144, the Copeland Act pursuant to 18 U.S.C. 874 and 40 U.S.C. 3145 or the Contract Work Hours and Safety Standards Act pursuant to 40 U.S.C. 332, or their New York State counterparts.

   ☐ True ☐ False

   If False is selected, information for questions 2 and 3 must be provided. If True is selected questions 2 and 3 are not applicable, continue to question 4.

2. If the Bidder has been found to be in violation of the Davis-Bacon Act, the Copeland Act, the Contract Work Hours and Safety Standards Act, or any of their New York State counterparts, state the name of the agency, the date of the violation, the nature of the violation and any consequence of the violation, including warnings, fines and debarments below.

   _____

   _____

   _____

   _____

3. The Bidder is not currently under investigation by any local, state or federal government agency. If Bidder is under investigation, state the name of the agency, the date of the alleged violation and the nature of the alleged violation below.

   _____

   _____

   _____

   _____

4. The Bidder's Dun & Bradstreet D-U-N-S number is _____.

5. I have authority to execute this certification, knowing it will be relied upon by the Owner of this Project.

_____ _____
Name Title

Sworn to before me this _____day of _____, 20__.

_____
Notary Public

TETRA TECH
ARCHITECTS & ENGINEERS

10 Brown Road
Ithaca, New York 14850
(607) 277-7100

Ithaca, New York
Farmingdale, New York
Albany, New York

BID FROM (Bidder's Name) : _____

(Address) : _____

_____

Bidder's Telephone : _____

Bidder's Facsimile (Fax) : _____

Bidder's E-mail Address (if applicable) : _____

BID FORM
(submit in duplicate)

CONTRACT: CONTRACT 2 MPC – MECHANICAL & PLUMBING CONSTRUCTION WORK

PROJECT TITLE: PHASE 3 RECONSTRUCTION TO
CORNWALL-ON-HUDSON ELEMENTARY SCHOOL
CORNWALL ELEMENTARY SCHOOL
CORNWALL CENTRAL MIDDLE SCHOOL

DATE: JUNE 28, 2024

PROJECT NO.: 363579-22001.3

BID TO: CORNWALL CENTRAL SCHOOL DISTRICT
24 IDLEWILD AVE.
CORNWALL-ON-HUDSON, NEW YORK 12520

The Bidder hereby certifies that it has examined and fully understands the requirements and intent of the Bidding Documents, including the Bidding Requirements and proposed Contract Documents; and proposes to furnish all labor, materials, and equipment necessary to complete the Work on, or before, the dates specified in the Contract Documents for the **BASE BID** sum of:

_____
(words)

_____ ($_____)
(figures)

Show all amounts in both words and figures; in the event of a discrepancy between amounts written in words and figures, the amount written in words shall govern.

Refer to Division 01 Section "Allowances" for description of allowances to be included in the Base Bid above.

ALTERNATES

Indicate in the spaces provided below the amount to be added to or the amount to be deducted from (as applicable) the Base Bid if the Owner accepts the following Alternates described in Division 01 Section "Alternates".

Include in the amount of each Alternate, all labor, materials, overhead and profit, modification of Work specified in the Contract Documents, and additional work that may be required by acceptance of the Alternate.

ALTERNATE NO. B2 - SECOND & THIRD FLOOR RESTROOM RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

ALTERNATE NO. D1 - C-WING RESTROOMS RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

ALTERNATE NO. D2 - A-WING RESTROOMS RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

ALTERNATE NO. D3 - D-WING RESTROOMS RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

LIST OF ADDENDA RECEIVED

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

BID ATTACHMENTS

Enclosed with this Bid are the following attachments:

Attachment #1 - Non-Collusive Bidding Certification.
Attachment #2 - Certified Corporate Resolution.
Attachment #3 – Iranian Energy Divestment Certification
Attachment #4 – Certification on Violations

BID SECURITY

Enclosed with this Bid is bid security in the amount of five percent of the Base Bid.

EXECUTION OF CONTRACT

If written notice of the acceptance of this Bid is transmitted to the undersigned within 45 days following the Bid opening, the undersigned will, within 10 days following the Notice of Award, execute and transmit a Contract in the form as required by the Architect.

This Bid may be withdrawn at any time prior to the Bid opening.

SIGNATURE

( ) NAME OF BIDDER (Corporate Name)
( )
( ) _____
(Corporate Seal)
( ) SIGNATURE (Corporate Officer)
( )
( ) _____
( )
( ) DATE: _____

BID FORM
ATTACHMENT #1

GENERAL CONDITIONS TO BID
NON-COLLUSIVE BIDDING CERTIFICATION

No bid will be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(a) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or any competitor;

(b) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor;

(c) No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition;

(d) The person signing this bid or proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in its behalf;

(e) That attached hereto (if corporate bidder) is a certified copy of resolution authorizing the execution of this certified by the signature of this bid or proposal in behalf of the corporate bidder.

_____
(Individual)

_____
(Corporation)

Dated:_____ By _____
(Signature of Officer)

This Non-Collusive Bidding Certificate must be submitted with the bid.

BID FORM
ATTACHMENT #2

CERTIFIED CORPORATE RESOLUTION

RESOLVED THAT _____ be authorized to sign and submit the bid or proposal of this corporation for the following project:

_____

_____

and to include in such bid or proposal the certificate as to non-collusion required by section one hundred three-d (103-d) of the general municipal law as to the act and deed of such corporation, and for any inaccuracies or mis-statements in such certificate this corporate bidder shall be liable under the penalties of perjury.

The foregoing is a true and correct copy of the resolution and adopted by

_____ at a meeting of its board of directors held on the

_____ day of _____ 20__ .

_____
(Secretary)

BID FORM
ATTACHMENT #3

IRANIAN ENERGY DIVESTMENT CERTIFICATION

Pursuant to Section 103-g
Of the New York State
General Municipal Law

A. By submission of this bid/proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.

B. A Bid/Proposal shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the bidder/proposer cannot make the foregoing certification set forth in Paragraph A above, the bidder/proposer shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid/proposal is made, or his designee, may award a bid/proposal, on a case-by-case business under the following circumstances:

1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or

2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

_____
Signature

_____
Title

_____ _____
Date Company

BID FORM
ATTACHMENT #4

CERTIFICATION ON VIOLATIONS

_____, a representative of _____, hereby swears to and certifies that, to the best of his or her knowledge and belief:

1. Neither _____, nor any substantially owned-affiliated entity of the Bidder (collectively the "Bidder"), has been found to be in violation of the Davis-Bacon Act pursuant to 40 U.S.C. 3144, the Copeland Act pursuant to 18 U.S.C. 874 and 40 U.S.C. 3145 or the Contract Work Hours and Safety Standards Act pursuant to 40 U.S.C. 332, or their New York State counterparts.

   ☐ True ☐ False

   If False is selected, information for questions 2 and 3 must be provided. If True is selected questions 2 and 3 are not applicable, continue to question 4.

2. If the Bidder has been found to be in violation of the Davis-Bacon Act, the Copeland Act, the Contract Work Hours and Safety Standards Act, or any of their New York State counterparts, state the name of the agency, the date of the violation, the nature of the violation and any consequence of the violation, including warnings, fines and debarments below.

   _____

   _____

   _____

   _____

3. The Bidder is not currently under investigation by any local, state or federal government agency. If Bidder is under investigation, state the name of the agency, the date of the alleged violation and the nature of the alleged violation below.

   _____

   _____

   _____

   _____

4. The Bidder's Dun & Bradstreet D-U-N-S number is _____.

5. I have authority to execute this certification, knowing it will be relied upon by the Owner of this Project.

_____ _____
Name Title

Sworn to before me this _____day of _____, 20__.

_____
Notary Public

TETRA TECH
ARCHITECTS & ENGINEERS

10 Brown Road
Ithaca, New York 14850
(607) 277-7100

Ithaca, New York
Farmingdale, New York
Albany, New York

BID FROM (Bidder's Name) : _____

(Address) : _____

_____

Bidder's Telephone : _____

Bidder's Facsimile (Fax) : _____

Bidder's E-mail Address (if applicable) : _____

BID FORM
(submit in duplicate)

CONTRACT: CONTRACT 3 EC – ELECTRICAL CONSTRUCTION WORK

PROJECT TITLE: PHASE 3 RECONSTRUCTION TO
CORNWALL-ON-HUDSON ELEMENTARY SCHOOL
CORNWALL ELEMENTARY SCHOOL
CORNWALL CENTRAL MIDDLE SCHOOL

DATE: JUNE 28, 2024

PROJECT NO.: 363579-22001.3

BID TO: CORNWALL CENTRAL SCHOOL DISTRICT
24 IDLEWILD AVE.
CORNWALL-ON-HUDSON, NEW YORK 12520

The Bidder hereby certifies that it has examined and fully understands the requirements and intent of the Bidding Documents, including the Bidding Requirements and proposed Contract Documents; and proposes to furnish all labor, materials, and equipment necessary to complete the Work on, or before, the dates specified in the Contract Documents for the **BASE BID** sum of:

_____
(words)

_____ ($_____)
(figures)

Show all amounts in both words and figures; in the event of a discrepancy between amounts written in words and figures, the amount written in words shall govern.

Refer to Division 01 Section "Allowances" for description of allowances to be included in the Base Bid above.

ALTERNATES

Indicate in the spaces provided below the amount to be added to or the amount to be deducted from (as applicable) the Base Bid if the Owner accepts the following Alternates described in Division 01 Section "Alternates".

Include in the amount of each Alternate, all labor, materials, overhead and profit, modification of Work specified in the Contract Documents, and additional work that may be required by acceptance of the Alternate.

ALTERNATE NO. B2 - SECOND & THIRD FLOOR RESTROOM RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

ALTERNATE NO. D1 - C-WING RESTROOMS RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

ALTERNATE NO. D2 - A-WING RESTROOMS RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

ALTERNATE NO. D3 - D-WING RESTROOMS RECONSTRUCTION ADDITIONAL WORK

ADD to the Base Bid the sum of:

_____ ($_____)

(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)

(words) (figures)

LIST OF ADDENDA RECEIVED

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

BID ATTACHMENTS

Enclosed with this Bid are the following attachments:

Attachment #1 - Non-Collusive Bidding Certification.
Attachment #2 - Certified Corporate Resolution.
Attachment #3 – Iranian Energy Divestment Certification
Attachment #4 – Certification on Violations

BID SECURITY

Enclosed with this Bid is bid security in the amount of five percent of the Base Bid.

EXECUTION OF CONTRACT

If written notice of the acceptance of this Bid is transmitted to the undersigned within 45 days following the Bid opening, the undersigned will, within 10 days following the Notice of Award, execute and transmit a Contract in the form as required by the Architect.

This Bid may be withdrawn at any time prior to the Bid opening.

SIGNATURE

( ) NAME OF BIDDER (Corporate Name)
( )
( ) _____
(Corporate Seal)
( ) SIGNATURE (Corporate Officer)
( )
( ) _____
( )
( ) DATE: _____

BID FORM
ATTACHMENT #1

GENERAL CONDITIONS TO BID
NON-COLLUSIVE BIDDING CERTIFICATION

No bid will be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(a) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or any competitor;

(b) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor;

(c) No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition;

(d) The person signing this bid or proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in its behalf;

(e) That attached hereto (if corporate bidder) is a certified copy of resolution authorizing the execution of this certified by the signature of this bid or proposal in behalf of the corporate bidder.

_____
(Individual)

_____
(Corporation)

Dated:_____ By _____
(Signature of Officer)

This Non-Collusive Bidding Certificate must be submitted with the bid.

BID FORM
ATTACHMENT #2

CERTIFIED CORPORATE RESOLUTION

RESOLVED THAT _____ be authorized to sign and submit the bid or proposal of this corporation for the following project:

_____

_____

and to include in such bid or proposal the certificate as to non-collusion required by section one hundred three-d (103-d) of the general municipal law as to the act and deed of such corporation, and for any inaccuracies or mis-statements in such certificate this corporate bidder shall be liable under the penalties of perjury.

The foregoing is a true and correct copy of the resolution and adopted by

_____ at a meeting of its board of directors held on the

_____ day of _____ 20__ .

_____
(Secretary)

BID FORM
ATTACHMENT #3

IRANIAN ENERGY DIVESTMENT CERTIFICATION

Pursuant to Section 103-g
Of the New York State
General Municipal Law

A. By submission of this bid/proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.

B. A Bid/Proposal shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the bidder/proposer cannot make the foregoing certification set forth in Paragraph A above, the bidder/proposer shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid/proposal is made, or his designee, may award a bid/proposal, on a case-by-case business under the following circumstances:

1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or

2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

_____
Signature

_____
Title

_____ _____
Date Company

BID FORM
ATTACHMENT #4

CERTIFICATION ON VIOLATIONS

_____, a representative of _____, hereby swears to and certifies that, to the best of his or her knowledge and belief:

1. Neither _____, nor any substantially owned-affiliated entity of the Bidder (collectively the "Bidder"), has been found to be in violation of the Davis-Bacon Act pursuant to 40 U.S.C. 3144, the Copeland Act pursuant to 18 U.S.C. 874 and 40 U.S.C. 3145 or the Contract Work Hours and Safety Standards Act pursuant to 40 U.S.C. 332, or their New York State counterparts.

   ☐ True ☐ False

   If False is selected, information for questions 2 and 3 must be provided. If True is selected questions 2 and 3 are not applicable, continue to question 4.

2. If the Bidder has been found to be in violation of the Davis-Bacon Act, the Copeland Act, the Contract Work Hours and Safety Standards Act, or any of their New York State counterparts, state the name of the agency, the date of the violation, the nature of the violation and any consequence of the violation, including warnings, fines and debarments below.

   _____

   _____

   _____

   _____

3. The Bidder is not currently under investigation by any local, state or federal government agency. If Bidder is under investigation, state the name of the agency, the date of the alleged violation and the nature of the alleged violation below.

   _____

   _____

   _____

   _____

4. The Bidder's Dun & Bradstreet D-U-N-S number is _____.

5. I have authority to execute this certification, knowing it will be relied upon by the Owner of this Project.

_____ _____
Name Title

Sworn to before me this _____day of _____, 20__.

_____
Notary Public

TETRA TECH
ARCHITECTS & ENGINEERS

10 Brown Road
Ithaca, New York 14850
(607) 277-7100

Ithaca, New York
Farmingdale, New York
Albany, New York

BID FROM (Bidder's Name) : _____

(Address) : _____

_____

Bidder's Telephone : _____

Bidder's Facsimile (Fax) : _____

Bidder's E-mail Address (if applicable) : _____

BID FORM
(submit in duplicate)

CONTRACT: CONTRACT 4 WC/AA – WINDOW & ABATEMENT OF HAZARDOUS MATERIAL CONSTRUCTION WORK

PROJECT TITLE: PHASE 3 RECONSTRUCTION TO
CORNWALL-ON-HUDSON ELEMENTARY SCHOOL
CORNWALL ELEMENTARY SCHOOL
CORNWALL CENTRAL MIDDLE SCHOOL

DATE: JUNE 28, 2024

PROJECT NO.: 363579-22001.3

BID TO: CORNWALL CENTRAL SCHOOL DISTRICT
24 IDLEWILD AVE.
CORNWALL-ON-HUDSON, NEW YORK 12520

The Bidder hereby certifies that it has examined and fully understands the requirements and intent of the Bidding Documents, including the Bidding Requirements and proposed Contract Documents; and proposes to furnish all labor, materials, and equipment necessary to complete the Work on, or before, the dates specified in the Contract Documents for the **BASE BID** sum of:

_____
(words)

_____ ($_____)
(figures)

Show all amounts in both words and figures; in the event of a discrepancy between amounts written in words and figures, the amount written in words shall govern.

Refer to Division 01 Section "Allowances" for description of allowances to be included in the Base Bid above.

ALTERNATES

Indicate in the spaces provided below the amount to be added to or the amount to be deducted from (as applicable) the Base Bid if the Owner accepts the following Alternates described in Division 01 Section "Alternates".

Include in the amount of each Alternate, all labor, materials, overhead and profit, modification of Work specified in the Contract Documents, and additional work that may be required by acceptance of the Alternate.

ALTERNATE NO. B3 – WINDOW LINTEL PAINT

ADD to the Base Bid the sum of:

_____ ($_____)
(words) (figures)

OR

DEDUCT from the Base Bid the sum of:

_____ ($_____)
(words) (figures)

UNIT PRICES

Refer to Division 01 Section "Unit Prices" for description of unit prices.

Unit Price No. WC/AA-UP-1 - Caulk Abatement

Unit of Measure: Per one (1) linear foot.

Cost per Unit:

_____ ($_____)

(words) (figures)

Unit Price No. WC/AA-UP-2 - Steel Lintel Replacement Work

Unit of Measure: Per one Window Type W1 masonry opening.

Cost per Unit:

_____ ($_____)

(words) (figures)

LIST OF ADDENDA RECEIVED

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

BID ATTACHMENTS

Enclosed with this Bid are the following attachments:

Attachment #1 - Non-Collusive Bidding Certification.
Attachment #2 - Certified Corporate Resolution.
Attachment #3 – Iranian Energy Divestment Certification
Attachment #4 – Certification on Violations

BID SECURITY

Enclosed with this Bid is bid security in the amount of five percent of the Base Bid.

EXECUTION OF CONTRACT

If written notice of the acceptance of this Bid is transmitted to the undersigned within 45 days following the Bid opening, the undersigned will, within 10 days following the Notice of Award, execute and transmit a Contract in the form as required by the Architect.

This Bid may be withdrawn at any time prior to the Bid opening.

SIGNATURE

( ) NAME OF BIDDER (Corporate Name)
( )
( ) _____
(Corporate Seal)
( ) SIGNATURE (Corporate Officer)
( )
( ) _____
( )
( ) DATE: _____

BID FORM
ATTACHMENT #1

GENERAL CONDITIONS TO BID
NON-COLLUSIVE BIDDING CERTIFICATION

No bid will be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(a) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or any competitor;

(b) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor;

(c) No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition;

(d) The person signing this bid or proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in its behalf;

(e) That attached hereto (if corporate bidder) is a certified copy of resolution authorizing the execution of this certified by the signature of this bid or proposal in behalf of the corporate bidder.

_____
(Individual)

_____
(Corporation)

Dated:_____ By _____
(Signature of Officer)

This Non-Collusive Bidding Certificate must be submitted with the bid.

BID FORM
ATTACHMENT #2

CERTIFIED CORPORATE RESOLUTION

RESOLVED THAT _____ be authorized to sign and submit the bid or proposal of this corporation for the following project:

_____

_____

and to include in such bid or proposal the certificate as to non-collusion required by section one hundred three-d (103-d) of the general municipal law as to the act and deed of such corporation, and for any inaccuracies or mis-statements in such certificate this corporate bidder shall be liable under the penalties of perjury.

The foregoing is a true and correct copy of the resolution and adopted by

_____ at a meeting of its board of directors held on the

_____ day of _____ 20__ .

_____
(Secretary)

BID FORM
ATTACHMENT #3

IRANIAN ENERGY DIVESTMENT CERTIFICATION

Pursuant to Section 103-g
Of the New York State
General Municipal Law

A. By submission of this bid/proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.

B. A Bid/Proposal shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the bidder/proposer cannot make the foregoing certification set forth in Paragraph A above, the bidder/proposer shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid/proposal is made, or his designee, may award a bid/proposal, on a case-by-case business under the following circumstances:

1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or

2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

_____
Signature

_____
Title

_____ _____
Date Company

BID FORM
ATTACHMENT #4

CERTIFICATION ON VIOLATIONS

_____, a representative of _____, hereby swears to and certifies that, to the best of his or her knowledge and belief:

1. Neither _____, nor any substantially owned-affiliated entity of the Bidder (collectively the "Bidder"), has been found to be in violation of the Davis-Bacon Act pursuant to 40 U.S.C. 3144, the Copeland Act pursuant to 18 U.S.C. 874 and 40 U.S.C. 3145 or the Contract Work Hours and Safety Standards Act pursuant to 40 U.S.C. 332, or their New York State counterparts.

   ☐ True ☐ False

   If False is selected, information for questions 2 and 3 must be provided. If True is selected questions 2 and 3 are not applicable, continue to question 4.

2. If the Bidder has been found to be in violation of the Davis-Bacon Act, the Copeland Act, the Contract Work Hours and Safety Standards Act, or any of their New York State counterparts, state the name of the agency, the date of the violation, the nature of the violation and any consequence of the violation, including warnings, fines and debarments below.

   _____

   _____

   _____

   _____

3. The Bidder is not currently under investigation by any local, state or federal government agency. If Bidder is under investigation, state the name of the agency, the date of the alleged violation and the nature of the alleged violation below.

   _____

   _____

   _____

   _____

4. The Bidder's Dun & Bradstreet D-U-N-S number is _____.

5. I have authority to execute this certification, knowing it will be relied upon by the Owner of this Project.

_____ _____
Name Title

Sworn to before me this _____day of _____, 20__.

_____
Notary Public

TETRA TECH
ARCHITECTS & ENGINEERS

10 Brown Road
Ithaca, New York 14850
(607) 277-7100

Ithaca, New York
Farmingdale, New York
Albany, New York

BID FROM (Bidder's Name) : _____

(Address) : _____

_____

Bidder's Telephone : _____

Bidder's Facsimile (Fax) : _____

Bidder's E-mail Address (if applicable) : _____

BID FORM
(submit in duplicate)

CONTRACT: CONTRACT 5 SC – SITE CONSTRUCTION WORK

PROJECT TITLE: PHASE 3 RECONSTRUCTION TO
CORNWALL-ON-HUDSON ELEMENTARY SCHOOL
CORNWALL ELEMENTARY SCHOOL
CORNWALL CENTRAL MIDDLE SCHOOL

DATE: JUNE 28, 2024

PROJECT NO.: 363579-22001.3

BID TO: CORNWALL CENTRAL SCHOOL DISTRICT
24 IDLEWILD AVE.
CORNWALL-ON-HUDSON, NEW YORK 12520

The Bidder hereby certifies that it has examined and fully understands the requirements and intent of the Bidding Documents, including the Bidding Requirements and proposed Contract Documents; and proposes to furnish all labor, materials, and equipment necessary to complete the Work on, or before, the dates specified in the Contract Documents for the **BASE BID** sum of:

_____
(words)

_____ ($_____)
(figures)

Show all amounts in both words and figures; in the event of a discrepancy between amounts written in words and figures, the amount written in words shall govern.

Refer to Division 01 Section "Allowances" for description of allowances to be included in the Base Bid above.

UNIT PRICES

Refer to Division 01 Section "Unit Prices" for description of unit prices.

Unit Price No. SC-UP-1 - Unsuitable Soils

Unit of Measure: Per one (1) cubic yard.

Cost per Unit:

_____ ($_____)
(words) (figures)

Unit Price No. SC-UP-2 - Mass Rock Removal

Unit of Measure: Per one (1) cubic yard in place.

Cost per Unit:

_____ ($_____)
(words) (figures)

Unit Price No. SC-UP-3 - Hot-Mix Asphalt Paving Top Course

Unit of Measure: Per one (1) ton.

Cost per Unit:

_____ ($_____)
(words) (figures)

Unit Price No. SC-UP-4 - Hot-Mix Asphalt Paving Binder Course

Unit of Measure: Per one (1) ton installed.

Cost per Unit:

_____ ($_____)
(words) (figures)

Unit Price No. SC-UP-5 - Import Clean Fill Suitable Soils

Unit of Measure: Per one (1) cubic yard.

Cost per Unit:

_____ ($_____)

(words) (figures)

Unit Price No. SC-UP-6 - Concrete Paving

Unit of Measure: Per one (1) cubic yard installed.

Cost per Unit:

_____ ($_____)

(words) (figures)

LIST OF ADDENDA RECEIVED

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

No. _____ Date_____ No. _____ Date _____

BID ATTACHMENTS

Enclosed with this Bid are the following attachments:

Attachment #1 - Non-Collusive Bidding Certification.
Attachment #2 - Certified Corporate Resolution.
Attachment #3 – Iranian Energy Divestment Certification
Attachment #4 – Certification on Violations

BID SECURITY

Enclosed with this Bid is bid security in the amount of five percent of the Base Bid.

EXECUTION OF CONTRACT

If written notice of the acceptance of this Bid is transmitted to the undersigned within 45 days following the Bid opening, the undersigned will, within 10 days following the Notice of Award, execute and transmit a Contract in the form as required by the Architect.

This Bid may be withdrawn at any time prior to the Bid opening.

SIGNATURE

( ) NAME OF BIDDER (Corporate Name)
( )
( ) _____
(Corporate Seal)
( ) SIGNATURE (Corporate Officer)
( )
( ) _____
( )
( ) DATE: _____

BID FORM
ATTACHMENT #1

GENERAL CONDITIONS TO BID
NON-COLLUSIVE BIDDING CERTIFICATION

No bid will be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(a) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or any competitor;

(b) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor;

(c) No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition;

(d) The person signing this bid or proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in its behalf;

(e) That attached hereto (if corporate bidder) is a certified copy of resolution authorizing the execution of this certified by the signature of this bid or proposal in behalf of the corporate bidder.

_____
(Individual)

_____
(Corporation)

Dated:_____ By _____
(Signature of Officer)

This Non-Collusive Bidding Certificate must be submitted with the bid.

BID FORM
ATTACHMENT #2

CERTIFIED CORPORATE RESOLUTION

RESOLVED THAT _____ be authorized to sign and submit the bid or proposal of this corporation for the following project:

_____

_____

and to include in such bid or proposal the certificate as to non-collusion required by section one hundred three-d (103-d) of the general municipal law as to the act and deed of such corporation, and for any inaccuracies or mis-statements in such certificate this corporate bidder shall be liable under the penalties of perjury.

The foregoing is a true and correct copy of the resolution and adopted by

_____ at a meeting of its board of directors held on the

_____ day of _____ 20__ .

_____
(Secretary)

BID FORM
ATTACHMENT #3

IRANIAN ENERGY DIVESTMENT CERTIFICATION

Pursuant to Section 103-g
Of the New York State
General Municipal Law

A. By submission of this bid/proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.

B. A Bid/Proposal shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the bidder/proposer cannot make the foregoing certification set forth in Paragraph A above, the bidder/proposer shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid/proposal is made, or his designee, may award a bid/proposal, on a case-by-case business under the following circumstances:

1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder/Proposer has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or

2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

_____
Signature

_____
Title

_____ _____
Date Company

BID FORM
ATTACHMENT #4

CERTIFICATION ON VIOLATIONS

_____, a representative of _____, hereby swears to and certifies that, to the best of his or her knowledge and belief:

1. Neither _____, nor any substantially owned-affiliated entity of the Bidder (collectively the "Bidder"), has been found to be in violation of the Davis-Bacon Act pursuant to 40 U.S.C. 3144, the Copeland Act pursuant to 18 U.S.C. 874 and 40 U.S.C. 3145 or the Contract Work Hours and Safety Standards Act pursuant to 40 U.S.C. 332, or their New York State counterparts.

   ☐ True ☐ False

   If False is selected, information for questions 2 and 3 must be provided. If True is selected questions 2 and 3 are not applicable, continue to question 4.

2. If the Bidder has been found to be in violation of the Davis-Bacon Act, the Copeland Act, the Contract Work Hours and Safety Standards Act, or any of their New York State counterparts, state the name of the agency, the date of the violation, the nature of the violation and any consequence of the violation, including warnings, fines and debarments below.

   _____

   _____

   _____

   _____

3. The Bidder is not currently under investigation by any local, state or federal government agency. If Bidder is under investigation, state the name of the agency, the date of the alleged violation and the nature of the alleged violation below.

   _____

   _____

   _____

   _____

4. The Bidder's Dun & Bradstreet D-U-N-S number is _____.

5. I have authority to execute this certification, knowing it will be relied upon by the Owner of this Project.

_____ _____
Name Title

Sworn to before me this _____day of _____, 20__.

_____
Notary Public

NAME OF BIDDER_____

PROPOSED PRODUCTS FORM

SUBMITTED BY THREE LOW BIDDERS WITHIN THREE DAYS FOLLOWING BID OPENING

In accordance with Articles 4 and 6 of the Instructions to Bidders, list specified products and corresponding proposed equivalent products below. Include additional pages as necessary.

Attach additional sheet explaining any aspect of the Contract Documents that cannot be complied with by the manufacturer or supplier of the proposed equivalent product.

Specified Product	**Equivalent Product**
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Product Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Product Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Product Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Product Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Product Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Product Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Product Designation: _____

NAME OF BIDDER_____

PROPOSED SUBCONTRACTORS FORM

SUBMITTED BY THREE LOW BIDDERS
WITHIN THREE DAYS FOLLOWING BID OPENING

Review of proposed subcontractors shall be in accordance with Article 5.2 of the General Conditions.

Instructions:

1. List below name of each subcontractor whose figures have been used in preparing the Bid, and to whom a subcontract is expected to be awarded, upon Architect's review, should the Contract be awarded to the Bidder.

2. For each subcontractor, identify the Specification section(s) included in that subcontract.

Subcontractor Name	**Specification Section**

NAME OF BIDDER_____

PROPOSED SCHEDULE OF VALUES FORM

SUBMITTED BY THREE LOW BIDDERS WITHIN THREE DAYS FOLLOWING BID OPENING

For the convenience of the Owner's preliminary analysis of the Bid, list the value of the Work included in the Base Bid sum for each building:

Cornwall Elementary School:

Alterations - Building:..... $ _____

Site Work:..... $ _____

Cornwall Central Middle School:

Alterations - Building:..... $ _____

Site Work:..... $ _____

Cornwall-on-Hudson Elementary School

Alterations - Building:..... $ _____

Total Base Bid..... $ _____

NAME OF BIDDER_____

BIDDER'S QUALIFICATIONS FORM

NOTARIZED AND SUBMITTED BY THREE LOW BIDDERS
WITHIN THREE DAYS FOLLOWING BID OPENING
UPON REQUEST BY ARCHITECT

All questions must be answered and the data given must be clear and comprehensive. If necessary, questions may be answered on separate attached sheet.

1. Name of Bidder:

2. Permanent main office address:

3. When organized:

4. If a corporation, where incorporated:

5. How many years have you been engaged in the contracting business under your present firm or trade name?

6. Contracts on hand: (List these, showing amount of each contract and the appropriate anticipated dates of completion.)

7. General character of work performed by your company:

8. Have you ever failed to complete any work awarded to you?

   If so, where and why?

9. Have you ever defaulted on a contract?

   If so, where and why?

10. List the more important projects recently completed by your company, stating the approximate cost for each, and the month and year completed.

11. List your major equipment available for this Contract.

12. List your experience in work similar to this project.

13. List the background and experience of the principal members of your organization, including officers.

14. List the work to be performed by Subcontractors and summarize the dollar value of each Subcontract.

15. Credit available: $

16. Give bank reference:

17. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Owner?

18. The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by the Owner in verification of the recitals comprising this Bidder's Qualifications Form.

Dated _____this _____ date of _____, 20__ .

_____
(Name of Bidder)

By _____

Title _____

State of _____)
) ss.

County of _____

_____ being duly sworn deposes and says that he is _____

_____ of _____

_____
(Name of Organization)

and that the answers to the foregoing questions and all statements therein contained are true and correct.

Subscribed and sworn to before me

this _____ day of_____, 20___

My commission expires _____, 20___

AIA® Document A232® – 2019

General Conditions of the Contract for Construction, *Construction Manager as Adviser Edition*

for the following PROJECT:
(Name, and location or address)
Reconstruction to
Cornwall Elementary School
Cornwall-On-Hudson Elementary School
Cornwall Central Middle School
Cornwall-on-Hudson, New York
Tt Project No.: 363579-22001.3

THE CONSTRUCTION MANAGER:
(Name, legal status, and address)

The Palombo Group
195 Front Street, 1st Floor
Newburgh, New York 12550

THE OWNER:
(Name, legal status, and address)

Cornwall Central School District
24 Idlewild Avenue
Cornwall-on-Hudson, New York 12520

THE ARCHITECT:
(Name, legal status, and address)

Tetra Tech Engineers, Architects & Landscape Architects, P.C.
d/b/a Tetra Tech Architects & Engineers
Cornell Business & Technology Park
10 Brown Road
Ithaca, New York 14850

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. The Contract Documents include the Notice to Bidders, Instructions to Bidders, sample forms and the Contractor's bid.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.8 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.9 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.10 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as

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binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.3.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

.1 Modifications, as defined in Section 1.1.1.
.2 The Agreement.
.3 Addenda, with those of later date having precedence over those of earlier date.
.4 The General Conditions of the Contract for Construction.
.5 Division 01 of the Specifications.
.6 Drawings and remaining Divisions of the Specifications.

In the case of conflicts or discrepancies between Drawings and Divisions of the Specifications (other than Division 01), or within or among the Contract Documents and not clarified by Addendum, the Architect will determine which takes precedence in accordance with Sections 4.2.11, 4.2.12, and 4.2.13.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to

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whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

§ 1.9 Submittal Exchange, a web-based construction phase software for managing project submittals, RFI's, and other construction phase paperwork, shall be used by all parties on this project. The Architect will be the administrator for the Submittal Exchange system on this project.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Not used.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law,

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including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.6 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.7 The Owner shall furnish the Contractor <**2**> copies of the Contract Documents, including one set to be used for the Project Record Drawings. The Contractor may purchase additional copies at the cost of reproduction, postage and handling.

§ 2.3.8 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a five-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including

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Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

§ 2.6 Acceleration Clause

§ 2.6.1 The Owner reserves the right to accelerate the work of the Contract. In the event that the Owner directs acceleration, such directive will be only in written form. The Contractor shall keep cost and other project records related to the acceleration directive separately from normal project costs and records and shall provide a written record of acceleration cost to the Owner on a daily basis.

§ 2.6.2 In the event that the Contractor believes that some action or inaction on the part of the Owner constitutes an acceleration directive, the Contractor shall immediately notify the Owner in writing that the Contractor considers the actions an acceleration directive, with copies to the Architect and Construction Manager. This written notification shall detail the circumstances of the claimed acceleration directive. The Contractor shall not accelerate their work efforts until the Owner responds in writing to the written notification. If acceleration is then directed or required by the Owner, all cost records referred to above shall be maintained by the Contractor and provided to the Owner on a daily basis.

§ 2.6.3 In order to preserve a claim to recover additional costs due to acceleration, the Contractor must document that additional expenses were incurred and paid by the Contractor. Labor costs recoverable will be only overtime or shift premium costs or the cost of additional laborers brought to the site to accomplish the accelerated work effort. Equipment costs recoverable will be only the cost of added equipment mobilized to the site to accomplish the accelerated work effort."

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the contract by the Contractor is a representation that the Contractor has carefully examined the Contract Documents and the site, and represents that the Contractor is thoroughly familiar with the nature and location of the Work, the site, the specific conditions under which the Work is to be performed, and all matters which may in any way affect the Work or its performance. The Contractor further represents that as a result of such examinations and investigations, the Contractor thoroughly understands the Contract Documents and their intent and purpose, and is familiar with all applicable codes, ordinances, laws, regulations, and rules as they apply to the Work, and that the Contractor will abide by same. Claims for additional time or additional compensation as a result of the Contractor's failure to follow the foregoing procedure and to familiarize itself with all local conditions and the Contract Documents will not be permitted.

It is intended that all mechanical and electrical systems will be complete and in proper operation and that all construction components will be complete and in compliance with accepted construction practice upon completion of the Work. Even if items are missing from the Plans and/or Specifications, but are normally required for proper operation of mechanical and electrical systems, or to complete otherwise incomplete construction or to meet

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governing code requirements, they shall be included by the Contractor, unless he sought and received contradictory interpretation or clarification from the Architect.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. If the Contractor performs any construction activity which involves an error, inconsistency or omission in the Contract Documents without first providing notice to the Owner, Architect and Construction Manager of such condition and receiving authorization to proceed, the Contractor shall assume responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

§ 3.2.2.1 Do not scale Drawings. Follow figure dimensions, confirming on site.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.2.5.1 The Contractor may submit requests for information to the Architect to help facilitate the Contractor's performance of the contract. Prior to submitting each request for information, the Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, and prior Project correspondence and documentation to determine that the information to be requested is not reasonably obtainable from such sources.

§ 3.2.5.2 Each request for information shall be submitted to the Architect, in writing, with a copy to the Construction Manager. Each request for information shall identify the specific sources which were reviewed by the Contractor in an effort to determine the information requested, and a statement to the effect that the information being requested could not be determined from such sources.

§ 3.2.5.3 The Contractor shall submit each request for information sufficiently in advance of the date by which such information is requested in order to allow the Architect sufficient time, in the Architect's professional judgment, to permit adequate review and response and to permit Contractor compliance with the latest construction schedule.

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§ 3.2.5.4 The Construction Manager shall maintain a log at the Project site that sequentially numbers and lists each request for information. This log shall contain the Drawings reference or Specification section to which the request pertains, the date of the request, to whom the request was made, by whom the request was made, the nature of the request, and the Architect's resolution thereof. This log shall be reviewed at each Project meeting and the status of the requests for information shall be made part of the minutes of such meetings.

§ 3.2.5.5 The Contractor shall reimburse the Owner amounts charged to the Owner by the Architect or Construction Manager for responding to Contractor requests for information where such information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, or prior Project correspondence or documentation."

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor shall be responsible for and coordinate any and all inspections required by any governmental body having jurisdiction over the project. Failure to obtain any permits, licenses or other approvals because of the failure of the Contractor to conform to this requirement shall not extend the Contract time, and the Contractor shall not be entitled to any increase in the contract sum therefor. In addition, any additional costs and/or expenses of any nature incurred by the Owner as a result of the Contractor's failure to conform to this requirement shall constitute a charge against the Contractor's contract. Each contractor shall be responsible for complying with union regulations existing under current labor agreements in performing construction work on the project."

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive. Substitutions shall satisfy the following conditions:

.1 The materials, products and equipment described in the Contract Documents establish the standard of required quality, function, dimension and appearance expected.

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.2 Substitution requests will be considered only if standards are met or exceeded as described above and are subsequently approved by the Architect and Owner.

.3 Each such request shall include the name of the material, product or equipment item for which substitution is requested and a complete description of the proposed substitute, including drawings, cuts, performance and test data and any other information necessary for a complete evaluation.

.6 Each such request shall include a statement setting forth any changes in other materials, product or equipment or other work that incorporation of the substitution would require.

.7 The burden of proof of the merit of the proposed substitution is upon the proposer.

.8 The Architect's decision of approval or disapproval of a proposed substitution shall be final and will be set forth in writing.

.9 Additional substitution requests, during construction, will be considered only if substitution is caused by specific material, product or equipment's subsequent removal from, or unavailability in the market place and only at "no change" or "credit" to Contract amount.

.10 Contractor's Responsibilities: If any of the following conditions occur due to substitutions, the contractor making the substitution shall bear the cost of such conditions, including payment for services rendered by the Architect:

(a) Redesign required for any of the Work.

(b) Material or quantity changes for any of the Work.

(c) Delays in any of the Work.

(d) Request for information generated due to substitutions.

§ 3.4.2.1 After the Contract has been executed, the Owner and Architect will consider requests for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 01 of the Specifications). By making requests for substitutions, the Contractor:

.1 represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;

.2 represents that it will provide the same warranty for the substitution as it would have provided for the product specified;

.3 certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that subsequently become apparent; and

.4 shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

§ 3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions for convenience after the period noted in Division 01 Section "Substitution Procedures" and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit

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otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.1 The Owner is exempt from payment of Federal, State, local taxes, and from payment of sales and compensating use taxes of the State of New York and of cities and counties on all materials and supplies sold to the Owner pursuant to the provisions of this Contract. These taxes are not to be included in bids. This exemption does not, however, apply to tools, machinery, equipment, or other property leased by, or to the Contractor or a subcontractor; and the Contractor and its subcontractor 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.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.1.1 The Owner shall secure the building permit from the New York State Education Department.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.2.1 In accordance New York State Labor Law Article 8, Section 220, subd. 3-a(a), the Contractor shall submit to the Owner within 30 days after issuance of Contractor's first payroll, and every 30 days thereafter, a transcript of the original payroll record, subscribed and affirmed as true under the penalties of perjury.

§ 3.7.2.2 The Contractor shall comply with all applicable New York State Department of Labor requirements, including the provision that every worker employed in performance of a public work contract shall be certified as having completed an OSHA 10-hour safety training course. The Contractor and subcontractor shall be solely responsible for compliance with this requirement with respect to their employees. The Contractor's or subcontractor's failure to comply with this requirement shall not transfer or in any way impose the responsibility for worker safety upon the Owner or the Architect.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time

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required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- **.1** Allowances shall cover the cost to the Contractor and Subcontractors, of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Lump Sum Allowances, Unit Cost Allowances and Quantity Allowances: Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances;
- **.3** Contingency Allowances: Contractor's costs, including all such subcontractor costs, for receiving and handling at Project site, labor, installation, and similar costs related to products and materials under allowance shall be included as part of the allowance. Contractor, and subcontractor, Overhead and profit related to the allowance shall be included as part of the Contract Sum and not part of the allowance; and
- **.4** Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.
- **.5** The Architect shall create and process Allowance Access Authorizations for the Construction Manager and Owner's approval and execution in accordance with the Contract Documents.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.8.4 Refer to Division 01 Section "Allowances" for additional information.

§ 3.9 Superintendent

§ 3.9.1 Prior to starting the work, the Contractor shall designate the project manager, superintendent and other key individuals who shall be assigned to the project through and including final completion. Such designation shall be in writing and provided to the Architect, Construction Manager, and Owner. The Superintendent shall be in attendance at the project site throughout the work while work is being performed by the Contractor, including completion of the punch list. The Superintendent shall, during the performance of the work unless otherwise excused by the Architect and Construction Manager, remain on site at all times any work is being performed, until termination of the contract, unless the job is suspended or work is stopped by the Construction Manager or Owner. Said representative shall be qualified in the type of work to be undertaken and shall not be changed during the course of construction without the prior written consent of the Owner. Should an approved representative thereafter leave the Contractor's employ, Contractor shall promptly designate a new representative. Owner shall have the right, at any time, to request a change in the Contractor's representatives if their performance is unsatisfactory. The Superintendent shall represent the Contractor, and communications given to the Superintendent shall be as binding as if given to the Contractor. The

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Owner shall have no obligation to direct or monitor the Contractor's employees. All references herein to the Superintendent shall be taken to mean the Contractor's Superintending staff.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect in writing, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 3.10.2 The Contractor shall participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

(Paragraph deleted)

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data, and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

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§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner, the Architect, and the Construction Manager shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept

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expressed in the Contract Documents. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.12.11 The Contractor is required to provide all submittals for the Architect's review; all submittals to be provided to the Architect by the Submittal deadlines noted in the Contract Documents. The Architect's review of Contractor's submittals will be limited to the time preceding the Submittal deadline and will consist of an examination of an initial submittal and **<1>** resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals, and for evaluation of submittals for which the initial submission is received after the Submittal deadlines.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.13.3 The Contractor shall be responsible for enforcing the Owner's security and access policies and procedures and the following rules of conduct for its personnel and those of its subcontractors, sub-subcontractors, and suppliers at the Project site , and the Owner's Project Representative shall provide interpretations should a question arise if the rules of conduct are being adequately enforced by the Contractor:

.1 No smoking or use of tobacco products.
.2 No drinking of alcoholic beverages or use of controlled substances.
.3 No working, or presence on site, under the influence of alcoholic beverages or controlled substances.
.4 No use of indecent language or display of indecent images, publications or terms.
.5 No use of radios or other entertainment devices.
.6 No horseplay or dangerous behavior.
.7 No firearms or other weapons.
.8 No communication with staff or students.

§ 3.13.4 The Contractor shall require its personnel and those of its subcontractors, sub-subcontractors and suppliers to wear visible photo-identification badges acceptable to the Owner, at all times for identification and security purposes.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

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§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager, and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner, Architect, or Construction Manager. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the Owner, Construction Manager, Architect, each of their consultant's, officers, board members, agents, and employees from and against any suits, claims, damages, losses, or expenses, including but not limited to attorneys' fees and litigation costs, arising out of or resulting from performance of the Work, provided that such suit, claim, damage, loss or expense is attributable to any bodily injury, sickness, disease, or death, or injury to or destruction of any tangible property, including loss of use resulting therefrom, but only to the extent caused in whole or in part by the act, omission, fault, or statutory violation of the Contractor, a subcontractor, or any person or entity directly or indirectly employed by them, or any person or entity for whose acts they may be liable or arises out of operation of law as a consequence of any act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of the above may be liable, regardless of whether any of them has been negligent. This provision shall not be construed to require the Contractor to indemnify the Owner, Construction Manager, or Architect for the negligence of the Owner, Construction Manager, or Architect to the extent such negligence, in whole or in part, proximately caused the damages resulting in the suit, claim, damage, loss or expense.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.19 Daily Records Clause

§ 3.19.1 The Contractor shall prepare and maintain Daily Inspection Records to document the progress of the work on a daily basis. Such daily records shall include a daily accounting of all labor and all equipment on the site for the Contractor and all subcontractors, at any tier. Such daily records will make a clear distinction between work being performed under Change Order, base scope work and/or disputed work.

§ 3.19.2 In the event that any labor or equipment is idled, solely as a result of Owner actions or inactions, the daily records shall record which laborers and equipment were idled and for how long. In the event that specific work activities were stopped, solely as a result of Owner actions or inactions, and labor and equipment was reassigned to perform work on other activities, the daily records will make a clear record of which activities were stopped and where labor and equipment was redirected to.

§ 3.19.3 Such daily records shall be copied and provided to the Construction Manager as the representative of the Owner at the end of every week.

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ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

(Paragraph deleted)

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

§ 4.2.2.2 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Construction Manager for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications. The Owner shall communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with other Contractors shall be

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through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.13 The Architect will prepare Change Orders, Construction Change Directives and Allowance Change Authorizations.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the

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Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.17 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of the Project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents. The Owner shall notify the Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.18 The Architect will interpret and decide matters concerning performance of the Contractor under, and requirements of, the Contract Documents on written request of the Construction Manager, Owner, or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.19 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings.

(Paragraph deleted)

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include Separate Contractors or the subcontractors of Separate Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor or the bidding requirements, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design for each principal portion of the Work. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2)

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requires additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.2.5 The Contractor shall perform at least <Twenty-Five> percent of the cost of the Contract (not including the costs of materials, insurance, bonds, submittals and similar items) with its own employees.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

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§ 5.5 Owner Payments to Subcontractors

§ 5.5.1 In the event of any default hereunder by the Contractor, or in the event the Owner, Construction Manager, or Architect fails to approve any application for payment, that is not the fault of a Subcontractor, the Owner may make direct payment to the Subcontractor, less appropriate retainage. In that event, the amount so paid the Subcontractor shall be deducted from any contract amount due to the Contractor.

§ 5.5.2 Nothing contained herein shall create any obligation on the part of the Owner to make any payments to any Subcontractor, and no payment by the Owner to any Subcontractor shall create any obligation to make any further payments to any Subcontractor.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Separate Contractors, Construction Manager and other Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractors or other Contractors that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of

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delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction, or to property of the Owner, Separate Contractors, or other Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.2.6 All Contractors shall cooperate with each other in the installation and construction of each Contractor's work and in such manner as the Owner and/or Construction Manager may direct. All Contractors shall control and coordinate the work of their subcontractors, if any. The Owner and/or Construction Manager shall approve or require the modification of the work schedules of all Contractors to the end of the Project so the whole Project may be progressed, as expeditiously as possible, as one unit. The award of more than one Contract for the Project requires sequential or otherwise inter-related Contractor operations, and may involve inherent delays in the progress of any individual contractor's work. Accordingly, the Owner and/or Construction Manager cannot guarantee the unimpeded operations of any Contractor. Each Contractor acknowledges these conditions and understands that he shall bear the risk of all ordinary delays caused by the presence or operations of other Contractors engaged upon the Project and ordinary delays attended upon the approved Construction Schedule.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 The combined overhead and profit (for Contractor, subcontractors, suppliers, and contractors of a lower-tier) included in the total cost to the Owner for a change in the Work shall be as follows:

.1 Maximum combined overhead and profit, **<15>** percent of the cost.

.2 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4.

.3 To facilitate checking of quotations for extras or credits, all proposals shall be accompanied by a complete itemization of costs including labor, materials, rental costs, and Subcontracts. Subcontracts shall be itemized also.

.4 The additional bond charges for the total change order, two percent (2%) of the cost shall also apply to Deduct Change orders.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Architect and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

.1 The change in the Work;

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.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.4.

§ 7.3.4 If

(Paragraphs deleted)

unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;
.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
.4 Overhead and profit mark-up shall include, but not be limited to, the following:
  .1 home office expense;
  .2 field office expense;
  .3 supervision;
  .4 project management & estimation; and
  .5 small tools & equipment.

§ 7.3.6 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.7 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with the method,

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if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.8 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.9 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.10 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.11 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Construction Manager and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Construction Manager that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

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§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine and as approved by the Owner. Nothing contained herein shall be construed to provide for payment of compensation of any kind to the Contractor for damages due to hindrance or delay from any cause in the progress of the Work, unless such delay is caused by the active interference of the Owner, or the Architect, or the Construction Manager and no claim for compensation shall be made by the Contractor or paid by the Owner except for such Owner or Architect or Construction Manager caused delay. The extension of time as above provided, shall be the Contractor's exclusive remedy except as above provided.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 The Owner shall not be liable to the Contractor and/or any subcontractor for claims or damages of any nature caused by or arising out of delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to the claim procedure set forth herein. Except to the extent, if any, expressly prohibited by law, the Contractor expressly agrees not to make and hereby waives any claim for damages for delay, including, but not limited to, those resulting from increased labor or material costs; directions given or not given by the Owner, Construction Manager or Architect, including scheduling and coordination of the Work; the Architect's preparation of drawings and specifications or review of shop drawings and requests for instruction(s); or, on account of any delay, obstruction or hindrance for any cause whatsoever by the Owner, Construction Manager, Architect, or any other contractor on the project, whether or not foreseeable or anticipated. The Contractor agrees that its sole right and remedy therefor shall be an extension of time, if appropriate. **IT IS EMPHASIZED THAT NO MONETARY RECOVERY MAY BE OBTAINED BY THE CONTRACTOR FOR DELAY AGAINST THE OWNER, CONSTRUCTION MANAGER, OR ARCHITECT BASED ON ANY REASON AND THAT THE CONTRACTOR'S SOLE REMEDY, IF APPROPRIATE, IS ADDITIONAL TIME.**

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Construction Manager, before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and

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supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers and shall reflect retainage if provided for in the Contract Documents. The form of Application for Payment, duly notarized, shall be a current authorized edition of AIA Document G7032, Application and Certificate for Payment. Alternative payment application forms are not permitted. AIA Document G732 shall be supported by a current authorized edition of AIA Document G703, Continuation Sheet or equivalent continuation sheet, subject to the approval of Owner and Architect.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Until Substantial Completion, the Owner shall pay 95 percent of the amount due the Contractor on account of progress payments. At Substantial Completion, the Construction Manager and Architect may authorize remaining partial payments to be made in full, less twice the value of items remaining to be completed and an amount necessary to satisfy any outstanding claims, liens, or judgments.

§ 9.3.1.4 "Applications for Payment must be accompanied by any and all releases of liens for previous applications from Contractor and his/her subcontractors and a sworn and notarized statement that all subcontractors have been paid to at least 95% of previously requisitioned sums.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 The Construction Manager's certification of an Application for Payment shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge,

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information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

(Paragraph deleted)

§ 9.4.3 The Architect's issuance of a Certificate for Payment shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.5 The issuance of a Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

(Paragraph deleted)

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.2 and 9.4.3 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a Separate Contractor or other Contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the

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Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents and shall so notify the Construction Manager and Architect. Payments to Contractor, including any interest, shall be consistent with this Agreement and in accordance with New York State General Municipal Law Section 106-b.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers' amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner in accordance with applicable law.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

(Paragraphs deleted)

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

(Paragraph deleted)

§ 9.8.2 No later than 14 days prior to the Contract-scheduled date of Substantial Completion, the Contractor shall issue a letter to the Architect and Construction Manager confirming their work is on schedule for Substantial Completion by the contract specified date. No later than seven days after Contract-scheduled date of Substantial Completion (including authorized adjustments), the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. Absence the contractor letter confirming readiness of work, the Architect may elect to postpone the substantial completion inspection. If the Architect's inspection discloses any item which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize

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the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine the actual date of Substantial Completion.

§ 9.8.2.1 The Architect will perform no more than one inspection to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

§ 9.8.3 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.4 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.5 In the event the Contractor does not achieve final completion within thirty (30) days after the date of substantial completion, allowing for any approved extensions of the contract time, Contractor shall not be entitled to any further payment and Contractor hereby agrees that such failure to complete the work within the time set forth above shall constitute a waiver of all claims by the Contractor to any money that may be due. This provision shall not operate as a waiver by the Owner of any claims or remedies of any nature against the Contractor arising out of the contract.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 On or within seven (7) days following the date of Final Completion (as established in the bid documents or modified by Change Order) the Architect will conduct a final inspection of the work. As a result of that inspection, the Architect will issue a Final Inspection Report. This report will document the condition of the work and will render a formal opinion as to the whether or not the work or designated portion is complete. If, as a result of the Architect's inspection, it is determined that the work is not complete and in accordance with the Contract Documents, the Architect shall notify the Owner and Contractor in writing of this opinion. This notice will include the Final Inspection Report documenting the conditions of the work and will be considered a formal notice to the Contractor of their failure to fulfill the terms and conditions of their contract.

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If as a result of this inspection, it is determined that the work is complete, the Contractor shall submit their Final Payment Application and Certificate for Payment. The Architect will then certify and issue the final Certificate for Payment stating that to the best of the Architects knowledge, information and belief, and on the basis of the Architect's periodic site visits and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for payment will constitute a further representation that the conditions listed in section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. The final Certificate for Payment will not be issued until all work on the final inspection report is completed or corrected.

§ 9.10.1.1 The Architect will perform no more than one on-site observation to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional on-site observations.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.10.6 If the Contractor is responsible for delays in the final completion and closeout beyond the contract specified time, the Owner is entitled to reimbursement from the Contractor for amounts paid by the Owner to subsequently extend the Electronic Submittal System (Submittal Exchange).

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ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Contractor shall be responsible for maintaining safety data sheets at the site.

The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and
- **.4** construction or operations by the Owner, Separate Contractors, or other Contractors.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of the injury or damage, whether or not insured,

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shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner, Construction Manager and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately, and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

(Paragraph deleted)

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

(Paragraph deleted)

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents. The policy certificate must include the project name.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

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§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.1.5 Schedule of Insurance

The Contractor, at its own expense, shall procure and maintain the following insurance coverages with limits of liability not less than the limits specified, or greater if required by law.

.1 Notwithstanding any terms, conditions or provisions, in any other writing between the parties, the contractor hereby agrees to effectuate the naming of the Cornwall Central School District ("District") as an Additional Insured on the contractor's insurance policies, except for workers' compensation and N.Y. State Disability insurance.

.2 The policy naming the District as an Additional Insured shall:

- **a.** Be an insurance policy from an A.M. Best A- rated or better insurer, licensed and admitted to conduct business in New York State. A New York licensed and admitted insurer is required.
- **b.** State that the organization's coverage shall be primary and non-contributory coverage for the District, its Board, employees and volunteers including a waiver of subrogation in favor of the District for all coverages including Workers Compensation.
- **c.** Additional insured status for General Liability coverage shall be provided by standard or other endorsements that extend coverage to the District for on-going operations (CG 20 38 or equivalent) and products and completed operations (CG 20 37 or equivalent). The decision to accept an endorsement rest solely with the District. A completed copy of the endorsements must be attached to the Certificate of Insurance to include General Liability, Auto Liability and Umbrella/Excess coverages.

.3

- **a.** The certificate of insurance must describe all services provided by the contractor (e.g., roofing, carpentry or plumbing) that are covered by the liability policies.
- **b.** At the District's/BOCES' request, the contractor shall provide a copy of the declaration page of the liability and umbrella/excess policies with a list of endorsements and forms. If requested, the contractor will provide a copy of the policy endorsements and forms.
- **c.** There will be no coverage restrictions and/or exclusions involving New York State Labor Law statutes or gravity related injuries.
- **d.** No policies containing escape clauses or exclusions contrary to the Owner's interests will be accepted
- **e.** A fully completed New York Construction Certificate of Liability Insurance Addendum (ACORD 855 2014/15) must be included with the certificates of insurance. For any "Yes" answers on Items G through L on this Form– additional details must be provided in writing. Policy exclusions may not be accepted.

.4 The contractor agrees to indemnify the District for applicable deductibles and self-insured retentions.

.5 Minimum Required Insurance:

- **a.** **Commercial General Liability Insurance**
  $1,000,000 per Occurrence/$2,000,000 Aggregate
  $2,000,000 Products and Completed Operations
  $1,000,000 Personal and Advertising Injury
  $100,000 Fire Damage

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$10,000 Medical Expense
The general aggregate shall apply on a per-project basis.

b. Owners Contractors Protective (OCP) Insurance
For projects less than or equal to $1,000,000 and/or work on 1 story (10 feet) only; $1,000,000 per occurrence, $2,000,000 aggregate with the District as the Named Insured.

For projects greater than $1,000,000 and/or work over 1 story (10 feet); $2,000,000 per occurrence, $4,000,000 aggregate with the District as the Named Insured.

The OCP Policy must be with a NYS licensed and admitted carrier. The District will be the Named Insured on OCP Policies. There will be no Additional Insureds on any OCP Policies.

c. Automobile Liability
$1,000,000 combined single limit for owned, hired, borrowed and non-owned motor vehicles.

d. Compensation and NYS Disability Insurance
Statutory Workers' Compensation (C-105.2 or U-26.3); and NYS Disability Insurance (DB-120.1) for all employees. Proof of coverage must be on the approved specific form, as required by the New York State Workers' Compensation Board. ACORD certificates are not acceptable. A person seeking an exemption must file a CE-200 Form with the state. The form can be completed and submitted directly to the WC Board online.

e. Umbrella/Excess Insurance
$5,000,000 each Occurrence and Aggregate for general construction and no work at elevation (1 story or 10 feet) and project values less than or equal to $1,000,000.

$10,000,000 each Occurrence and Aggregate for high-risk construction, work at elevation (>1 story or 10 feet) and project values greater than $1,000,000.

Umbrella/Excess coverage shall be on a follow-form basis or provide broader coverage over the General Liability and Auto Liability coverages.

.6 Contractor acknowledges that failure to obtain such insurance on behalf of the District constitutes a material breach of contract and subjects it to liability for damages, indemnification and all other legal remedies available to the District. The contractor is to provide the District with a certificate of insurance, evidencing the above requirements have been met, prior to the commencement of work. The failure of the District to object to the contents of the certificate or the absence of same shall not be deemed a waiver of any rights held by the District.

.7 Subcontractors are subject to the same terms and conditions as stated above and must submit same to the District for approval prior to the start of any work.

.8 In the event the General Contractor fails to obtain the required certificates of insurance from the Subcontractor and a claim is made or suffered, the General Contractor shall indemnify, defend, and hold harmless the District, it's Board, employees and volunteers from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract.

.9 Asbestos/Lead Abatement/Pollution Liability Insurance
$2,000,000 per occurrence/$2,000,000 aggregate, including products and completed operations. Such insurance shall include coverage for the Contractor's operations including, but not limited to, removal, replacement, enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it shall pre-date the inception of the Contract.

If the Contractor is using motor vehicles for transporting hazardous materials, the Contractor shall maintain pollution liability broadened coverage (ISO Endorsement CA 9948 or CA 01 12), as well as proof of MCS 90.

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Coverage shall fulfill all requirements of these specifications and shall extend for a period of three (3) years following acceptance by the District of the Certificate of Completion.

.10 Testing Company Errors and Omission Insurance
$1,000,000 per occurrence/$2,000,000 aggregate for the testing and other professional acts of the Contractor performed under the Contract with the District.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform both the Contractor and the Construction Manager, separately and in writing, prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice directly to the Contractor, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

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§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor, Architect, and Construction Manager for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion, and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

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§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within two years after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The two-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The two-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Separate Contractors, or other Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the two-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be affected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

(Paragraph deleted)

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Construction Manager, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

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§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Construction Manager, Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments to Contractor, including any interest, shall be consistent with this Agreement and in accordance with New York State General Municipal Law Section 106-b.

§ 13.6 Time Limits on Claims

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case, not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

§ 13.7 Equal Opportunity

§ 13.7.1 The Contractor shall maintain policies of employment as follows:

.1 The Contractor and the Contractor's subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, or natural origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notice setting forth the policies of non-discrimination.

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.2 The Contractor and the Contractor's subcontractors shall, in all solicitations or advertisement for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

§ 13.8 Wage Rates

§ 13.8.1 The Contractor shall comply with Prevailing Wage Rates issued and periodically updated, by the New York State Department of Labor, for the location and duration of the Project.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;

.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents.

(Paragraphs deleted)

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, under direct or indirect contract with the Contractor, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon thirdy days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work properly executed.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon thirty additional days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;

.3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

.5 Breaches any warranty made by the Contractor under or pursuant to the Contract Documents.

.6 Fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all of the requirements of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

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.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The costs of finishing the Work include, without limitation, all reasonable attorney's fees, additional title costs, insurance, additional interest because of any delay in completing the Work, and all other direct and indirect and consequential damages incurred by the Owner by reason of the termination of the Contractor as stated herein.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 Adjustment of the Contract Sum may include profit. No adjustment shall be made to the extent:

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 Notwithstanding any other provision to the contrary in this Agreement, the Owner reserves the right at any time and in its absolute discretion to terminate the services of the Contractor and/or the Work for the Owner's convenience and without cause by giving written notice to the Contractor. This termination for the convenience of the Owner provision allows and authorizes the Owner to terminate this Agreement at any time and for any reason whatsoever. This right may be exercised by the Owner in its complete discretion.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In the case of such termination for the Owner's convenience, the Contractor shall be entitled to, and the Owner shall reimburse the Contractor for, an equitable portion of the Contractor's fee based on the portion of the Work properly completed before the effective date of termination and for any other reasonable costs attributable to such termination. Contractor's entitlement to payment for all such work shall be predicated on its performance of such work in accordance with the Contract Documents as certified by the Architect and Construction Manager. Contractor shall be entitled to no other payment and waives any claim for damages.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

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§ 15.1.2 Time Limits on Claims

Claims by the Contractor must be initiated by written notice to the Owner with a copy sent to the Construction Manager and Architect. Claims by the Contractor must be initiated within twenty-one (21) days after the occurrence of the event giving rise to such Claim or within twenty-one (21) days after the Contractor should have been aware of the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

(Paragraph deleted)

§ 15.1.3.2 Written notice shall contain a heading stating "Notice of Claim" to clearly identify it as such. Such notice shall set forth in detail the circumstances that form the basis for the Claim and shall include the following:

.1 Clear statement of claim matter, including background and chronology.
.2 Documentation in support of claim matter.
.3 Documentation in support of claimed damages.
.4 Certification by responsible officer of claimant.

§ 15.1.3.3 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

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§ 15.1.6.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14.

§ 15.1.8 Claim Procedure

§ **15.1.8.1** Claims by the Contractor must be made by written notice in accordance with the following procedures:

.1 The Contractor may submit a claim concerning a matter properly noticed in accordance with the time requirements of this Contract.

.2 Failure by the Contractor to furnish the required claim documentation within the time set forth above shall constitute waiver of the Contractor's right to compensation for such claim.

.3 Contractor shall furnish three (3) certified copies of the required claim documentation, with a copy submitted to the Owner, Architect, and Construction Manager. The claim documentation shall be complete when furnished. The evaluation of the Contractor's claim will be based, among other things, upon the Owner project records and the Contractor's furnished claim documentation.

.4 Claim documentation shall conform to Generally Accepted Accounting Principles and shall be in the following format:

1. General Introduction
2. General Background Discussion
3. Issues

    A. Index of Issues (listed numerically)
    B. For each issue

        (1) Background
        (2) Chronology
        (3) Contractor's position (reason for Owner's potential liability)
        (4) Supporting documentation of merit or entitlement
        (5) Supporting documentation of damages
        (6) Begin each issue on a new page

4. All critical path method schedules, (as-planned, monthly updates, schedule revisions, and as-built) along with the computer disks of all schedules related to the claim.

5. Productivity exhibits (if appropriate)

6. Summary of Issues and Damages

.5 Supporting documentation of merit for each issue shall be cited by reference, photocopies, or explanation. Supporting documentation may include, but shall not be limited to, general conditions;

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general requirements; technical specifications; drawings; correspondence; conference notes; shop drawings and submittals; shop drawing logs; survey books; inspection reports; delivery schedules; test reports; daily reports; subcontracts; fragmentary CPM schedules or time impact analyses; photographs; technical reports; requests for information; field instructions; and all other related records necessary to support the Contractor's claim.

.6 Supporting documentation of damages for each issue shall be cited, photocopies, or explained. Supporting documentation may include, but shall not be limited to, any or all documents related to the preparation and submission of the bid; certified, detailed labor records including labor distribution reports; material and equipment procurement records; construction equipment ownership cost records or rental records; subcontractor or vendor files and cost records; service cost records; purchase orders; invoices; project as-planned and as-built cost records; general ledger records; variance reports; accounting adjustment records; and any other accounting materials necessary to support the Contractor's claim.

.7 Each copy of the claim documentation shall be certified by a responsible officer of the Contractor in accordance with the requirements of these Contract Documents.

§ **15.1.8.2 Claims and Actions Thereon.** No claim against the Owner for damages for breach of contract or compensation for extra work shall be made or asserted in any action or proceeding at law, or in equity, unless the Contractor shall have strictly complied with all the requirements relating to the giving of notice and of information with respect to such claims all as provided in this Agreement.

§ **15.1.8.3 No Estoppel.** Neither the Owner nor any department officer, agent or employees 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 Owner, or any officer, agent or employee of the Owner, either before or after the final completion and acceptance of the Work and payment therefor: (1) from showing the true and correct classification, amount, quality or character of the Work actually done; or that any such termination, decision, order, letter, payment or certificate was untrue, incorrect or improperly made in any particular matter, or that the Work or any part thereof does not in fact conform to the requirements of this Contract; or (2) from demanding and recovering from the Contractor any overpayments made to him, or such damages as it may sustain by reason of his failure to perform each and every part of this Contract in strict accordance with its terms; or (3) both (1) and (2) hereto.

§ 15.2 Initial Decision

§ 15.2.1 Claims by the Contractor, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date of final payment is due. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

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§ 15.2.4 If the Initial Decision Maker requests a Contractor to furnish additional supporting data, the Contractor shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 If a Claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Architect, the Architect will render to the parties the Architect's written recommendation relative to the Claim, including any recommended change in the Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Contractor's default, the Architect may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days of receipt thereof, then both parties waive their rights to.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.2.9 Nothing contained in this Agreement is intended to alter or replace any provisions of the laws of the state of New York relating to claims made against the Owner or to relieve Contractor from any obligations thereunder.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 The parties expressly agree that any claim, dispute, or other controversy of any nature arising out of the contract or performance of the work shall be commenced and maintained in New York State Supreme Court located in Orange County.

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PAGE 1

Reconstruction to
Cornwall Elementary School
Cornwall-On-Hudson Elementary School
Cornwall Central Middle School
Cornwall-on-Hudson, New York
Tt Project No.: 363579-22001.3

...

The Palombo Group
195 Front Street, 1st Floor
Newburgh, New York 12550

...

Cornwall Central School District
24 Idlewild Avenue
Cornwall-on-Hudson, New York 12520

...

(Name, legal status, and address)

Tetra Tech Engineers, Architects & Landscape Architects, P.C.
d/b/a Tetra Tech Architects & Engineers
Cornell Business & Technology Park
10 Brown Road
Ithaca, New York 14850

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§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. ~~Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding or proposal requirements.~~The Contract Documents include the Notice to Bidders, Instructions to Bidders, sample forms and the Contractor's bid.

...

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§ 1.1.5 Contractors. Contractors are persons or ~~entities, other than the Contractor or Separate Contractors,~~ entities who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

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§ 1.2.3.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

.1 Modifications, as defined in Section 1.1.1.
.2 The Agreement.
.3 Addenda, with those of later date having precedence over those of earlier date.
.4 The General Conditions of the Contract for Construction.
.5 Division 01 of the Specifications.
.6 Drawings and remaining Divisions of the Specifications.

In the case of conflicts or discrepancies between Drawings and Divisions of the Specifications (other than Division 01), or within or among the Contract Documents and not clarified by Addendum, the Architect will determine which takes precedence in accordance with Sections 4.2.11, 4.2.12, and 4.2.13.

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The parties shall agree upon ~~written~~ protocols governing the transmission and use ~~of, and reliance on,~~ of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

...

Any use of, or reliance on, all or a portion of a building information model without agreement to ~~written~~ protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

§ 1.9 Submittal Exchange, a web-based construction phase software for managing project submittals, RFI's, and other construction phase paperwork, shall be used by all parties on this project. The Architect will be the administrator for the Submittal Exchange system on this project.

...

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. ~~Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.~~

...

§ 2.2.1 ~~Prior to commencement of the Work, and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.~~Not used.

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§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect ~~to whom the Contractor has no reasonable objection and~~ whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

...

§ 2.3.7 ~~Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.~~The Owner shall furnish the Contractor <**2**> copies of the Contract Documents, including one set to be used for the Project Record Drawings. The Contractor may purchase additional copies at the cost of reproduction, postage and handling.

§ 2.3.8 The Owner shall endeavor to forward all communications to the Contractor through the Construction ~~Manager. Other communication shall be made as set forth in Section 4.2.6.~~Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

...

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ~~ten-day~~ five-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

§ 2.6 Acceleration Clause

§ 2.6.1 The Owner reserves the right to accelerate the work of the Contract. In the event that the Owner directs acceleration, such directive will be only in written form. The Contractor shall keep cost and other project records related to the acceleration directive separately from normal project costs and records and shall provide a written record of acceleration cost to the Owner on a daily basis.

§ 2.6.2 In the event that the Contractor believes that some action or inaction on the part of the Owner constitutes an acceleration directive, the Contractor shall immediately notify the Owner in writing that the Contractor considers the actions an acceleration directive, with copies to the Architect and Construction Manager. This written notification shall detail the circumstances of the claimed acceleration directive. The Contractor shall not accelerate their work efforts until the Owner responds in writing to the written notification. If acceleration is then directed or required by the Owner, all cost records referred to above shall be maintained by the Contractor and provided to the Owner on a daily basis.

§ 2.6.3 In order to preserve a claim to recover additional costs due to acceleration, the Contractor must document that additional expenses were incurred and paid by the Contractor. Labor costs recoverable will be only overtime or shift premium costs or the cost of additional laborers brought to the site to accomplish the accelerated work effort. Equipment costs recoverable will be only the cost of added equipment mobilized to the site to accomplish the accelerated work effort."

PAGE 7

§ 3.2.1 Execution of the ~~Contract~~ contract by the Contractor is a representation that the Contractor has ~~visited the site, become generally familiar with local~~ carefully examined the Contract Documents and the site, and represents that the Contractor is thoroughly familiar with the nature and location of the Work, the site, the specific conditions under which the Work is to be performed, ~~and correlated personal observations with requirements of the Contract Documents.~~and all matters which may in any way affect the Work or its performance. The Contractor further

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represents that as a result of such examinations and investigations, the Contractor thoroughly understands the Contract Documents and their intent and purpose, and is familiar with all applicable codes, ordinances, laws, regulations, and rules as they apply to the Work, and that the Contractor will abide by same. Claims for additional time or additional compensation as a result of the Contractor's failure to follow the foregoing procedure and to familiarize itself with all local conditions and the Contract Documents will not be permitted.

It is intended that all mechanical and electrical systems will be complete and in proper operation and that all construction components will be complete and in compliance with accepted construction practice upon completion of the Work. Even if items are missing from the Plans and/or Specifications, but are normally required for proper operation of mechanical and electrical systems, or to complete otherwise incomplete construction or to meet governing code requirements, they shall be included by the Contractor, unless he sought and received contradictory interpretation or clarification from the Architect.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. If the Contractor performs any construction activity which involves an error, inconsistency or omission in the Contract Documents without first providing notice to the Owner, Architect and Construction Manager of such condition and receiving authorization to proceed, the Contractor shall assume responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

§ 3.2.2.1 Do not scale Drawings. Follow figure dimensions, confirming on site.
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§ 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.2.5.1 The Contractor may submit requests for information to the Architect to help facilitate the Contractor's performance of the contract. Prior to submitting each request for information, the Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, and prior Project correspondence and documentation to determine that the information to be requested is not reasonably obtainable from such sources.

§ 3.2.5.2 Each request for information shall be submitted to the Architect, in writing, with a copy to the Construction Manager. Each request for information shall identify the specific sources which were reviewed by the Contractor in an effort to determine the information requested, and a statement to the effect that the information being requested could not be determined from such sources.

§ 3.2.5.3 The Contractor shall submit each request for information sufficiently in advance of the date by which such information is requested in order to allow the Architect sufficient time, in the Architect's professional judgment, to permit adequate review and response and to permit Contractor compliance with the latest construction schedule.

§ 3.2.5.4 The Construction Manager shall maintain a log at the Project site that sequentially numbers and lists each request for information. This log shall contain the Drawings reference or Specification section to which the request pertains, the date of the request, to whom the request was made, by whom the request was made, the nature of the request, and the Architect's resolution thereof. This log shall be reviewed at each Project meeting and the status of the requests for information shall be made part of the minutes of such meetings.

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§ 3.2.5.5 The Contractor shall reimburse the Owner amounts charged to the Owner by the Architect or Construction Manager for responding to Contractor requests for information where such information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, or prior Project correspondence or documentation."

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§ 3.3.4 The Contractor shall be responsible for and coordinate any and all inspections required by any governmental body having jurisdiction over the project. Failure to obtain any permits, licenses or other approvals because of the failure of the Contractor to conform to this requirement shall not extend the Contract time, and the Contractor shall not be entitled to any increase in the contract sum therefor. In addition, any additional costs and/or expenses of any nature incurred by the Owner as a result of the Contractor's failure to conform to this requirement shall constitute a charge against the Contractor's contract. Each contractor shall be responsible for complying with union regulations existing under current labor agreements in performing construction work on the project."

...

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive. Substitutions shall satisfy the following conditions:

.1 The materials, products and equipment described in the Contract Documents establish the standard of required quality, function, dimension and appearance expected.

.2 Substitution requests will be considered only if standards are met or exceeded as described above and are subsequently approved by the Architect and Owner.

.3 Each such request shall include the name of the material, product or equipment item for which substitution is requested and a complete description of the proposed substitute, including drawings, cuts, performance and test data and any other information necessary for a complete evaluation.

.6 Each such request shall include a statement setting forth any changes in other materials, product or equipment or other work that incorporation of the substitution would require.

.7 The burden of proof of the merit of the proposed substitution is upon the proposer.

.8 The Architect's decision of approval or disapproval of a proposed substitution shall be final and will be set forth in writing.

.9 Additional substitution requests, during construction, will be considered only if substitution is caused by specific material, product or equipment's subsequent removal from, or unavailability in the market place and only at "no change" or "credit" to Contract amount.

.10 Contractor's Responsibilities: If any of the following conditions occur due to substitutions, the contractor making the substitution shall bear the cost of such conditions, including payment for services rendered by the Architect:

(a) Redesign required for any of the Work.

(b) Material or quantity changes for any of the Work.

(c) Delays in any of the Work.

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(d) Request for information generated due to substitutions.

§ 3.4.2.1 After the Contract has been executed, the Owner and Architect will consider requests for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 01 of the Specifications). By making requests for substitutions, the Contractor:

.1 represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;

.2 represents that it will provide the same warranty for the substitution as it would have provided for the product specified;

.3 certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that subsequently become apparent; and

.4 shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

§ 3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions for convenience after the period noted in Division 01 Section "Substitution Procedures" and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

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§ 3.6.1 The Owner is exempt from payment of Federal, State, local taxes, and from payment of sales and compensating use taxes of the State of New York and of cities and counties on all materials and supplies sold to the Owner pursuant to the provisions of this Contract. These taxes are not to be included in bids. This exemption does not, however, apply to tools, machinery, equipment, or other property leased by, or to the Contractor or a subcontractor; and the Contractor and its subcontractor 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.

...

§ 3.7.1.1 The Owner shall secure the building permit from the New York State Education Department.

§ 3.7.2.1 In accordance New York State Labor Law Article 8, Section 220, subd. 3-a(a), the Contractor shall submit to the Owner within 30 days after issuance of Contractor's first payroll, and every 30 days thereafter, a transcript of the original payroll record, subscribed and affirmed as true under the penalties of perjury.

§ 3.7.2.2 The Contractor shall comply with all applicable New York State Department of Labor requirements, including the provision that every worker employed in performance of a public work contract shall be certified as having completed an OSHA 10-hour safety training course. The Contractor and subcontractor shall be solely responsible for compliance with this requirement with respect to their employees. The Contractor's or subcontractor's failure to comply with this requirement shall not transfer or in any way impose the responsibility for worker safety upon the Owner or the Architect.

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.1 ~~allowances~~ Allowances shall cover the cost to the Contractor and Subcontractors, of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Lump Sum Allowances, Unit Cost Allowances and Quantity Allowances: Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances;

.3 Contingency Allowances: Contractor's costs, including all such subcontractor costs, for receiving and handling at Project site, labor, installation, and similar costs related to products and materials under allowance shall be included as part of the allowance. Contractor, and subcontractor, Overhead and

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profit related to the allowance shall be included as part of the Contract Sum and not part of the allowance; and

.3 ~~whenever~~ .4 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

.5 The Architect shall create and process Allowance Access Authorizations for the Construction Manager and Owner's approval and execution in accordance with the Contract Documents.

...

§ 3.8.4 Refer to Division 01 Section "Allowances" for additional information.

§ 3.9.1 ~~The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent~~ Prior to starting the work, the Contractor shall designate the project manager, superintendent and other key individuals who shall be assigned to the project through and including final completion. Such designation shall be in writing and provided to the Architect, Construction Manager, and Owner. The Superintendent shall be in attendance at the project site throughout the work while work is being performed by the Contractor, including completion of the punch list. The Superintendent shall, during the performance of the work unless otherwise excused by the Architect and Construction Manager, remain on site at all times any work is being performed, until termination of the contract, unless the job is suspended or work is stopped by the Construction Manager or Owner. Said representative shall be qualified in the type of work to be undertaken and shall not be changed during the course of construction without the prior written consent of the Owner. Should an approved representative thereafter leave the Contractor's employ, Contractor shall promptly designate a new representative. Owner shall have the right, at any time, to request a change in the Contractor's representatives if their performance is unsatisfactory. The Superintendent shall represent the Contractor, and communications given to the ~~superintendent~~ Superintendent shall be as binding as if given to the Contractor. The Owner shall have no obligation to direct or monitor the Contractor's employees. All references herein to the Superintendent shall be taken to mean the Contractor's Superintending staff.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and ~~Architect,~~ Architect in writing, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work ~~and Project.~~ and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 3.10.2 The ~~Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any~~

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~~increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.~~Contractor shall participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.3 The Contractor shall ~~participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the~~ perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

~~**§ 3.10.4** The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.~~

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§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, ~~in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule,~~ with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

...

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

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§ 3.12.11 The Contractor is required to provide all submittals for the Architect's review; all submittals to be provided to the Architect by the Submittal deadlines noted in the Contract Documents. The Architect's review of Contractor's submittals will be limited to the time preceding the Submittal deadline and will consist of an examination of an initial submittal and **<1>** resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals, and for evaluation of submittals for which the initial submission is received after the Submittal deadlines.

...

§ 3.13.3 The Contractor shall be responsible for enforcing the Owner's security and access policies and procedures and the following rules of conduct for its personnel and those of its subcontractors, sub-subcontractors, and suppliers at the Project site , and the Owner's Project Representative shall provide interpretations should a question arise if the rules of conduct are being adequately enforced by the Contractor:

.1 No smoking or use of tobacco products.
.2 No drinking of alcoholic beverages or use of controlled substances.
.3 No working, or presence on site, under the influence of alcoholic beverages or controlled substances.
.4 No use of indecent language or display of indecent images, publications or terms.

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.5 No use of radios or other entertainment devices.
.6 No horseplay or dangerous behavior.
.7 No firearms or other weapons.
.8 No communication with staff or students.

§ 3.13.4 The Contractor shall require its personnel and those of its subcontractors, sub-subcontractors and suppliers to wear visible photo-identification badges acceptable to the Owner, at all times for identification and security purposes.

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§ 3.18.1 To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the Owner, Construction Manager, Architect, ~~Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and~~ each of their consultant's, officers, board members, agents, and employees from and against any suits, claims, damages, losses, or expenses, including but not limited to attorneys' ~~fees,~~ fees and litigation costs, arising out of or resulting from performance of the Work, provided that such suit, claim, damage, ~~loss,~~ loss or expense is attributable to any bodily injury, sickness, ~~disease~~ disease, or death, or ~~to~~ injury to or destruction of ~~tangible property (other than the Work itself),~~ any tangible property, including loss of use resulting therefrom, but only to the extent caused ~~by the negligent acts or omissions of the Contractor, a~~ in whole or in part by the act, omission, fault, or statutory violation of the Contractor, a subcontractor, or any person or entity directly or indirectly employed by them, or any person or entity for whose acts they may be liable or arises out of operation of law as a consequence of any act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts ~~they~~ any of the above may be liable, regardless of whether ~~or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.~~any of them has been negligent. This provision shall not be construed to require the Contractor to indemnify the Owner, Construction Manager, or Architect for the negligence of the Owner, Construction Manager, or Architect to the extent such negligence, in whole or in part, proximately caused the damages resulting in the suit, claim, damage, loss or expense.

...

§ 3.19 Daily Records Clause

§ 3.19.1 The Contractor shall prepare and maintain Daily Inspection Records to document the progress of the work on a daily basis. Such daily records shall include a daily accounting of all labor and all equipment on the site for the Contractor and all subcontractors, at any tier. Such daily records will make a clear distinction between work being performed under Change Order, base scope work and/or disputed work.

§ 3.19.2 In the event that any labor or equipment is idled, solely as a result of Owner actions or inactions, the daily records shall record which laborers and equipment were idled and for how long. In the event that specific work activities were stopped, solely as a result of Owner actions or inactions, and labor and equipment was reassigned to perform work on other activities, the daily records will make a clear record of which activities were stopped and where labor and equipment was redirected to.

§ 3.19.3 Such daily records shall be copied and provided to the Construction Manager as the representative of the Owner at the end of every week.

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~~**§ 4.1.3** Duties, responsibilities, and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Construction Manager, Architect, and Contractor. Consent shall not be unreasonably withheld.~~

...

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§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

§ 4.2.2.2 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Construction Manager for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

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§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract ~~Documents,~~ Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

...

§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken ~~in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule,~~ with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

...

§ 4.2.13 The ~~Construction Manager will prepare Change Orders and Construction Change Directives.~~Architect will prepare Change Orders, Construction Change Directives and Allowance Change Authorizations.

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§ 4.2.17 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of the Project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents. The Owner shall notify the Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.18 The Architect will interpret and decide matters concerning performance of the Contractor under, and requirements of, the Contract Documents on written request of the Construction Manager, Owner, or Contractor

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through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.19 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. ~~When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions so rendered in good faith.~~

~~**§ 4.2.20** The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.~~

...

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include ~~other Contractors or~~ Separate Contractors or the subcontractors of ~~other Contractors or~~ Separate Contractors.

...

§ 5.2.1 Unless otherwise stated in the Contract Documents, the ~~Contractor,~~ Contractor or the bidding requirements, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special ~~design.~~ design for each principal portion of the Work. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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§ 5.2.5 The Contractor shall perform at least <Twenty-Five> percent of the cost of the Contract (not including the costs of materials, insurance, bonds, submittals and similar items) with its own employees.

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§ 5.5 Owner Payments to Subcontractors

§ 5.5.1 In the event of any default hereunder by the Contractor, or in the event the Owner, Construction Manager, or Architect fails to approve any application for payment, that is not the fault of a Subcontractor, the Owner may make direct payment to the Subcontractor, less appropriate retainage. In that event, the amount so paid the Subcontractor shall be deducted from any contract amount due to the Contractor.

§ 5.5.2 Nothing contained herein shall create any obligation on the part of the Owner to make any payments to any Subcontractor, and no payment by the Owner to any Subcontractor shall create any obligation to make any further payments to any Subcontractor.

...

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

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§ 6.1.2 When ~~the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.~~separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 ~~Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.~~The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

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§ 6.2.6 All Contractors shall cooperate with each other in the installation and construction of each Contractor's work and in such manner as the Owner and/or Construction Manager may direct. All Contractors shall control and coordinate the work of their subcontractors, if any. The Owner and/or Construction Manager shall approve or require the modification of the work schedules of all Contractors to the end of the Project so the whole Project may be progressed, as expeditiously as possible, as one unit. The award of more than one Contract for the Project requires sequential or otherwise inter-related Contractor operations, and may involve inherent delays in the progress of any individual contractor's work. Accordingly, the Owner and/or Construction Manager cannot guarantee the unimpeded operations of any Contractor. Each Contractor acknowledges these conditions and understands that he shall bear the risk of all ordinary delays caused by the presence or operations of other Contractors engaged upon the Project and ordinary delays attended upon the approved Construction Schedule.

...

§ 7.1.4 The combined overhead and profit (for Contractor, subcontractors, suppliers, and contractors of a lower-tier) included in the total cost to the Owner for a change in the Work shall be as follows:

.1 Maximum combined overhead and profit, **<15>** percent of the cost.

.2 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4.

.3 To facilitate checking of quotations for extras or credits, all proposals shall be accompanied by a complete itemization of costs including labor, materials, rental costs, and Subcontracts. Subcontracts shall be itemized also.

.4 The additional bond charges for the total change order, two percent (2%) of the cost shall also apply to Deduct Change orders.

A Change Order is a written instrument prepared by the ~~Construction Manager~~ Architect and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

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§ 7.3.1 A Construction Change Directive is a written order prepared by the ~~Construction Manager~~ Architect and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

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...

§ 7.3.4 If ~~the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:~~

~~**.1** Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;~~

~~**.2** Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;~~

~~**.3** Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;~~

~~**.4** Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and~~

~~**.5** Costs of supervision and field office personnel directly attributable to the change.~~unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 If the Contractor ~~disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.~~does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;

.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Overhead and profit mark-up shall include, but not be limited to, the following:

.1 home office expense;

.2 field office expense;

.3 supervision;

.4 project management & estimation; and

.5 small tools & equipment.

§ 7.3.6 ~~Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.~~If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.7 ~~A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall~~

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~~be effective immediately and shall be recorded as a Change Order.~~Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.8 ~~The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.~~A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.9 ~~Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.~~The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.10 ~~When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.~~Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.11 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

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§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may ~~determine.~~determine and as approved by the Owner. Nothing contained herein shall be construed to provide for payment of compensation of any kind to the Contractor for damages due to hindrance or delay from any cause in the progress of the Work, unless such delay is caused by the active interference of the Owner, or the Architect, or the Construction Manager and no claim for compensation shall be made by the

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Contractor or paid by the Owner except for such Owner or Architect or Construction Manager caused delay. The extension of time as above provided, shall be the Contractor's exclusive remedy except as above provided.

...

§ 8.3.3 ~~This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.~~The Owner shall not be liable to the Contractor and/or any subcontractor for claims or damages of any nature caused by or arising out of delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to the claim procedure set forth herein. Except to the extent, if any, expressly prohibited by law, the Contractor expressly agrees not to make and hereby waives any claim for damages for delay, including, but not limited to, those resulting from increased labor or material costs; directions given or not given by the Owner, Construction Manager or Architect, including scheduling and coordination of the Work; the Architect's preparation of drawings and specifications or review of shop drawings and requests for instruction(s); or, on account of any delay, obstruction or hindrance for any cause whatsoever by the Owner, Construction Manager, Architect, or any other contractor on the project, whether or not foreseeable or anticipated. The Contractor agrees that its sole right and remedy therefor shall be an extension of time, if appropriate. **IT IS EMPHASIZED THAT NO MONETARY RECOVERY MAY BE OBTAINED BY THE CONTRACTOR FOR DELAY AGAINST THE OWNER, CONSTRUCTION MANAGER, OR ARCHITECT BASED ON ANY REASON AND THAT THE CONTRACTOR'S SOLE REMEDY, IF APPROPRIATE, IS ADDITIONAL TIME.**

...

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and ~~suppliers,~~ suppliers and shall reflect retainage if provided for in the Contract Documents. The form of Application for Payment, duly notarized, shall be a current authorized edition of AIA Document G7032, Application and Certificate for Payment. Alternative payment application forms are not permitted. AIA Document G732 shall be supported by a current authorized edition of AIA Document G703, Continuation Sheet or equivalent continuation sheet, subject to the approval of Owner and Architect.
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§ 9.3.1.3 Until Substantial Completion, the Owner shall pay 95 percent of the amount due the Contractor on account of progress payments. At Substantial Completion, the Construction Manager and Architect may authorize remaining partial payments to be made in full, less twice the value of items remaining to be completed and an amount necessary to satisfy any outstanding claims, liens, or judgments.

§ 9.3.1.4 "Applications for Payment must be accompanied by any and all releases of liens for previous applications from Contractor and his/her subcontractors and a sworn and notarized statement that all subcontractors have been paid to at least 95% of previously requisitioned sums.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

...

§ 9.4.1 ~~Where there is only one Contractor, the~~ The Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and

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Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 ~~Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.~~The Construction Manager's certification of an Application for Payment shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

~~**§ 9.4.2.1** Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.~~

§ 9.4.3 The ~~Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's~~ Architect's issuance of a Certificate for Payment shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the ~~Construction Manager's~~ Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The ~~Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.~~representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.5 The ~~representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or Architect.~~issuance of a Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections

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to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

~~**§ 9.4.6** The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.~~

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.2 and 9.4.3 ~~and 9.4.4~~ cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section ~~9.4.1 and 9.4.2.~~ 9.4.1. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

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.7 ~~repeated~~ failure to carry out the Work in accordance with the Contract Documents.

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§ 9.6.1 After the Architect has issued a Certificate for ~~Payment or Project Certificate for~~ Payment, the Owner shall make payment in the manner and within the time provided in the Contract ~~Documents,~~ Documents and shall so notify the Construction Manager and Architect. Payments to Contractor, including any interest, shall be consistent with this Agreement and in accordance with New York State General Municipal Law Section 106-b.

...

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and ~~suppliers~~ material and equipment suppliers' amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

...

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the ~~Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.~~Owner in accordance with applicable law.

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...

§ 9.7 Failure of Payment

~~If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.~~

...

§ 9.8.2 ~~When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.~~

§ 9.8.2 No later than 14 days prior to the Contract-scheduled date of Substantial Completion, the Contractor shall issue a letter to the Architect and Construction Manager confirming their work is on schedule for Substantial Completion by the contract specified date. No later than seven days after Contract-scheduled date of Substantial Completion (including authorized adjustments), the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. Absence the contractor letter confirming readiness of work, the Architect may elect to postpone the substantial completion inspection. If the Architect's inspection discloses any item which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine the actual date of Substantial Completion.

§ 9.8.2.1 The Architect will perform no more than one inspection to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

§ 9.8.3 ~~Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether~~ When the Work or designated portion thereof is substantially ~~complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize~~ complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof ~~for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine~~ unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.4 ~~When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the~~

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~~list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.~~The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.5 ~~The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.~~In the event the Contractor does not achieve final completion within thirty (30) days after the date of substantial completion, allowing for any approved extensions of the contract time, Contractor shall not be entitled to any further payment and Contractor hereby agrees that such failure to complete the work within the time set forth above shall constitute a waiver of all claims by the Contractor to any money that may be due. This provision shall not operate as a waiver by the Owner of any claims or remedies of any nature against the Contractor arising out of the contract.

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§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. ~~When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2.~~ Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

...

§ 9.10.1 ~~Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment~~ On or within seven (7) days following the date of Final Completion (as established in the bid documents or modified by Change Order) the Architect will conduct a final inspection of the work. As a result of that inspection, the Architect will issue a Final Inspection Report. This report will document the condition of the work and will render a formal opinion as to the whether or not the work or designated portion is complete. If, as a result of the Architect's inspection, it is determined that the work is not complete and in accordance with the Contract Documents, the Architect shall notify the Owner and Contractor in writing of this opinion. This notice will include the Final Inspection Report documenting the conditions of the work and will be considered a formal notice to the Contractor of their failure to fulfill the terms and conditions of their contract.

If as a result of this inspection, it is determined that the work is complete, the Contractor shall submit their Final Payment Application and Certificate for Payment. The Architect will then certify and issue the final Certificate for Payment stating that to the best of ~~their~~ the Architects knowledge, information and belief, and on the basis of ~~their on-site~~ the Architect's periodic site visits and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The ~~Construction Manager's and Architect's final Certificate for Payment or~~

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~~Project Certificate for Payment~~ Architect's final Certificate for payment will constitute a further representation that the conditions listed in ~~Section~~ section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. The final Certificate for Payment will not be issued until all work on the final inspection report is completed or corrected.

§ 9.10.1.1 The Architect will perform no more than one on-site observation to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional on-site observations.

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§ 9.10.6 If the Contractor is responsible for delays in the final completion and closeout beyond the contract specified time, the Owner is entitled to reimbursement from the Contractor for amounts paid by the Owner to subsequently extend the Electronic Submittal System (Submittal Exchange).

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The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Contractor shall be responsible for maintaining safety data sheets at the site.

The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

...

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

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§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended ~~appropriately~~ appropriately, and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

~~**§ 10.3.3** To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.~~

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...

~~**§ 10.3.6** If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.~~

...

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents. The policy certificate must include the project name.
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§ 11.1.5 Schedule of Insurance
The Contractor, at its own expense, shall procure and maintain the following insurance coverages with limits of liability not less than the limits specified, or greater if required by law.

.1 Notwithstanding any terms, conditions or provisions, in any other writing between the parties, the contractor hereby agrees to effectuate the naming of the Cornwall Central School District ("District") as an Additional Insured on the contractor's insurance policies, except for workers' compensation and N.Y. State Disability insurance.

.2 The policy naming the District as an Additional Insured shall:

- **a.** Be an insurance policy from an A.M. Best A- rated or better insurer, licensed and admitted to conduct business in New York State. A New York licensed and admitted insurer is required.
- **b.** State that the organization's coverage shall be primary and non-contributory coverage for the District, its Board, employees and volunteers including a waiver of subrogation in favor of the District for all coverages including Workers Compensation.
- **c.** Additional insured status for General Liability coverage shall be provided by standard or other endorsements that extend coverage to the District for on-going operations (CG 20 38 or equivalent) and products and completed operations (CG 20 37 or equivalent). The decision to accept an endorsement rest solely with the District. A completed copy of the endorsements must be attached to the Certificate of Insurance to include General Liability, Auto Liability and Umbrella/Excess coverages.

.3
- **a.** The certificate of insurance must describe all services provided by the contractor (e.g., roofing, carpentry or plumbing) that are covered by the liability policies.
- **b.** At the District's/BOCES' request, the contractor shall provide a copy of the declaration page of the liability and umbrella/excess policies with a list of endorsements and forms. If requested, the contractor will provide a copy of the policy endorsements and forms.
- **c.** There will be no coverage restrictions and/or exclusions involving New York State Labor Law statutes or gravity related injuries.
- **d.** No policies containing escape clauses or exclusions contrary to the Owner's interests will be accepted
- **e.** A fully completed New York Construction Certificate of Liability Insurance Addendum (ACORD 855 2014/15) must be included with the certificates of insurance. For any "Yes" answers on Items G through L on this Form– additional details must be provided in writing. Policy exclusions may not be accepted.

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.4 The contractor agrees to indemnify the District for applicable deductibles and self-insured retentions.

.5 Minimum Required Insurance:

a. **Commercial General Liability Insurance**
$1,000,000 per Occurrence/$2,000,000 Aggregate
$2,000,000 Products and Completed Operations
$1,000,000 Personal and Advertising Injury
$100,000 Fire Damage
$10,000 Medical Expense
The general aggregate shall apply on a per-project basis.

b. **Owners Contractors Protective (OCP) Insurance**
For projects less than or equal to $1,000,000 and/or work on 1 story (10 feet) only; $1,000,000 per occurrence, $2,000,000 aggregate with the District as the Named Insured.

For projects greater than $1,000,000 and/or work over 1 story (10 feet); $2,000,000 per occurrence, $4,000,000 aggregate with the District as the Named Insured.

The OCP Policy must be with a NYS licensed and admitted carrier. The District will be the Named Insured on OCP Policies. There will be no Additional Insureds on any OCP Policies.

c. **Automobile Liability**
$1,000,000 combined single limit for owned, hired, borrowed and non-owned motor vehicles.

d. **Compensation and NYS Disability Insurance**
Statutory Workers' Compensation (C-105.2 or U-26.3); and NYS Disability Insurance (DB-120.1) for all employees. Proof of coverage must be on the approved specific form, as required by the New York State Workers' Compensation Board. ACORD certificates are not acceptable. A person seeking an exemption must file a CE-200 Form with the state. The form can be completed and submitted directly to the WC Board online.

e. **Umbrella/Excess Insurance**
$5,000,000 each Occurrence and Aggregate for general construction and no work at elevation (1 story or 10 feet) and project values less than or equal to $1,000,000.

$10,000,000 each Occurrence and Aggregate for high-risk construction, work at elevation (>1 story or 10 feet) and project values greater than $1,000,000.

Umbrella/Excess coverage shall be on a follow-form basis or provide broader coverage over the General Liability and Auto Liability coverages.

.6 Contractor acknowledges that failure to obtain such insurance on behalf of the District constitutes a material breach of contract and subjects it to liability for damages, indemnification and all other legal remedies available to the District. The contractor is to provide the District with a certificate of insurance, evidencing the above requirements have been met, prior to the commencement of work. The failure of the District to object to the contents of the certificate or the absence of same shall not be deemed a waiver of any rights held by the District.

.7 Subcontractors are subject to the same terms and conditions as stated above and must submit same to the District for approval prior to the start of any work.

.8 In the event the General Contractor fails to obtain the required certificates of insurance from the Subcontractor and a claim is made or suffered, the General Contractor shall indemnify, defend, and hold harmless the District, it's Board, employees and volunteers from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract.

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.9 Asbestos/Lead Abatement/Pollution Liability Insurance

$2,000,000 per occurrence/$2,000,000 aggregate, including products and completed operations. Such insurance shall include coverage for the Contractor's operations including, but not limited to, removal, replacement, enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it shall pre-date the inception of the Contract.

If the Contractor is using motor vehicles for transporting hazardous materials, the Contractor shall maintain pollution liability broadened coverage (ISO Endorsement CA 9948 or CA 01 12), as well as proof of MCS 90. Coverage shall fulfill all requirements of these specifications and shall extend for a period of three (3) years following acceptance by the District of the Certificate of Completion.

.10 Testing Company Errors and Omission Insurance

$1,000,000 per occurrence/$2,000,000 aggregate for the testing and other professional acts of the Contractor performed under the Contract with the District.

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§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within ~~one year~~ two years after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. ~~During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.~~ If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The ~~one-year~~ two-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The ~~one-year~~ two-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

...

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the ~~one-year~~ two-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

...

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be ~~effected~~ affected whether or not final payment has been made.

...

The Contract shall be governed by the law of the place where the Project ~~is located excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.~~is.

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~~**§ 13.2.2** The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.~~

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Payments ~~due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~to Contractor, including any interest, shall be consistent with this Agreement and in accordance with New York State General Municipal Law Section 106-b.

§ 13.6 Time Limits on Claims

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case, not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

§ 13.7 Equal Opportunity

§ 13.7.1 The Contractor shall maintain policies of employment as follows:

.1 The Contractor and the Contractor's subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, or natural origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notice setting forth the policies of non-discrimination.

.2 The Contractor and the Contractor's subcontractors shall, in all solicitations or advertisement for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

§ 13.8 Wage Rates

§ 13.8.1 The Contractor shall comply with Prevailing Wage Rates issued and periodically updated, by the New York State Department of Labor, for the location and duration of the Project.

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§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, under direct or indirect contract with the Contractor, for any of the following reasons:

...

.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract ~~Documents; or~~

~~**.4** The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.~~ Documents.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, under direct or indirect contract with the Contractor, repeated suspensions, delays, or interruptions of the entire Work by the

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Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon ~~seven~~ thirdy days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work ~~executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.~~properly executed.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon ~~seven~~ thirty additional days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

...

.1 ~~repeatedly~~ refuses or fails to supply enough properly skilled workers or proper materials;

...

.3 ~~repeatedly~~ disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

.5 Breaches any warranty made by the Contractor under or pursuant to the Contract Documents.

.6 Fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all of the requirements of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, ~~after consultation with~~ the ~~Construction Manager, and upon certification by the Architect that sufficient cause exists to justify such action, the~~ Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

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§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The ~~amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.~~costs of finishing the Work include, without limitation, all reasonable attorney's fees, additional title costs, insurance, additional interest because of any delay in completing the Work, and all other direct and indirect and consequential damages incurred by the Owner by reason of the termination of the Contractor as stated herein.

...

§ 14.3.2 ~~The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall~~ Adjustment of the Contract Sum may include profit. No adjustment shall be made to the extent:

...

§ 14.4.1 ~~The Owner may, at any time, terminate the Contract~~ Notwithstanding any other provision to the contrary in this Agreement, the Owner reserves the right at any time and in its absolute discretion to terminate the services of the Contractor and/or the Work for the Owner's convenience and without ~~cause.~~cause by giving written notice to the Contractor. This termination for the convenience of the Owner provision allows and authorizes the Owner to

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terminate this Agreement at any time and for any reason whatsoever. This right may be exercised by the Owner in its complete discretion.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

...

§ 14.4.3 In the case of such termination for the Owner's convenience, the ~~Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.~~Contractor shall be entitled to, and the Owner shall reimburse the Contractor for, an equitable portion of the Contractor's fee based on the portion of the Work properly completed before the effective date of termination and for any other reasonable costs attributable to such termination. Contractor's entitlement to payment for all such work shall be predicated on its performance of such work in accordance with the Contract Documents as certified by the Architect and Construction Manager. Contractor shall be entitled to no other payment and waives any claim for damages.

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~~The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.~~
Claims by the Contractor must be initiated by written notice to the Owner with a copy sent to the Construction Manager and Architect. Claims by the Contractor must be initiated within twenty-one (21) days after the occurrence of the event giving rise to such Claim or within twenty-one (21) days after the Contractor should have been aware of the condition giving rise to the Claim, whichever is later.

...

~~**§ 15.1.3.2** Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.~~

§ 15.1.3.2 Written notice shall contain a heading stating "Notice of Claim" to clearly identify it as such. Such notice shall set forth in detail the circumstances that form the basis for the Claim and shall include the following:

.1 Clear statement of claim matter, including background and chronology.
.2 Documentation in support of claim matter.
.3 Documentation in support of claimed damages.
.4 Certification by responsible officer of claimant.

§ 15.1.3.3 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

...

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

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...

§ 15.1.6.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.6.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

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This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. ~~Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable,~~

§ 15.1.8 Claim Procedure

§ **15.1.8.1** Claims by the Contractor must be made by written notice in accordance with the following procedures:

.1 The Contractor may submit a claim concerning a matter properly noticed in accordance with the time requirements of this Contract.

.2 Failure by the Contractor to furnish the required claim documentation within the time set forth above shall constitute waiver of the Contractor's right to compensation for such claim.

.3 Contractor shall furnish three (3) certified copies of the required claim documentation, with a copy submitted to the Owner, Architect, and Construction Manager. The claim documentation shall be complete when furnished. The evaluation of the Contractor's claim will be based, among other things, upon the Owner project records and the Contractor's furnished claim documentation.

.4 Claim documentation shall conform to Generally Accepted Accounting Principles and shall be in the following format:

1. General Introduction
2. General Background Discussion
3. Issues

    A. Index of Issues (listed numerically)
    B. For each issue

        (1) Background
        (2) Chronology
        (3) Contractor's position (reason for Owner's potential liability)
        (4) Supporting documentation of merit or entitlement
        (5) Supporting documentation of damages
        (6) Begin each issue on a new page

4. All critical path method schedules, (as-planned, monthly updates, schedule revisions, and as-built) along with the computer disks of all schedules related to the claim.

5. Productivity exhibits (if appropriate)

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6. Summary of Issues and Damages

.5 Supporting documentation of merit for each issue shall be cited by reference, photocopies, or explanation. Supporting documentation may include, but shall not be limited to, general conditions; general requirements; technical specifications; drawings; correspondence; conference notes; shop drawings and submittals; shop drawing logs; survey books; inspection reports; delivery schedules; test reports; daily reports; subcontracts; fragmentary CPM schedules or time impact analyses; photographs; technical reports; requests for information; field instructions; and all other related records necessary to support the Contractor's claim.

.6 Supporting documentation of damages for each issue shall be cited, photocopies, or explained. Supporting documentation may include, but shall not be limited to, any or all documents related to the preparation and submission of the bid; certified, detailed labor records including labor distribution reports; material and equipment procurement records; construction equipment ownership cost records or rental records; subcontractor or vendor files and cost records; service cost records; purchase orders; invoices; project as-planned and as-built cost records; general ledger records; variance reports; accounting adjustment records; and any other accounting materials necessary to support the Contractor's claim.

.7 Each copy of the claim documentation shall be certified by a responsible officer of the Contractor in accordance with the requirements of ~~the Contract Documents.~~these Contract Documents.

§ **15.1.8.2 Claims and Actions Thereon.** No claim against the Owner for damages for breach of contract or compensation for extra work shall be made or asserted in any action or proceeding at law, or in equity, unless the Contractor shall have strictly complied with all the requirements relating to the giving of notice and of information with respect to such claims all as provided in this Agreement.

§ **15.1.8.3 No Estoppel.** Neither the Owner nor any department officer, agent or employees 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 Owner, or any officer, agent or employee of the Owner, either before or after the final completion and acceptance of the Work and payment therefor: (1) from showing the true and correct classification, amount, quality or character of the Work actually done; or that any such termination, decision, order, letter, payment or certificate was untrue, incorrect or improperly made in any particular matter, or that the Work or any part thereof does not in fact conform to the requirements of this Contract; or (2) from demanding and recovering from the Contractor any overpayments made to him, or such damages as it may sustain by reason of his failure to perform each and every part of this Contract in strict accordance with its terms; or (3) both (1) and (2) hereto.

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§ 15.2.1 ~~Claims,~~ Claims by the Contractor, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any ~~Claim.~~ Claim arising prior to the date of final payment is due. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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§ 15.2.4 If the Initial Decision Maker requests a ~~party to provide a response to a Claim or to furnish additional supporting data, such party~~ Contractor to furnish additional supporting data, the Contractor shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

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§ 15.2.5 ~~The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, and the Architect, if the Architect is not serving as the Initial Decision Maker, of any~~ If a Claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Architect, the Architect will render to the parties the Architect's written recommendation relative to the Claim, including any recommended change in the Contract Sum or Contract Time or both. ~~The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.~~If there is a surety and there appears to be a possibility of a Contractor's default, the Architect may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

...

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days of receipt thereof, then both parties waive their rights ~~to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.~~to.

...

§ 15.2.9 Nothing contained in this Agreement is intended to alter or replace any provisions of the laws of the state of New York relating to claims made against the Owner or to relieve Contractor from any obligations thereunder.

...

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. ~~If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.~~

...

§ 15.4 ~~Arbitration~~

The parties expressly agree that any claim, dispute, or other controversy of any nature arising out of the contract or performance of the work shall be commenced and maintained in New York State Supreme Court located in Orange County.~~**§ 15.4.1** If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~

~~**§ 15.4.1.1** A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.~~

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~~**§ 15.4.2** The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.~~

~~**§ 15.4.3** The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~

~~**§ 15.4.4 Consolidation or Joinder**~~

~~**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~

~~**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.~~

~~**§ 15.4.4.3** The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.~~

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Kim Ruebel, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 17:19:12 ET on 07/23/2024 under Order No. 3104241246 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A232™ – 2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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AIA® Document A132® – 2019

Standard Form of Agreement Between Owner and Contractor, *Construction Manager as Adviser Edition*

AGREEMENT made as of the day of in the year
(In words, indicate day, month, and year.)

BETWEEN the Owner:
(Name, legal status, address, and other information)

Cornwall Central School District
24 Idlewild Avenue
Cornwall-on-Hudson, New York 12520

and the Contractor:
(Name, legal status, address, and other information)

for the following Project:
(Name, location, and detailed description)

Reconstruction to
Cornwall On Hudson Elementary School
Cornwall Elementary School
Cornwall Central Middle School
Tetra Tech Project Number: 363579-22001.3

The Construction Manager:
(Name, legal status, address, and other information)

The Palombo Group
195 Front Street, 1st Floor
Newburgh, New York 12550

The Architect:
(Name, legal status, address, and other information)

Tetra Tech Engineers, Architects & Landscape Architects, P.C.
d/b/a Tetra Tech Architects & Engineers
10 Brown Road
Ithaca, New York 14850

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™–2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

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2 THE WORK OF THIS CONTRACT

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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[ ] The date of this Agreement.

[ ] A date set forth in a notice to proceed issued by the Owner.

[**X**] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

Refer to Section 01 12 00 – Multiple Contract Summary

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be:
(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

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§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of all of the Contractors for the Project are to be completed prior to Substantial Completion of the entire Work of all of the Contractors for the Project, the Contractors shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:
(Check one of the following boxes and complete the necessary information.)

[ ] Not later than ( ) calendar days from the date of commencement of the Work.

[ ] By the following date:

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work	Date to be substantially complete

§ 3.4.3 If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[X] Stipulated Sum, in accordance with Section 4.2 below

[ ] Cost of the Work plus the Contractor's Fee, in accordance with Section 4.3 below

[ ] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

§ 4.2.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.2.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

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Item	Price

§ 4.2.4 Unit prices, if any:
(Identify the item and state the unit price, and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and Architect, the Owner shall make progress payments on account of the Contract Sum, to the Contractor, as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the fifth (5th) day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the thirtieth (30th) day of the same month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall be made by the Owner not later than forty-five (45) days after the Construction Manager receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to the other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

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.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019; and

.5 Retainage withheld pursuant to Section 5.1.7.

(Paragraphs deleted)

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Five percent (5%)

(Paragraphs deleted)

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to when the entire Work of this Contract is substantially complete, including modifications for completion of portions of the Work as provided in Section 3.4.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, when the Work of this Contract is substantially complete, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted when the Work of this Contract is substantially complete shall not include retainage as follows:
(Insert any other conditions for release of retainage when the Work of this Contract is substantially complete, or upon Substantial Completion of the Work of all Contractors on the Project or portions thereof.)

§ 5.2 Final Payment

§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

§ 5.2.1.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

§ 5.2.1.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

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(Paragraphs deleted)

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[ ] Arbitration pursuant to Article 15 of AIA Document A232–2019.

[X] Litigation in a court of competent jurisdiction.

[ ] Other: *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.

(Paragraphs deleted)

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019.

(Paragraphs deleted)

§ 7.3 Suspension

The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019; in such case, the Contract Sum and Contract Time shall be increased as provided in Article 14 of AIA Document A232–2019, except that the term "profit" shall be understood to mean the Contractor's Fee as described in Section 4.3.2 or 4.4.2, as applicable, of this Agreement.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

Mr. Harvey Sotland
Assistant Superintendent for Business
Cornwall Central School District
24 Idlewild Ave., Cornwall-On-Hudson, NY 12520
Phone: (845) 534-8009, ext. 7104
Email: hsotland@cornwallschools.com

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§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A132™–2019, Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

1. Any unused Allowance Costs to be returned to Owner.

(Paragraphs deleted)

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

.2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit

.3 AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

.4

(Paragraphs deleted)

Drawings

Number	Title	Date
00 01 15	List of Drawing Sheets	

.5 Specifications

Section	Title	Date	Pages
00 01 10	Table of Contents		

.6 Addenda, if any:

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Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

(Paragraphs deleted)

.7 Other documents, if any, listed below:

(Paragraph deleted)

The Contract Documents include the Notice To Bidders (Advertisement), Instructions to Bidders, Supplementary Instructions to Bidders, Bid Form (including Unit Prices) (executed by Bidder), the Non-Collusive Bidding Certification (executed by Bidder), General Conditions, Specifications, Drawings, Addenda issued prior to execution of the Contract, Agreement between Owner and Contractor ("Agreement"), other Documents listed in the Agreement, and Modifications issued or negotiated after receipt of bids or execution of the Agreement.

Where the term "Agreement", "Contract" or "Prime Contract" is used in the General Conditions and other Contract Documents, it shall mean the separate Owner-Contractor Agreement between the Owner and each Prime Contractor identified in Conditions of the Contract (General and other conditions).

This Agreement is entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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AIA® Document A132® – 2019

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PAGE 1

Cornwall Central School District
24 Idlewild Avenue
Cornwall-on-Hudson, New York 12520

...

Reconstruction to
Cornwall On Hudson Elementary School
Cornwall Elementary School
Cornwall Central Middle School
Tetra Tech Project Number: 363579-22001.3

...

The Palombo Group
195 Front Street, 1st Floor
Newburgh, New York 12550

...

Tetra Tech Engineers, Architects & Landscape Architects, P.C.
d/b/a Tetra Tech Architects & Engineers
10 Brown Road
Ithaca, New York 14850

PAGE 2

[X] Established as follows:

...

~~If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.~~Refer to Section 01 12 00 – Multiple Contract Summary

PAGE 3

[X] Stipulated Sum, in accordance with Section 4.2 below

...

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[ ] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.3 Cost of the Work Plus Contractor's Fee without a Guaranteed Maximum Price

§ 4.3.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

§ 4.3.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.3.3 The method of adjustment of the Contractor's Fee for changes in the Work:

§ 4.3.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

§ 4.3.5 Rental rates for Contractor-owned equipment shall not exceed __ percent (__ %) of the standard rental rate paid at the place of the Project.

§ 4.3.6 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.3.7 The Contractor shall prepare and submit to the Construction Manager, within 14 days of executing this Agreement, a written Control Estimate for the Owner's review and approval. The Control Estimate shall include the items in Section B.1 of Exhibit B, Determination of the Cost of the Work.

§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price

§ 4.4.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

§ 4.4.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.4.3 The method of adjustment of the Contractor's Fee for changes in the Work:

§ 4.4.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

§ 4.4.5 Rental rates for Contractor-owned equipment shall not exceed __ percent (__ %) of the standard rental rate paid at the place of the Project.

§ 4.4.6 Unit Prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

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~~**Item** **Units and Limitations** **Price per Unit ($0.00)**~~

~~**§ 4.4.7 Guaranteed Maximum Price**~~
~~**§ 4.4.7.1** The Contract Sum is guaranteed by the Contractor not to exceed ($), subject to additions and deductions by Change Order as provided in the Contract Documents. This maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.~~

~~**§ 4.4.7.2 Alternates**~~
~~**§ 4.4.7.2.1** Alternates, if any, included in the Guaranteed Maximum Price:~~

~~**Item** **Price**~~

~~**§ 4.4.7.2.2** Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.~~
~~*(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)*~~

~~**Item** **Price** **Conditions for Acceptance**~~

~~**§ 4.4.7.3** Allowances, if any, included in the Guaranteed Maximum Price:~~
~~*(Identify each allowance.)*~~

~~**Item** **Price**~~

~~**§ 4.4.7.4** Assumptions, if any, upon which the Guaranteed Maximum Price is based:~~
~~*(Identify each assumption.)*~~

~~**§ 4.4.8** To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes, or equipment, all of which, if required, shall be incorporated by Change Order.~~

~~**§ 4.4.9** The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 4.4.7.4. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions contained in Section 4.4.7.4 and the revised Contract Documents.~~

~~**§ 4.5** Liquidated damages, if any:~~
~~*(Insert terms and conditions for liquidated damages, if any, to be assessed in accordance with Section 3.4.)*~~

~~**§ 4.6** Other:~~
~~*(Insert provisions for bonus, cost savings or other incentives, if any, that might result in a change to the Contract Sum.)*~~

...

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the fifth (5th) day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the thirtieth

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(30th) day of the same month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall be made by the Owner not later than forty-five (45) days after the Construction Manager receives the Application for Payment.

...

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of ~~values~~ values, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

...

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to the other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

~~**§ 5.1.5 Progress Payments Where the Contract Sum is Based on the Cost of the Work without a Guaranteed Maximum Price**~~

~~**§ 5.1.5.1** With each Application for Payment, the Contractor shall submit the cost control information required in Exhibit B, Determination of the Cost of the Work, along with payrolls, petty cash accounts, receipted invoices, or invoices with check vouchers attached, and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that payments already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor, plus payrolls for the period covered by the present Application for Payment, less that portion of the payments attributable to the Contractor's Fee.~~

~~**§ 5.1.5.2** Applications for Payment shall show the Cost of the Work actually incurred by the Contractor through the end of the period covered by the Application for Payment and for which the Contractor has made or intends to make actual payment prior to the next Application for Payment.~~

~~**§ 5.1.5.3** In accordance with AIA Document A232-2019 and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:~~

~~**§ 5.1.5.3.1** The amount of each progress payment shall first include:~~

- ~~**.1** The Cost of the Work as described in Exhibit B, Determination of the Cost of the Work;~~
- ~~**.2** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and~~
- ~~**.3** The Contractor's Fee computed upon the Cost of the Work described in the preceding Section 5.1.5.3.1.1 at the rate stated in Section 4.3.2; or if the Contractor's Fee is stated as a fixed sum in Section 4.3.2 an amount which bears the same ratio to that fixed-sum Fee as the Cost of the Work included in Section 5.1.5.3.1.1 bears to a reasonable estimate of the probable Cost of the Work upon its completion.~~

~~**§ 5.1.5.3.2** The amount of each progress payment shall then be reduced by:~~

- ~~**.1** The aggregate of any amounts previously paid by the Owner;~~
- ~~**.2** The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;~~
- ~~**.3** Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;~~
- ~~**.4** For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019;~~

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.5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.5.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.6 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.5.4 The Owner, Construction Manager and Contractor shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors and the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.5.5 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor, and such action shall not be deemed to be a representation that (1) the Construction Manager and Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Article 5 or other supporting data; (2) that the Construction Manager and Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager and Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

§ 5.1.5.6 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.5.7 If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232–2019.

§ 5.1.6 Progress Payments Where the Contract Sum is Based on the Cost of the Work with a Guaranteed Maximum Price

§ 5.1.6.1 With each Application for Payment, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that payments already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Contractor's Fee.

§ 5.1.6.2 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Guaranteed Maximum Price among: (1) the various portions of the Work; (2) any contingency for costs that are included in the Guaranteed Maximum Price but not otherwise allocated to another line item or included in a Change Order; and (3) the Contractor's Fee.

§ 5.1.6.2.1 The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.6.2.2 The allocation of the Guaranteed Maximum Price under this Section 5.1.6.2 shall not constitute a separate guaranteed maximum price for the Cost of the Work of each individual line item in the schedule of values.

§ 5.1.6.2.3 When the Contractor allocates costs from a contingency to another line item in the schedule of values, the Contractor shall submit supporting documentation to the Architect and Construction Manager.

§ 5.1.6.3 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. The percentage of completion shall be the lesser of (1) the percentage of that portion of the Work which has actually been completed; or (2) the percentage obtained by dividing (a) the expense that has actually been incurred by the Contractor on account of that portion of the Work and for which the Contractor has made payment or intends to make payment prior to the next Application for Payment by (b) the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values.

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§ 5.1.6.4 In accordance with AIA Document A232-2019, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.4.1 The amount of each progress payment shall first include:

.1 That portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the most recent schedule of values;

.2 That portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction or, if approved in writing in advance by the Owner, suitably stored off the site at a location agreed upon in writing;

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and

.4 The Contractor's Fee, computed upon the Cost of the Work described in the preceding Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 at the rate stated in Section 4.4.2 or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work included in Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

§ 5.1.6.4.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019;

.5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.6.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.6 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.6.5 The Owner and the Contractor shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors and the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.6.6 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and such action shall not be deemed to be a representation that (1) the Construction Manager or Architect have made a detailed examination, audit, or arithmetic verification of the documentation submitted in accordance with Section 5.1.6.1 or other supporting data; (2) that the Construction Manager or Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager or Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits, and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

§ 5.1.6.7 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.6.8 If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232-2019.

...

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Five percent (5%)

~~**§ 5.1.7.1.1** The following items are not subject to retainage:~~
~~*(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)*~~

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~~**§ 5.2.2 Final Payment Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price**~~
~~**§ 5.2.2.1** Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when~~

~~**.1** the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment;~~
~~**.2** the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit B, Determination of the Cost of the Work and a final Application for Payment; and~~
~~**.3** a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect in accordance with Exhibit B, Determination of the Cost of the Work.~~

~~**§ 5.2.2.2** The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:~~

~~**§ 5.3** Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~
~~*(Insert rate of interest agreed upon, if any.)*~~

~~—%~~

...

[**X**] Litigation in a court of competent jurisdiction.

...

~~**§ 7.1.1.1** If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:~~
~~*(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)*~~

~~**§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price**~~
~~**§ 7.2.1 Termination**~~
~~**§ 7.2.1.1** The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.~~

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~~**§ 7.2.1.2 Termination by the Owner for Cause**~~

~~**§ 7.2.1.2.1** If the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232–2019, the Owner shall then only pay the Contractor an amount as follows:~~

~~**.1** Take the Cost of the Work incurred by the Contractor to the date of termination;~~

~~**.2** Add the Contractor's Fee, computed upon the Cost of the Work to the date of termination at the rate stated in Section 4.3.2 or 4.4.2, as applicable, or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion;~~

~~**.3** Subtract the aggregate of previous payments made by the Owner; and~~

~~**.4** Subtract the costs and damages incurred, or to be incurred, by the Owner under Article 14 of AIA Document A232–2019.~~

~~**§ 7.2.1.2.2** When the Contract Sum is based on the Cost of the Work with a Guaranteed Maximum Price, if the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232-2019, the amount, if any, to be paid to the Contractor under Article 14 of AIA Document A232-2019 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed the amount calculated in Section 7.2.1.2.1.~~

~~**§ 7.2.1.2.3** The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 7.2.1.2.1.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 7, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders. All Subcontracts, purchase orders and rental agreements entered into by the Contractor will contain provisions allowing for assignment to the Owner as described above.~~

~~**§ 7.2.1.3 Termination by the Owner for Convenience**~~

~~If the Owner terminates the Contract for convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:~~

~~*(Insert the amount of or method for determining the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)*~~

...

Mr. Harvey Sotland
Assistant Superintendent for Business
Cornwall Central School District
24 Idlewild Ave., Cornwall-On-Hudson, NY 12520
Phone: (845) 534-8009, ext. 7104
Email: hsotland@cornwallschools.com

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§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, may be given in accordance with ~~a building information modeling exhibit,~~ AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with ~~a building information modeling exhibit,~~ AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

...

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§ 8.7 ~~Relationship of the Parties~~Other provisions:

~~Where the Contract is based on the Cost of the Work plus the Contractor's Fee, with or without a Guaranteed Maximum Price, the Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.~~1. Any unused Allowance Costs to be returned to Owner.

~~§ 8.8~~ ~~Other provisions:~~

...

~~.4~~ ~~Building Information Modeling Exhibit, if completed:~~

~~.5~~ Drawings

...

00 01 15 List of Drawing Sheets

~~.6~~ .5 Specifications

...

00 01 10 Table of Contents

~~.7~~ .6 Addenda, if any:

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~~.8~~ ~~Other Exhibits:~~
~~*(Check all boxes that apply and include appropriate information identifying the exhibit where required.)*~~

~~[–] AIA Document A132™–2019, Exhibit B, Determination of the Cost of the Work~~

~~[–] AIA Document E235™–2019, Sustainable Projects Exhibit, Construction Manager as Adviser Edition, dated as indicated below:~~
~~*(Insert the date of the E235-2019 incorporated into this Agreement.)*~~

~~[–] The Sustainability Plan:~~

~~**Title** **Date** **Pages**~~

~~[–] Supplementary and other Conditions of the Contract:~~

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~~Document~~ ~~Title~~ ~~Date~~ ~~Pages~~

~~.9~~ .7 Other documents, if any, listed below:

~~*(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232–2019 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)*~~

The Contract Documents include the Notice To Bidders (Advertisement), Instructions to Bidders, Supplementary Instructions to Bidders, Bid Form (including Unit Prices) (executed by Bidder), the Non-Collusive Bidding Certification (executed by Bidder), General Conditions, Specifications, Drawings, Addenda issued prior to execution of the Contract, Agreement between Owner and Contractor ("Agreement"), other Documents listed in the Agreement, and Modifications issued or negotiated after receipt of bids or execution of the Agreement.

Where the term "Agreement", "Contract" or "Prime Contract" is used in the General Conditions and other Contract Documents, it shall mean the separate Owner-Contractor Agreement between the Owner and each Prime Contractor identified in Conditions of the Contract (General and other conditions).

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Kim Ruebel, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 17:21:34 ET on 07/23/2024 under Order No. 3104241246 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A132™ – 2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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Kathy Hochul, Governor

Roberta Reardon, Commissioner

Cornwall Central School Dist

James Bouffard
Tetra Tech Archs & Engs
10 Brown Road
Ithaca NY 14850

Schedule Year	2024
Date Requested	07/25/2024
PRC#	2024009388

Location	24 Idlewild Avenue
Project ID#	363579-22001.3
Project Type	Reconstruction to Cornwall-On-Hudson Elementary, Cornwall Elementary, Cornwall Central Middle School

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2024 through June 2025. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12226

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission: a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion online.

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12226; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.ny.gov.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemperaneous, true, and accurate payroll records. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment.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. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, but are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed $100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds $25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYSDOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

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. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "Public Work Project" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12226 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex 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 (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of $50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.

Kathy Hochul, Governor

Roberta Reardon, Commissioner

Cornwall Central School Dist

James Bouffard
Tetra Tech Archs & Engs
10 Brown Road
Ithaca NY 14850

Schedule Year 2024
Date Requested 07/25/2024
PRC# 2024009388

Location 24 Idlewild Avenue
Project ID# 363579-22001.3
Project Type Reconstruction to Cornwall-On-Hudson Elementary, Cornwall Elementary, Cornwall Central Middle School

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information
All information must be supplied

Federal Employer Identification Number: _____

Name: _____

Address: _____

_____

City: _____ State: _____ Zip: _____

Amount of Contract: $_____

Approximate Starting Date: ____/____/____

Approximate Completion Date: ____/____/____

Contract Type:
[ ] (01) General Construction
[ ] (02) Heating/Ventilation
[ ] (03) Electrical
[ ] (04) Plumbing
[ ] (05) Other : _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12226

Social Security Numbers on Certified Payrolls:

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concern regarding inclusion of this information on payrolls if another identifier will suffice.

For these reasons, the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor. This change does not affect the Department's ability to request and receive the entire social security number from employers during its public work/ prevailing wage investigations.

Construction Industry Fair Play Act: Required Posting for Labor Law Article 25-B § 861-d

Construction industry employers must post the "Construction Industry Fair Play Act" notice in a prominent and accessible place on the job site. Failure to post the notice can result in penalties of up to $1,500 for a first offense and up to $5,000 for a second offense. The posting is included as part of this wage schedule. Additional copies may be obtained from the NYS DOL website, https://dol.ny.gov/public-work-and-prevailing-wage
If you have any questions concerning the Fair Play Act, please call the State Labor Department toll-free at 1-866-435-1499 or email us at: dol.misclassified@labor.ny.gov .

Worker Notification: (Labor Law §220, paragraph a of subdivision 3-a)

Effective June 23, 2020

This provision is an addition to the existing wage rate law, Labor Law §220, paragraph a of subdivision 3-a. It requires contractors and subcontractors to provide written notice to all laborers, workers or mechanics of the *prevailing wage and supplement rate* for their particular job classification *on each pay stub**. It also requires contractors and subcontractors to *post a notice* at the beginning of the performance of every public work contract *on each job site* that includes the telephone number and address for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her job classification. The required notification will be provided with each wage schedule, may be downloaded from our website *www.labor.ny.gov* or be made available upon request by contacting the Bureau of Public Work at 518-457-5589. *In the event the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.

(12.20)

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

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1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12226

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.

NEW YORK STATE OF OPPORTUNITY. Department of Labor

Required Notice under Article 25-B of the Labor Law

Attention All Employees, Contractors and Subcontractors: You are Covered by the Construction Industry Fair Play Act

The law says that you are an employee unless:

- You are free from direction and control in performing your job, **and**
- You perform work that is not part of the usual work done by the business that hired you, **and**
- You have an independently established business.

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. These include:

- Unemployment Insurance benefits, if you are unemployed through no fault of your own, able to work, and otherwise qualified,
- Workers' compensation benefits for on-the-job injuries,
- Payment for wages earned, minimum wage, and overtime (under certain conditions),
- Prevailing wages on public work projects,
- The provisions of the National Labor Relations Act, and
- A safe work environment.

It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor**, you must pay all taxes and Unemployment Insurance contributions required by New York State and Federal Law.**

Penalties for paying workers off the books or improperly treating employees as independent contractors:

• **Civil Penalty**	First offense: Up to $2,500 per employee Subsequent offense(s): Up to $5,000 per employee
• **Criminal Penalty**	First offense: Misdemeanor - up to 30 days in jail, up to a $25,000 fine and debarment from performing public work for up to one year. Subsequent offense(s): Misdemeanor - up to 60 days in jail or up to a $50,000 fine and debarment from performing public work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at (866) 435-1499 or send an email to dol.misclassified@labor.ny.gov. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name:

WE ARE YOUR DOL

NEW YORK STATE Department of Labor

New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A:

PUBLIC WORK PROJECT

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Your pay stub and wage notice received upon hire must clearly state your wage rate and supplement rate.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at: https://dol.ny.gov/bureau-public-work

If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 932-2419	White Plains	(914) 997-9507
Newburgh	(845) 568-5287		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is $250,000.00 or more the contract must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training “prior to the performing any work on the project.”

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date.)*
- Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is $3 million in Bronx, Kings, New York, Queens and, Richmond counties; $1.5 million in Nassau, Suffolk and Westchester counties; and $500,000 in all other counties.

For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or the use of a Project Labor Agreement (PLA), and must be open to public inspection.

Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.

The Commissioner of Labor shall have the power to enforce separate specification requirement s on projects, and may issue stop-bid orders against public owners for non-compliance.

Other new monetary thresholds, and similar sealed bidding for non-Wicks projects, would apply to certain public authorities including municipal housing authorities, NYC Construction Fund, Yonkers Educational Construction Fund, NYC Municipal Water Finance Authority, Buffalo Municipal Water Finance Authority, Westchester County Health Care Association, Nassau County Health Care Corp., Clifton-Fine Health Care Corp., Erie County Medical Center Corp., NYC Solid Waste Management Facilities, and the Dormitory Authority.

Contractors must pay subcontractors within a 7 days period.

(07.19)

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 that 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 12226

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

Orange County General Construction

Boilermaker — 07/01/2024

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:	07/01/2024	01/01/2025
Boilermaker	$ 67.38	$ 68.88
Repairs & Renovations	67.38	68.88

Repairs & Renovation: Includes Repairing, Renovating replacement of parts to an existing unit(s).

SUPPLEMENTAL BENEFITS
Per Hour:

Boilermaker Repair & Renovations	33.5% of hourly Wage Paid + $ 26.85	33.5% of Hourly Wage Paid + $26.85

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 (*B, O, **U) on OVERTIME PAGE
Note:* Includes 9th & 10th hours, double for 11th or more.
** Labor Day ONLY, if worked.

Repairs & Renovation see (B,E,Q) on OT Page

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 12, 15, 25, 26, 29) on HOLIDAY PAGE

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:

	33.5% of Hourly Wage Paid Plus Amount Below	33.5% of Hourly Wage Paid Plus Amount Below
1st Term	$ 20.36	$ 20.36
2nd Term	21.28	21.28
3rd Term	22.22	22.22
4th Term	23.12	23.12
5th Term	24.07	24.07
6th Term	25.00	25.00
7th Term	25.93	25.93

NOTE: "Hourly Wage Paid" shall include any and all premium(s)

4-5

Carpenter — 07/01/2024

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Orange

WAGES
Per hour: 07/01/2024

Building:
Millwright $ 46.35
+ 8.44*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman $ 34.94

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18, 19) on HOLIDAY PAGE
Paid: See (5,6,11,13,16,18,19,25) for 1st & 2nd yr. Apprentices
Overtime: See (5,6,11,13,16,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour:
One (1) year terms:

1st	2nd	3rd	4th
$ 28.18	$ 30.51	$ 34.84	$ 43.50
+ 4.40*	+ 5.19*	+ 5.94*	+ 7.44*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 23.00	$ 24.79	$ 26.90	$ 29.63

8-740.2

Carpenter 07/01/2024

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Dutchess

PARTIAL COUNTIES
Orange: : The territory west demarcated by a line drawn from the Bear Mountain Bridge continuing east to the Bear Mountain Circle. The territory south demarcated by a line continuing north on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W to the centerline of Route 32, The territories south and east heading north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES
Per hour: 07/01/2024

Carpet/Resilient
Floor Coverer $ 34.45
+ 3.25*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

INCLUDES HANDLING & INSTALLATION OF ARTIFICIAL TURF AND SIMILAR TURF INDOORS/OUTDOORS.

SUPPLEMENTAL BENEFITS
Per hour:
$ 28.33

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
$15.75	$18.87	$23.55	$28.23
+ 2.48*	+ 2.48*	+ 2.48*	+ 2.48*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental Benefits per hour - All apprentice terms:

$ 20.87

8-2287D&O

Carpenter — 07/01/2024

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per Hour: 07/01/2024

Marine Construction:

Marine Diver	$ 75.46
	+ 10.00*
Marine Tender	$ 55.00
	+ 10.00*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime

SUPPLEMENTAL BENEFITS
Per Hour:

Journeyworker	$ 45.65

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18, 19) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 13, 16, 18, 19, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:
One (1) year terms.

1st year	$ 26.98
	+ 5.50*
2nd year	32.58
	+ 5.50*
3rd year	40.96
	+ 5.50*
4th year	49.35
	+ 5.50*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental Benefits
Per Hour:

All terms	$ 32.20

8-1456MC

Carpenter — 07/01/2024

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:	07/01/2024
Core Drilling:	
Driller	$ 46.25
	+ 3.25*
Driller Helper	$ 36.28
	+ 3.25*

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 of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

SUPPLEMENTAL BENEFITS

Per hour:	
Driller and Helper	$ 30.24

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 — 07/01/2024

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT** 2

ENTIRE COUNTIES
Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

PARTIAL COUNTIES
Orange: The area lying on Northern side of Orange County demarcated by a line drawn from the Bear Mountain Bridge continuing west to the Bear Mountain Circle, continue North on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W, then east on County Road 107 to Route 32, then north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES

Wages per hour:	07/01/2024
Carpenter - ONLY for Artificial Turf/Synthetic Sport Surface	$ 36.48

Note - Does not include the operation of equipment. Please see Operating Engineers rates.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyworker	$ 26.55

OVERTIME PAY
See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE

Notes:
When a holiday falls upon a Saturday, it shall be observed on the preceding Friday. Whan a holiday falls upon a Sunday, it shall be observed on the following Monday.
An employee taking an unexcused day off the regularly scheduled day before or after a paid Holiday shall not receive Holiday pay.

REGISTERED APPRENTICES
Wages per hour (1300 hour terms at the following percentage of Journeyworker's wage):

1st	2nd	3rd	4th
65%	70%	75%	80%

Supplemental Benefits per hour:

$18.58	$19.14	$21.24	$21.79

2-42AtSS

Carpenter - Building / Heavy&Highway — 07/01/2024

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Columbia, Dutchess, Orange, Sullivan, Ulster

WAGES
WAGES (per hour)

Applies to Carpenter (Building/Heavy & Highway/Tunnel), Dockbuilder, Piledriver, Dive Tender, and Diver (Dry):

	07/01/2024	07/01/2025 Additional	07/01/2026 Additional
Base Wage	$ 37.19 + 6.31*	$ 2.23**	$ 2.30**

Applies to Diver (Wet):

Base Wage	$ 50.00 + 6.31*

*For all hours paid straight or premium.
**To be allocated at a later date.

SHIFT WORK
SHIFT DIFFERENTIAL: When mandated by a Government Agency irregular or off shift can be worked. The Carpenter shall receive an additional fifteen percent (15%) of the base wage.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyworker	$ 30.65

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
$ 18.60 +3.09*	$ 22.31 +3.09*	$ 26.03 +3.09*	$ 29.75 +3.09*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS per hour:

All Terms $ 16.30

11-279.2B/H&H

Carpenter - Floor Coverer 07/01/2024

JOB DESCRIPTION Carpenter - Floor Coverer **DISTRICT** 11

ENTIRE COUNTIES
Columbia, Sullivan, Ulster

PARTIAL COUNTIES
Orange: The area lying on Northern side of Orange County demarcated by a line drawn from the Bear Mountain Bridge continuing west to the Bear Mountain Circle, continue North on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W, then east on County Road 107 to Route 32, then north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES
WAGES:(per hour)

	07/01/2024	07/01/2025 Additional
Carpet/Resilient Floor Coverer	$ 37.19 +6.31*	$ 2.23**

* For all hours paid straight or premium
** To be allocated at a later date.

SHIFT WORK
SHIFT DIFFERENTIAL: When mandated by a Government Agency irregular or off shift can be worked. The Carpenter shall receive an additional fifteen (15) percent of wage plus applicable benefits.

SUPPLEMENTAL BENEFITS
Per hour:

Journey worker $ 30.65

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
$ 18.60 +3.09*	$ 22.31 +3.09*	$ 26.03 +3.09*	$ 29.75 +3.09*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS per hour:

All terms $ 16.30

11-279.2Floor

Electrician 07/01/2024

JOB DESCRIPTION Electrician **DISTRICT** 11

ENTIRE COUNTIES
Orange, Putnam, Rockland

PARTIAL COUNTIES
Dutchess: Towns of Fishkill, East Fishkill, and Beacon.

WAGES
Per hour:

	07/01/2024
Electrician Wireman/Technician	$ 50.50
	+ 9.50*

*For all hours paid straight or premium, not to be included in 3% calculation for supplemental benefits.

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (subject to overtime premiums):
- On jobs where employees are required to work from boatswain chairs, swinging scaffolds, etc., forty (40) feet or more above the ground, or under compressed air, using Scottair packs, or gas masks, they shall receive an additional $2.00 per hour above the regular straight time rate.
- Journeyman Wireman working in Shafts, Tunnels or on Barges: $5.00 above the Journeyman Wireman rate of pay
- Journeyman Wireman when performing welding or cable splicing: $3.00 above the Journeyman Wireman rate of pay
- Journeyman Wireman required to have a NYS Asbestos Certificate: $3.00 above the Journeyman Wireman rate of pay
- Journeyman Wireman required to have a CDL: $3.00 above the Journeyman Wireman rate of pay.

SHIFT WORK
SHIFT DIFFERENTIAL: On Public Work in New York State when shift work is mandated either in the job specifications or by the contracting agency, the following rates apply when shift is worked:

Between 4:30pm & 12:30am	$ 59.30
	+ 9.50*
Between 12:30am & 8:30am	$66.35
	+ 9.50*

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2024
Journeyman	$ 29.68 plus
	3% of straight
	or premium wage

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 13, 15, 16, 25) on HOLIDAY PAGE
When the holiday falls on a Saturday it is observed the Friday before. When the holiday falls on a Sunday it is observed on the Monday after.

REGISTERED APPRENTICES
WAGES:
(1)year terms at the following rates

07/01/2024	1st	2nd	3rd	4th	5th	6th
1st Shift	$ 16.01	$ 19.40	$ 24.25	$ 29.10	$ 33.95	$ 36.38
	+1.00*	+1.00*	+1.50*	+2.00*	+2.50*	+2.50*
2nd Shift	18.78	22.76	28.45	34.13	39.82	42.67
	+1.00*	+1.00*	+1.50*	+2.00*	+2.50*	+2.50*
3rd Shift	21.04	25.49	31.86	38.24	44.61	47.80
	+1.00*	+1.00*	+1.50*	+2.00*	+2.50*	+2.50*

09/01/2024	1st	2nd	3rd	4th	5th	6th
1st Shift	$ 16.01	$ 19.40	$ 24.25	$ 29.10	$ 33.95	$ 36.38
	+1.00*	+1.00*	+1.00*	+2.00*	+2.50*	+2.50*
2nd Shift	18.78	22.76	28.45	34.13	39.82	42.67
	+1.00*	+1.00*	+1.00*	+2.00*	+2.50*	+2.50*
3rd Shift	21.04	25.49	31.86	38.24	44.61	47.80
	+1.00*	+1.00*	+1.00*	+2.00*	+2.50*	+2.50*

04/01/2025	1st	2nd	3rd	4th	5th	6th
1st Shift	$ 16.34	$ 19.80	$ 24.75	$ 29.70	$ 34.65	$ 37.13
	+1.00*	+1.00*	+1.00*	+2.00*	+2.50*	+2.50*
2nd Shift	19.17	23.23	29.03	34.84	40.64	43.55
	+1.00*	+1.00*	+1.00*	+2.00*	+2.50*	+2.50*

3rd Shift	21.47 +1.00*	26.02 +1.00*	32.52 +1.00*	39.03 +2.00*	45.53 +2.50*	48.79 +2.50*

*For all hours paid straight or premium, not to be included in 3% calculation for supplemental benefits.

SUPPLEMENTAL BENEFITS per hour:

07/01/2024

1st term	$ 16.28 plus 3% of straight or premium wage
2nd term	$ 16.28 plus 3% of straight or premium wage
3rd term	$ 18.28 plus 3% of straight or premium wage
4th term	$ 18.78 plus 3% of straight or premium wage
5th term	$ 20.28 plus 3% of straight or premium wage
6th term	$ 20.28 plus 3% of straight or premium wage

09/01/2024

1st term	$ 16.28 plus 3% of straight or premium wage
2nd term	$ 17.78 plus 3% of straight or premium wage
3rd term	$ 18.78 plus 3% of straight or premium wage
4th term	$ 19.78 plus 3% of straight or premium wage
5th term	$ 21.28 plus 3% of straight or premium wage
6th term	$ 21.28 plus 3% of straight or premium wage

11-363/1

Elevator Constructor — 07/01/2024

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	07/01/2024	01/01/2025
Mechanic	$ 70.15	$ 73.07
Helper	70% of Mechanic Wage Rate	70% of Mechanic Wage Rate

SUPPLEMENTAL BENEFITS
Per hour

	07/01/2024	01/01/2025
Journeyworker/Helper	$ 37.885*	$ 38.435*

(*)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 Journeyperson/Helper

1-138

Glazier 07/01/2024

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:

	07/01/2024	05/01/2025 Additional
Glazier, Glass Tinting and Window Film	$ 63.28	$ 1.11***
Scaffolding, including swing scaffold	67.28	
*Mechanical Equipment	64.28	
**Repair & Maintenance	30.76	

*Mechanical equipment, scissor jacks, man lifts, booms & buckets 30' or more, but not pipe scaffolding.
**Repair & Maintenance- All repair & maintenance work on a particular building whenever performed, where the total cumulative Repair & Maintenance contract value is under $193,000.

***To be allocated at a later date.

SUPPLEMENTAL BENEFITS
Per hour:

	7/01/2024
Glazier, Glass Tinting Window Film, Scaffolding and Mechanical Equipment	$ 42.13
Repair & Maintenance	24.62

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE
For 'Repair & Maintenance' see (B, B2, I, S) on overtime page.

HOLIDAY
Paid: See (5, 6, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE
For 'Repair & Maintenance'
Paid: See(5, 6, 16, 25)
Overtime: See(5, 6, 16, 25)

REGISTERED APPRENTICES
Wage per hour:
(1) year terms at the following wage rates:

	7/01/2024
1st term	$ 22.34
2nd term	30.64
3rd term	40.87
4th term	50.14

Supplemental Benefits:
(Per hour)

1st term	$ 19.27
2nd term	27.34
3rd term	32.85
4th term	36.01

8-1087 (DC9 NYC)

Insulator - Heat & Frost 07/01/2024

JOB DESCRIPTION Insulator - Heat & Frost **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Westchester

WAGES
Per hour: 07/01/2024

Insulator	$ 60.85
Discomfort & Additional Training**	63.92
Fire Stop Work*	32.97

* 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	$ 38.25
Discomfort & Additional Training	40.32
Fire Stop Work:	
Journeyworker	19.48

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
$ 32.97	$ 38.54	$ 44.12	$ 49.70

Discomfort & Additional Training Apprentices:

1st	2nd	3rd	4th
$ 34.51	$ 40.38	$ 46.27	$ 52.16

Supplemental Benefits paid per hour:

Insulator Apprentices:

1st term	$ 19.48
2nd term	23.23
3rd term	26.98
4th term	30.74

Discomfort & Additional Training Apprentices:

1st term	$ 20.50
2nd term	24.47
3rd term	28.43
4th term	32.39

8-91

Ironworker — 07/01/2024

JOB DESCRIPTION Ironworker **DISTRICT** 11

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster

WAGES
Per hour:

	07/01/2024	07/01/2025 Additional	07/01/2026 Additional
Structural	$ 51.38	$ 2.00*	$2.00*

Reinforcing	51.38	2.00*	2.00*
Ornamental	51.38	2.00*	2.00*
Chain Link Fence	51.38	2.00*	2.00*

* To be allocated at a later date.

NOTE: For Reinforcing classification ONLY, Ironworker 4-46Reinf rates apply in Rockland County's southern section (south of Convent Road and east of Blue Hills Road).

SHIFT WORK
On Government Mandated Irregular Workdays or Shift Work, the following wage will be paid:

1st Shift	$ 51.38
2nd Shift	66.39
3rd Shift	71.39

Note- Any shift that works past 12:00 midnight shall receive the 3rd shift differential.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 45.56

OVERTIME PAY
See (B1, Q, V) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE
If a holiday falls on Saturday, it will be observed Friday. If a holiday falls on Sunday, it will be observed Monday.

REGISTERED APPRENTICES
Wages:

(1) year terms at the following wage:

	1st yr	2nd yr	3rd yr	4th yr
1st Shift	$ 25.69	$ 30.83	$ 35.97	$ 41.10
2nd Shift	36.15	42.20	48.79	54.29
3rd Shift	38.81	45.25	51.69	58.12

Supplemental Benefits per hour:

	07/01/2024
1st year	$ 40.94
2nd year	41.86
3rd year	42.79
4th year	43.71

11-417

Laborer - Building — 07/01/2024

JOB DESCRIPTION Laborer - Building **DISTRICT** 11

ENTIRE COUNTIES
Orange, Sullivan, Ulster

PARTIAL COUNTIES
Delaware: Only the Townships of Andes, Bovina, Davenport, Delhi, Franklin, Hamden, Harpersfield, Kortright, Meredith, Middletown, Roxbury, and Stamford.
Greene: Only the Township of Catskill.

WAGES
Class 1: Custodial and janitorial work, general cleanup, and flag person.

Class 2: Concrete laborer, mason tending, hod carrier, signal person, pressure blasting and washing, chainsaw, demo saw, jackhammers, general labor.

Class 3: Jumping jack, air track drills, grading, explosive handler and blaster, grade checker. When OSHA requires negative pressure respirator.

Class 4: Environmental work including but not limited to asbestos abatement, toxic and hazardous abatement, lead abatement work, mold remediation and biohazards.

WAGES: (per hour)	07/01/2024	06/01/2025 Additional	06/01/2026 Additional
Class 1	$ 43.15	$ 2.69*	$ 2.79*
Class 2	43.95	2.72*	2.82*

Class 3	45.90	2.79*	2.89*
Class 4	49.00	2.90*	3.00*

*To be allocated at a later date.

These rates will cover all work within five feet of the building foundation line.

SHIFT WORK
Shift Differential: On all Governmental mandated irregular or off shift work, an additional 25% of wage is required. The 25% shift differential will be paid on public works contract for shifts or irregular workdays outside the normal working hours for 2nd and 3rd shifts or irregular workday or when mandated or required by state, federal, county, local or other governmental agency contracts.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 33.50
Shift	40.84

OVERTIME PAY
See (B, *E, E5, **Q) on OVERTIME PAGE
*For first 8 hours on Saturday
**When an employee is required to work on a holiday which falls on a Sunday the employee shall be paid three (3) times the hourly rate and one (1) hour benefits for every hour worked. When an employee is required to work on a holiday which falls on a Saturday the employee shall be paid two and a half (2.5) times the hourly rate and one hour benefits for every hour worked.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE
Holidays that fall on Saturday shall be observed on Friday, when holidays fall on Sunday they shall be observed on Monday.

REGISTERED APPRENTICES
(1000) hour terms at the following wages.

	07/01/2024
1st term	$ 28.05
2nd term	32.35
3rd term	36.70
4th term	41.00

Supplemental Benefits per hour:

All Terms Regular	$ 29.23
All Terms Shift Rate	35.39

11-17.BA

Laborer - Heavy&Highway — 07/01/2024

JOB DESCRIPTION Laborer - Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Orange, Sullivan, Ulster

PARTIAL COUNTIES
Delaware: Only the Townships of Andes, Bovina, Middletown, Roxbury,Franklin, Hamden, Stamford, Delhi, Kortright, Harpersfield,Meredith, and Davenport.
Greene: Only the Township of Catskill.

WAGES
CLASS 1: Flag person, gate person.

CLASS 2: General laborer, chuck tender, nipper, powder carrier, magazine tender, concrete men, vibrator men, mason tender, mortar men, traffic control, custodial work, temporary heat, pump men, pit men, dump men, asphalt men, joint setter, signalman, pipe men, riprap, dry stone layers, jack hammer, bush hammer, pavement breaker, men on mulching & seeding machines, all seeding & sod laying, landscape work, walk behind self-propelled power saws, grinder, walk behind rollers and tampers of all types, burner men, filling and wiring of baskets for gabion walls, chain saw operator, railroad track laborers, power buggy, plaster & acoustic pump, power brush cutter, retention liners, walk behind surface planer, chipping hammer, manhole, catch basin or inlet installing, mortar mixer, laser men. *Micro paving and crack sealing.

CLASS 3: Asbestos, toxic, bioremediation and Phyto-remediation, lead or hazardous materials abatement when certification or license is required, Drilling Equipment Only Where a Separate Air Compressor Unit Supplies Power.

CLASS 4: Asphalt screed man, blaster, all laborers involved in pipejacking and boring operations not exceeding more than 10 feet into pipe, boring or drilled area.

WAGES: (per hour)	07/01/2024
Class 1	$ 42.35
Class 2	46.05

Class 3	50.75
Class 4	55.80

* When laborers are performing micro paving, crack sealing or slurry application when not part of asphalt prep operations laborers shall receive an additional $2.50 per hour over rate.

**To be allocated at a later date.

SHIFT WORK
SHIFT DIFFERENTIAL: Night work and irregular shift require 20% increase on wages for all Government mandated night and irregular shift work.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 33.38
Shift	39.18

OVERTIME PAY
See (B, E, P, *R, **S, ***T, X) on OVERTIME PAGE
*For Mon-Fri Holidays, Double Benefits to be paid for all hours worked.
**For Saturday Holidays, Two- and one-half Benefits for all hours worked.
***For Sunday Holidays, Triple Benefits for all hours worked.

HOLIDAY
Paid: See (5, 6, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 25) on HOLIDAY PAGE
To be eligible for a paid holiday, an employee must work at least two (2) days in the calendar week or payroll week in which the holiday falls.

REGISTERED APPRENTICES
(1000) hour terms at the following wages.

	07/01/2024
1st term	$ 28.05
2nd term	32.35
3rd term	36.70
4th term	41.00

Supplemental Benefits per hour:

All Terms Regular	$ 29.23
All Terms Shift Rate	34.16

11-17.1H/H

Laborer - Tunnel — 07/01/2024

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)

	07/01/2024	06/01/2025
Class 1	$ 57.05	$ 58.55
Class 2	59.20	60.70
Class 4	65.60	67.10
Class 5	49.90	51.40

Toxic and hazardous waste, lead abatement and asbestos abatement work will be paid an additional $ 3.00 an hour.

SHIFT WORK
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	$ 36.98	$ 38.23
Benefit 2	55.39	59.99
Benefit 3	74.58	76.73

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 — 07/01/2024

JOB DESCRIPTION Lineman Electrician **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, Wyoming, Yates

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.

Crane Operators: Operation of any type of crane on line projects.
Crawler Backhoe: Operation of tracked excavator/crawler backhoe with 1/2 yard bucket or larger on line projects.
Digging Machine Operator: All other digging equipment and augering on line projects.

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.

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.

Below rates applicable on all overhead and underground distribution and maintenance work, and all overhead and underground transmission line work and the installation of fiber optic cable where no other construction trades are or have been involved. Includes access matting for line work.

Per hour:	07/01/2024
Group A:	
Lineman, Technician	$ 58.90
Crane, Crawler Backhoe	58.90
Welder, Cable Splicer	58.90

Group B:	
Digging Mach. Operator	53.01
Tractor Trailer Driver	50.07
Groundman, Truck Driver	47.12
Equipment Mechanic	47.12
Flagman	35.34

Additional $1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all electrical sub-stations, switching structures, fiber optic cable and all other work not defined as "Utility outside electrical work." Includes access matting for line work.

Group A:	
Lineman, Technician	$ 58.90
Crane, Crawler Backhoe	58.90
Cable Splicer	64.79
Certified Welder, Pipe Type Cable	61.85

Group B:	
Digging Mach. Operator	53.01
Tractor Trailer Driver	50.07
Groundman, Truck Driver	47.12
Equipment Mechanic	47.12
Flagman	35.34

Additional $1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all switching structures, maintenance projects, railroad catenary install/maintenance third rail installation, bonding of rails and pipe type cable and installation of fiber optic cable. Includes access matting for line work.

Group A:	
Lineman, Tech, Welder	$ 60.22
Crane, Crawler Backhoe	60.22
Cable Splicer	66.24
Certified Welder, Pipe Type Cable	63.23

Group B:	
Digging Mach. Operator	54.20
Tractor Trailer Driver	51.19
Groundman, Truck Driver	48.18
Equipment Mechanic	48.18
Flagman	36.13

Additional $1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all overhead and underground transmission line work & fiber optic cable where other construction trades are or have been involved. This applies to transmission line work only, not other construction. Includes access matting for line work.

Group A:	
Lineman, Tech, Welder	$ 61.41
Crane, Crawler Backhoe	61.41

Group B:	
Digging Mach. Operator	55.27
Tractor Trailer Driver	52.20
Groundman, Truck Driver	49.13
Equipment Mechanic	49.13
Flagman	36.85

Additional $1.00 per hour for entire crew when a helicopter is used.

SHIFT WORK

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 %

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2024
Group A	$ 30.90 *plus 7% of the hourly wage paid
Group B	$ 26.90 *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, X) on OVERTIME PAGE. NOTE: Double time for all emergency work designated by the Dept. of Jurisdiction.
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 Journeyworker's Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

	07/01/2024
	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249a

Lineman Electrician - Teledata — 07/01/2024

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).

	07/01/2024	01/01/2025
Cable Splicer	$ 39.24	$ 40.81
Installer, Repairman	$ 37.24	$ 38.73
Teledata Lineman	$ 37.24	$ 38.73
Tech., Equip. Operator	$ 37.24	$ 38.73
Groundman	$ 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.

SHIFT WORK
THE FOLLOWING RATES APPLY WHEN THE CONTRACTING AGENCY MANDATES MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION ARE WORKED. WHEN TWO (2) OR THREE (3) SHIFTS ARE WORKED THE FOLLOWING RATES APPLY:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2024	01/01/2025
Journeyworker	$ 5.70 *plus 3% of the hour wage paid	$ 5.70 *plus 3% of the hour 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
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 — 07/01/2024

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting **DISTRICT** 6

ENTIRE COUNTIES
Columbia, Dutchess, Orange, Putnam, Rockland, Ulster

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.

Crane Operators: Operation of any type of crane on Traffic Signal/Lighting projects.
Crawler Backhoe: Operation of tracked excavator/crawler backhoe with 1/2 yard bucket or larger on Traffic Signal/Lighting projects.
Digging Machine Operator: All other digging equipment and augering on Traffic Signal/Lighting projects.

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.

A flagger's duties shall consist of traffic control only.

Per hour:	07/01/2024
Group A:	
Lineman, Technician	$ 51.82
Crane, Crawler Backhoe	51.82
Certified Welder	54.41
Group B:	
Digging Machine	46.64
Tractor Trailer Driver	44.05
Groundman, Truck Driver	41.46
Equipment Mechanic	41.46
Flagman	31.09

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.

SHIFT WORK

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%

SUPPLEMENTAL BENEFITS

Per hour worked:

	07/01/2024
Group A:	$ 30.90 *plus 7% of the hourly wage paid
Group B	$ 26.90 *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, X) on OVERTIME PAGE. NOTE: Double time for all emergency work designated by the Dept. of Jurisdiction.
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 Journeyworker's Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2024
$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aReg8LT

Lineman Electrician - Tree Trimmer — 07/01/2024

JOB DESCRIPTION Lineman Electrician - Tree Trimmer **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, Wyoming, Yates

WAGES

Applies to line clearance, tree work and right-of-way preparation on all new or existing energized overhead or underground electrical, telephone and CATV lines. This also includes stump removal near underground energized electrical lines including telephone and CATV lines.

Per hour:	07/01/2024
Tree Trimmer	$ 31.44
Equipment Operator	27.80
Equipment Mechanic	27.80
Truck Driver	23.15
Groundman	19.07
Flag person	15.00*

*NOTE-Rate effective on 01/01/2025 - $15.50 due to minimum wage increase.

SUPPLEMENTAL BENEFITS
Per hour:

	07/01/2024
Journeyworker	$ 10.48 *plus 4.5% of the hourly wage paid

* The 4.5% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY
See (B, E, Q, X) on OVERTIME PAGE
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, 15) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 16, 25) on HOLIDAY PAGE
NOTE: All paid holidays falling on a Saturday shall be observed on the preceding Friday. All paid holidays falling on a Sunday shall be observed on the following Monday.

6-1249TT

Mason - Building — 07/01/2024

JOB DESCRIPTION Mason - Building **DISTRICT** 11

ENTIRE COUNTIES
Dutchess, Sullivan, Ulster

PARTIAL COUNTIES
Orange: Entire county except the Township of Tuxedo.

WAGES
Per hour:

	07/01/2024
Bricklayer	$ 46.45
Cement Mason	46.45
Plasterer/Stone Mason	46.45
Pointer/Caulker	46.45

Additional $1.00 per hour for power saw work
Additional $0.50 per hour for swing scaffold or staging work

SHIFT WORK
SHIFT WORK: When shift work or an irregular workday is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:
Irregular workday 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	$ 38.00

OVERTIME PAY

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

11-5du-b

Mason - Building — 07/01/2024

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Sullivan, Ulster

WAGES

Per hour:	07/01/2024	12/02/2024
Building:		Additional
Tile, Marble,& Terrazzo Mechanic/Setter	$ 58.06	$ 0.63*

*To be allocated at a later date.

SUPPLEMENTAL BENEFITS
Per Hour:
Journeyworker: $ 25.11*
+ 6.14

* This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE
Double time rate applies after 10 hours

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage per hour:
(Counties of Orange & Putnam)
750 hour terms at the following wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-	751-	1501-	2251-	3001-	3751-	4501-	5251-	6001-	6751-
750	1500	2250	3000	3750	4500	5250	6000	6750	7500
07/01/2024									
$22.19	$27.21	$34.45	$39.46	$43.07	$46.58	50.23	$55.24	$57.71	$62.00

Supplemental Benefits per hour:
(Counties of Orange & Putnam)

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
07/01/2024									
$12.55* + 0.76	$12.55* + 0.81	$15.36* + 0.91	$15.36* + 0.96	$16.36* + 1.43	$17.86* + 1.48	$18.86* + 1.91	$18.86* + 1.97	$18.86* + 4.57	$24.11* + 5.18

Wages per hour:
(Counties of Dutchess, Sullivan, Ulster)

750 hour terms at the following wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-	751-	1501-	2251-	3001-	3751-	4501-	5251-	6001-	6751-
750	1500	2250	3000	3750	4500	5250	6000	6750	7500
07/01/2024									
$22.06	$26.44	$28.50	$32.88	$35.84	$39.71	$43.21	$46.59	$47.95	$51.44

Supplemental Benefits per hour:
(Counties of Dutchess, Sullivan, Ulster)

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
07/01/2024									
$12.55* + 0.76	$12.55* + 0.80	$14.86* + 0.85	$14.86* + 0.89	$15.86* + 1.35	$16.36* + 1.40	$16.86* + 1.82	$17.86* + 1.87	$17.86* + 4.93	$22.61* + 5.02

* This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/52B

Mason - Building — 07/01/2024

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Sullivan, Ulster

WAGES

Per hour: Building	07/01/2024	12/02/2024 Additional
Tile, Marble, & Terrazzo Finisher	$ 47.74	$ 0.54*

*To be allocated at a later date.

SUPPLEMENTAL BENEFITS
Journeyworker:

Per Hour	$ 22.11*
	+ 6.01

*This portion of benefits subject to same premium rate as shown for overtime wages

OVERTIME PAY
See (A, *E, Q) on OVERTIME PAGE
Double time rate applies after 10 hours on Saturdays.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

9-7/88B-tf

Mason - Building — 07/01/2024

JOB DESCRIPTION Mason - Building **DISTRICT** 11

ENTIRE COUNTIES

Putnam, Rockland, Westchester

PARTIAL COUNTIES
Orange: Only the Township of Tuxedo.

WAGES
Per hour:

	07/01/2024
Bricklayer	$ 47.44
Cement Mason	47.44
Plasterer/Stone Mason	47.44
Pointer/Caulker	47.44

Additional $1.00 per hour for power saw work
Additional $0.50 per hour for swing scaffold or staging work

SHIFT WORK
SHIFT WORK: When shift work or an irregular workday is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:
Irregular workday 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	$ 38.50

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 — 07/01/2024

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES
Per Hour:

	07/01/2024	01/06/2025 Additional
Marble Cutters & Setters	$ 63.92	$ 0.75*

*To be allocated at a later date.

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker	$ 40.05

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:
07/01/2024
750 hour terms at the following wage

1st	2nd	3rd	4th	5th	6th	7th	8th
0-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6750	6751-7500	7500+
$ 27.01	$ 40.52	$ 43.88	$ 47.26	$ 50.64	$ 54.32	$ 60.71	$ 63.92

Supplemental Benefits per hour:
07/01/2024

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 26.42	$ 29.76	$ 30.61	$ 31.44	$ 32.28	$ 37.55	$ 39.23	$ 40.05

9-7/4

Mason - Heavy&Highway — 07/01/2024

JOB DESCRIPTION Mason - Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Dutchess, Sullivan, Ulster

PARTIAL COUNTIES
Orange: Entire county except the Township of Tuxedo.

WAGES
Per hour:

	07/01/2024
Bricklayer	$ 46.95
Cement Mason	46.95
Marble/Stone Mason	46.95
Plasterer	46.95
Pointer/Caulker	46.95

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 workday is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:
Irregular workday 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 $ 38.00

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

11-5du-H/H

Mason - Heavy&Highway 07/01/2024

JOB DESCRIPTION Mason - Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Putnam, Rockland, Westchester

PARTIAL COUNTIES
Orange: Only the Township of Tuxedo.

WAGES
Per hour:

	07/01/2024
Bricklayer	$ 47.94
Cement Mason	47.94
Marble/Stone Mason	47.94
Plasterer	47.94
Pointer/Caulker	47.94

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 workday is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:

Irregular workday 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	$ 38.50

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 / Heavy&Highway **07/01/2024**

JOB DESCRIPTION Operating Engineer - Building / Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Delaware, Orange, Rockland, Sullivan, Ulster

WAGES
CLASS A5: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes, with 140ft boom and over.
CLASS A4: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes, with 100ft to 139ft boom.
CLASS A3: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes with a boom under 100ft.
CLASS A2: Cranes, Derricks and Pile Drivers less than 100 tons with 140ft boom and over.
CLASS A1: Cranes, Derricks and Pile Drivers less than 100 tons with a 100ft to 139ft boom.

CLASS A: Cranes, Derricks and Pile Drivers less than 100 tons with a boom under 100ft.; Autograde Combination Subgrader, Base Material Spreader and Base Trimmer (CMI and Similar Types); Autograde Pavement profiler (CMI and Similar Types); Autograde Pavement Profiler and Recycle type (CMI and Similar Type); Autograde Placer-Trimmer-Spreader Comb. (CMI & Similar types); Autograde Slipform Paver (CMI & Similar Types); Central Power Plants (all types); Chief of Party; Concrete Paving Machines; Drill (Bauer, AMI and Similar Types); Drillmaster, Quarrymaster (Down the Hole Drill), Rotary Drill, Self-Propelled Hydraulic Drill, Self-Powered Drill; Draglines; Elevator Graders; Excavator; Front End Loaders (5 yds. and over); Gradall's; Grader-Rago; Helicopters (Co-Pilot); Helicopters (Communications Engineer);Juntann Pile Driver; Locomotive (Large); Mucking Machines; Pavement & Concrete Breaker, i.e., Superhammer & Hoe Ram; Roadway Surface Grinder; Prentice Truck; Scooper (Loader and Shovel); Shovels; Tree Chopper with Boom; Trench Machines (Cable Plow); Tunnel Boring Machine; Vacuum Truck

CLASS B: "A" Frame; Backhoe (Combination); Boom Attachment on Loaders (Rate based on size of Bucket) not applicable to Pipehook; Boring and Drilling Machines; Brush Chopper, Shredder and Tree Shredder, Tree Shearer; Bulldozer(Fine Grade); Cableways; Carryalls; Concrete Pump; Concrete Pumping System, Pump Concrete and Similar Types; Conveyors (125 ft. and over); Drill Doctor (duties incl. Dust Collector Maintenance); Front End Loaders (2 yds. but less than 5 yds.); Graders (Finish); Groove Cutting Machine (Ride on Type); Heater Planer; Hoists (all type Hoists, shall also include Steam, Gas, Diesel, Electric, Air Hydraulic, Single and Double Drum, Concrete, Brick Shaft Caisson, Snorkel Roof, and/or any other Similar Type Hoisting Machines, portable or stationary, except Chicago Boom Type); Long Boom Rate to be applied if Hoist is "Outside Material Tower Hoist"**; Hydraulic Cranes-10 tons and under; Hydraulic Dredge; Hydro-Axe; Hydro Blaster; Jacks-Screw Air Hydraulic Power Operated Unit or Console Type (not hand Jack or Pile Load Test Type); Log Skidder; Pans; Pavers (all) concrete; Plate and Frame Filter Press; Pumpcrete Machines, Squeezecrete & Concrete Pumping (regardless of size); Scrapers; Side Booms; "Straddle"Carrier-Ross and similar types; Winch Trucks (Hoisting); Whip Hammer

CLASS C: Asphalt Curbing Machine; Asphalt Plant Engineer; Asphalt Spreader; Autograde Tube Finisher and Texturing Machine (CMI & Similar types); Autograde Curecrete Machine (CMI & Similar Types); Autograde Curb Trimmer & Sidewalk, Shoulder, Slipform (CMI & Similar Types); Bar Bending Machines (Power); Barrier Moving Machine-Zipper; Batchers, Batching Plant and Crusher on Site; Belt Conveyor Systems; Boom Type Skimmer Machines; Bridge Deck Finisher; Bulldozer(except fine grade); Car Dumpers (Railroad); Compressor and Blower Type Units (used independently or mounted on dual purpose Trucks, on Job Site or in conjunction with jobsite, in Loading and Unloading of Concrete, Cement, Fly Ash, Instantcrete, or Similar Type Materials); Compressors (2 or 3 in Battery); Concrete Finishing Machines; Concrete cleaning decontamination machine operator; Concrete Saws and Cutters (Ride-on type); Concrete Spreaders (Hetzel, Rexomatic and Similar Types); Concrete Vibrators; Conveyors (under 125 feet); Crushing Machines; Directional Boring Machines; Ditching Machine-small (Ditch-witch, Vermeer, or Similar type); Dope Pots (Mechanical with or without pump); Dumpsters; Elevator; Fireman; Fork Lifts (Economobile, Lull and Similar Types of Equipment); Front End Loaders (1 yd. and over but under 2 yds.); Generators (2 or 3 in Battery); Giraffe Grinders; Grout Pump; Gunnite Machines (excluding nozzle); Hammer Vibrator (in conjunction with Generator); Heavy Equipment Robotics Operator Technician; Hoists-Roof, Tugger, Aerial Platform Hoist & House Cars; Hoppers; Hopper Doors (power operated); Hydro Blaster; Hydraulic Jacking Trailer; Ladders (motorized); Laddervator; Locomotive-dinky type; Maintenance -Utility Man; Master Environmental Maintenance Technician; Mechanics; Mixers (Excepting Paving Mixers); Motor Patrols; Pavement Breakers (small self - propelled ride on type-also maintains compressor hydraulic unit); Pavement Breaker-truck mounted; Pipe Bending Machine (Power); Pitch Pump; Plaster Pump (regardless of size); Post Hole Digger (Post Pounder & Auger); Pot Hole Killer Trucks or equivalent; Rod Bending Machines (Power); Roller-Black Top; Scales (Power); Seaman pulverizing mixer; Shoulder widener; Silos; Skidsteer (all attachments); Skimmer Machines (boom-type); Steel Cutting Machine (service & maintain); Tam Rock Drill; Tractors; Transfer Machine; Captain (Power Boats); Tug Master (powerboats); Ultra High Pressure Waterjet Cutting Tool System operator/maintenance technician; Vacuum Blasting Machine; Vibrating Plants (used in conjunction with unloading); Welder and Repair Mechanics

CLASS D: Brooms and Sweepers; Chippers; Compressor (single); Concrete Spreaders (small type); Conveyor Loaders (not including Elevator Graders); Engines-large diesel (1620 HP) and Staging Pump; Farm Tractors; Fertilizing Equipment (Operation & Maintenance of); Fine Grade Machine (small type); Form Line Graders (small type); Front End Loader (under 1 yard); Generator (single); Grease, Gas, Fuel and Oil supply trucks; Heaters (Nelson or other type incl. Propane, Natural Gas or Flow type Units); Lights, Portable Generating Light Plants; Mixers (Concrete, small); Mulching Equipment (Operation and Maintenance of); Pumps (2 or less than 4 inch suction); Pumps (4 inch suction and over incl. submersible pumps); Pumps (Diesel Engine and Hydraulic-immaterial of power); Road Finishing Machines (small type); Rollers-grade, fill or stone base; Seeding Equip. (Operation and Maintenance of); Sprinkler & Water Pump Trucks (used on jobsite or in conjunction with jobsite); Steam Jennies and Boilers-irrespective of use; Stone Spreader; Tamping Machines, Vibrating Ride-on; Temporary Heating Plant (Nelson or other type, incl. Propane, Natural Gas or Flow Type Units); Water & Sprinkler Trucks (used on or in conjunction with jobsite); Welding Machines (Gas, Diesel, and/or Electric Converters of any type, single, two, or three in a battery); Wellpoint Systems (including installation by Bull Gang and Maintenance of)

CLASS E: Assistant Engineer/Oiler; Drillers Helper; Maintenance Apprentice (Deck Hand); Maintenance Apprentice (Oiler); Mechanics' Helper; Tire Repair and Maintenance; Transit/Instrument Man

WAGES:(per hour)

	07/01/2024	07/01/2025 Additional
Class A5	$ 66.97 plus 5.00*	$ 2.50***
Class A4	65.97 plus 5.00*	2.50***
Class A3	64.97 plus 5.00*	2.50***
Class A2	62.47 plus 5.00*	2.50***
Class A1	61.47 plus 5.00*	2.50***
Class A	60.47 plus 5.00*	2.50***
Class B	58.88 plus 5.00*	2.50***
Class C	56.97 plus 5.00*	2.50***
Class D	55.34 plus 5.00*	2.50***
Class E	51.63 plus 5.00*	2.50***
Safety Engineer	61.21 plus 5.00*	2.50***
Helicopter:		
Pilot/Engineer	62.29 plus 5.00*	2.50***
Co Pilot	60.47 plus 5.00*	2.50***
Communications Engineer	60.47 plus 5.00*	2.50***
Surveying:		
Chief of Party	60.47 plus 5.00*	2.50***
Transit/Instrument Man	51.63 plus 5.00*	2.50***
Rod/Chainman	51.05 plus 5.00*	2.50***

Additional $0.75 for Survey work Tunnel under compressed air.
Additional $0.50 for Hydrographic work.

*The $5.00 is added to the Class Base Wage for all hours worked. Additionally, the $5.00 is subject to the V-Code listed on the OVERTIME CODE Sheet.

**Outside Material Hoist (Class B) receives additional $ 1.00 per hour on 110 feet up to 199 feet total height, $ 2.00 per hour on 200 feet and over total height.

***To be allocated at a later date

- On HAZARDOUS WASTE REMOVAL or ASBESTOS REMOVAL work, or any state or federally DESIGNATED HAZARDOUS WASTE SITE:

For projects bid on or before April 1, 2020...Where the Operating Engineer is in direct contact with hazardous material and when personal protective equipment is required for respiratory, skin and eye protection, the Operating Engineer shall receive the hourly wage plus an additional twenty percent (20%) of that wage for the entire shift.

For projects bid after April 1, 2020...On hazardous waste removal work of any kind, including state or federally designated site where the operating engineer is required to wear level A, B, or C personal protection the operating engineer shall receive an hourly wage rate of his regular hourly wage plus $5.00 per hour. An operating engineer working at a hazardous waste removal project or site at a task requiring hazardous waste related certification, but who is not working in a zone requiring level A, B, or C personal protection, shall receive an hourly wage rate of his regular rate plus $ 1.00 per hour. This shall also apply to sites where the level D personal protection is required.

SHIFT WORK

- SHIFT WORK: On all Government mandated irregular or off shift work, an additional 15% on straight time hours.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman $ 34.00*

*15% premium is also required on shift work benefits

OVERTIME PAY
See (B, E, Q, *V, X) on OVERTIME PAGE
*15% premium is also required on shift work benefits

HOLIDAY
Paid: See (5, 6, 10, 13, 15) on HOLIDAY PAGE
Overtime: See (5, 6, 10, 13, 15) on HOLIDAY PAGE
Holidays falling on Sunday will be celebrated on Monday.

REGISTERED APPRENTICES
(1) year terms at the following percentage of journeyman's wage:

1st year	60% of Class base wage plus $5.00*
2nd year	70% of Class base wage plus $5.00*
3rd year	80% of Class base wage plus $5.00*
4th year	90% of Class base wage plus $5.00*

*The $5.00 is added to the Class Base Wage for all hours worked. Additionally, the $5.00 is subject to the V-Code listed on the OVERTIME CODE Sheet.

Supplemental Benefits per hour:

Apprentices $ 34.00

11-825

Operating Engineer - Marine Dredging 07/01/2024

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:	07/01/2024
CLASS A1 Deck Captain, Leverman, Mechanical Dredge Operator, Licensed Tug Operator 1000HP or more.	$ 45.26
CLASS A2 Crane Operator (360 swing)	40.33
CLASS B Dozer, Front Loader Operator on Land	To conform to Operating Engineer 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	39.14
CLASS B2 Certified Welder	36.84
CLASS C1 Drag Barge Operator, Steward, Mate, Assistant Fill Placer	35.83

CLASS C2 Boat Operator	34.68
CLASS D Shoreman, Deckhand, Oiler, Rodman, Scowman, Cook, Messman, Porter/Janitor	28.81

SUPPLEMENTAL BENEFITS
Per Hour:
THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes A & B	$ 12.00 plus 7% of straight time wage, Overtime hours add $ 0.63
All Class C & D	$ 11.75 plus 7% of straight time wage, Overtime hours add $ 0.50

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 - Steel Erectors — 07/01/2024

JOB DESCRIPTION Operating Engineer - Steel Erectors **DISTRICT** 11

ENTIRE COUNTIES
Delaware, Orange, Rockland, Sullivan, Ulster

WAGES
CLASS A3: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes, with a 140 ft. boom and over.

CLASS A2: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes, with up to a 139 ft. boom and under.

CLASS A1: Cranes, Derricks and Pile Drivers less than 100 tons with a 140 ft. boom and over.

CLASS A: Cranes, Derricks and Pile Drivers less than 100 tons with up to a 139 ft. boom and under.

CLASS B: "A" Frame; Cherry Pickers(10 tons and under); Hoists (all type Hoists, shall also include Steam, Gas, Diesel, Electric, Air Hydraulic, Single and Double Drum, Concrete, Brick Shaft Caisson, Snorkel Roof, and/or any other Similar Type Hoisting Machines, portable or stationary, except Chicago Boom Type); Jacks-Screw Air Hydraulic Power Operated Unit or Console Type (not hand Jack or Pile Load Test Type); Side Booms; Straddle Carrier

CLASS C: Aerial Platform used as Hoist; Compressors (2 or 3 in Battery); Concrete cleaning/ decontamination machine operator; Directional Boring Machines; Elevator or House Cars; Conveyers and Tugger Hoists; Fireman; Fork Lifts; Generators (2 or 3 in Battery); Heavy Equipment Robotics Operator/Technician; Master Environmental Maintenance Technician; Maintenance -Utility Man; Rod Bending Machines (Power); Captain(powerboat); Tug Master; Ultra High Pressure Waterjet Cutting Tool System; Vacuum Blasting Machine; Welding Machines(gas or electric,2 or 3 in battery, including diesels); Transfer Machine; Apprentice Engineer/Oiler with either one compressor or one welding machine when used for decontamination and remediation

CLASS D: Compressor (single); Welding Machines (Gas, Diesel, and/or Electric Converters of any type); Welding System Multiple (Rectifier Transformer type)

CLASS E: Assistant Engineer/Oiler; Maintenance Apprentice (Deck Hand);Drillers Helper; Maintenance Apprentice (Oiler); Mechanics' Helper; Transit/Instrument Man

WAGES:(per hour)

	07/01/2024	07/01/2025 Additional
Class A3	$ 68.99 plus 5.00*	$ 2.50**
Class A2	67.33 plus 5.00*	2.50**
Class A1	64.49 plus 5.00*	2.50**
Class A	62.83 plus 5.00*	2.50**

Class B	60.04 plus 5.00*	2.50**
Class C	57.38 plus 5.00*	2.50**
Class D	55.85 plus 5.00*	2.50**
Class E	52.09 plus 5.00*	2.50**
Vacuum Truck	60.80 plus 5.00*	2.50**
Safety Engineer	61.66 plus 5.00*	2.50**
Helicopter:		
Pilot/Engineer	64.49 plus 5.00*	2.50**
Co Pilot	64.10 plus 5.00*	2.50**
Communications Engineer	64.10 plus 5.00*	2.50**
Surveying:		
Chief of Party	60.80 plus 5.00*	2.50**
Transit/Instrument man	52.09 plus 5.00*	2.50**
Rod/Chainman	51.05 plus 5.00*	2.50**

Additional $0.75 for Survey work Tunnels under compressed air.
Additional $0.50 for Hydrographic work.

*The $5.00 is added to the Class Base Wage for all hours worked. Additionally, the $5.00 is subject to the V-Code listed on the OVERTIME CODE Sheet.

**To be allocated at a later date

- On HAZARDOUS WASTE REMOVAL or ASBESTOS REMOVAL work, or any state or federally DESIGNATED HAZARDOUS WASTE SITE:

For projects bid on or before April 1, 2020...Where the Operating Engineer is in direct contact with hazardous material and when personal protective equipment is required for respiratory, skin and eye protection, the Operating Engineer shall receive the hourly wage plus an additional twenty percent (20%) of that wage for the entire shift.

For projects bid after April 1, 2020...On hazardous waste removal work of any kind, including state or federally designated site where the operating engineer is required to wear level A, B, or C personal protection the operating engineer shall receive an hourly wage rate of his regular hourly wage plus $5.00 per hour. An operating engineer working at a hazardous waste removal project or site at a task requiring hazardous waste related certification, but who is not working in a zone requiring level A, B, or C personal protection, shall receive an hourly wage rate of his regular rate plus $ 1.00 per hour. This shall also apply to sites where the level D personal protection is required.

SHIFT WORK
- SHIFT WORK: On all Government mandated irregular or off shift work, an additional 15% on straight time hours.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 34.00*

*15% premium is also required on shift work benefits

OVERTIME PAY
See (B, E, Q, *V, X) on OVERTIME PAGE
*15% premium is also required on shift work benefits

HOLIDAY

Paid:	See (5, 6, 10, 13, 15) on HOLIDAY PAGE
Overtime:	See (5, 6, 10, 13, 15) on HOLIDAY PAGE

Holidays falling on Sunday will be celebrated on Monday.

REGISTERED APPRENTICES
(1) year terms at the following percentage of journeyman's wage.

1st year	60% of Class base wage plus $5.00*
2nd year	70% of Class base wage plus $5.00*
3rd year	80% of Class base wage plus $5.00*
4th year	90% of Class base wage plus $5.00*

*The $5.00 is added to the Class Base Wage for all hours worked. Additionally, the $5.00 is subject to the V-Code listed on the OVERTIME CODE Sheet.

Supplemental Benefits per hour:

Apprentices	$ 34.00

11-825SE

Painter — 07/01/2024

JOB DESCRIPTION Painter **DISTRICT** 1

ENTIRE COUNTIES
Columbia, Dutchess, Greene, Orange, Sullivan, Ulster

WAGES
Per hour

	07/01/2024	05/01/2025 Additional
Brush/Paper Hanger	$ 38.81	$ 1.99*
Dry Wall Finisher	38.81	1.99*
Lead Abatement	38.81	1.99*
Sandblaster-Painter	38.81	1.99*
Spray Rate	39.81	1.99*

(*) To be allocated at later date.

See Bridge Painting rates for the following work:
Structural Steel, all work performed on tanks, ALL BRIDGES, towers, smoke stacks, flag poles. Rate shall apply to all of said areas from the ground up.

SUPPLEMENTAL BENEFITS
Per hour

Journeyworker	$ 27.37

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour

Six (6) month terms at the following percentage of Journeyperson's wage

1st	2nd	3rd	4th	5th	6th
50%	55%	65%	75%	85%	95%

Supplemental Benefits per hour worked

1st term	$ 11.39
All others	27.37

1-155

Painter - Bridge & Structural Steel — 07/01/2024

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:

	07/01/2024
Bridge Painting:	$ 56.00
	+ 10.35*

ADDITIONAL $7.00 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 (50 hour 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:

$ 12.43
+ 31.55*

* 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 (50 hour 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	$ 22.40
	+ 4.14
2nd year	$ 33.60
	+ 6.21
3rd year	$ 44.80
	+ 8.28

Supplemental Benefits - Per hour:

1st year	$ 1.16
	+ 12.62
2nd year	$ 7.46
	+ 18.93
3rd year	$ 9.94
	+ 25.24

NOTE: All premium wages are to be calculated on base rate per hour only.

8-DC-9/806/155-BrSS

Painter - Line Striping — 07/01/2024

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):	07/01/2024	04/01/2025	04/01/2026
Striping-Machine Operator*	$ 34.12	$ 35.49	$ 36.93
Linerman Thermoplastic	41.12	42.74	44.44

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.

SHIFT WORK
When directly specified in public agency or authority contract documents there shall be a 30% night shift premium pay differential for all work performed after 9:00pm and before 5:00am.

SUPPLEMENTAL BENEFITS
Per hour paid:
Journeyworker:

Striping Machine Operator:	$23.65	$ 24.30	$ 24.95
Linerman Thermoplastic:	23.65	24.30	24.95

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:	$ 16.00	$ 16.00	$ 16.00
2nd Term:	20.47	21.29	22.16
3rd Term:	27.30	28.39	29.54

Supplemental Benefits per hour:

All terms:	$ 23.65	$ 24.30	$ 24.95

8-1456-LS

Painter - Metal Polisher — 07/01/2024

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, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

	07/01/2024
Metal Polisher	$ 39.33
Metal Polisher*	40.43
Metal Polisher**	43.33

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS
Per Hour: 07/01/2024

Journeyworker:
All classification $ 12.79

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, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:
One (1) year term at the following wage rates:

	07/01/2024
1st year	$ 19.67
2nd year	21.63
3rd year	23.60
1st year*	$ 22.06

2nd year*	22.07
3rd year*	24.14
1st year**	$ 22.17
2nd year**	24.13
3rd year**	26.10

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:
Per hour:

1st year	$ 8.69
2nd year	8.69
3rd year	8.69

8-8A/28A-MP

Plumber — 07/01/2024

JOB DESCRIPTION Plumber **DISTRICT** 11

ENTIRE COUNTIES
Orange, Rockland, Sullivan

PARTIAL COUNTIES
Ulster: Only the Townships of Plattekill, Marlboro, Wawarsing, and Shawangunk (except for Wallkill and Shawangunk Prisons).

WAGES
REFRIGERATION: For commercial and industrial refrigeration which means service, maintenance, and installation work where the combined compressor tonnage does not exceed 40 tons.
AIR CONDITIONING: Air conditioning to be installed that is water cooled shall not exceed 25 tons. This will include the piping of the component system and erection of water tower. Air conditioning that is air cooled shall not exceed 50 tons.

WAGES: (per hour)

	07/01/2024	05/01/2025 Additional
Plumber	$ 40.09	$ 2.50*

*To be allocated at a later date

Star Certification: an additional $ 1.00 per hour over scale will be paid to all those who have Star Certification.

SHIFT WORK
Shift Differential: When mandated by the governmental agency, an additional 15% premium will be paid for irregular workday or for 2nd and 3rd shift.

SUPPLEMENTAL BENEFITS
Per hour:
Journeyman
$ 36.78*

*For overtime or shift differential work, $0.10 is paid at straight time, the remaining balance is paid at the same premium as the wages.

OVERTIME PAY
See (B, G, P, *V) on OVERTIME PAGE
* A portion of the benefit amount is subject to the V code for overtime and shift differential work.

HOLIDAY
Paid: See (5, 6, 13, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 13, 15, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1)year terms at the following wage.

	07/01/2024
1st term	$ 18.04
2nd term	22.05
3rd term	26.06
4th term	30.07
5th term	34.08

Supplemental Benefits per hour:
Apprentices

1st term	$ 16.62*
2nd term	20.29*
3rd term	23.95*
4th term	27.63*
5th term	31.19*

*For overtime or shift differential work, $0.10 is paid at straight time, the remaining balance is paid at the same premium as the wages.

11-373 Refrig

Plumber 07/01/2024

JOB DESCRIPTION Plumber **DISTRICT** 11

ENTIRE COUNTIES
Orange, Rockland, Sullivan

PARTIAL COUNTIES
Ulster: Only the Townships of Plattekill, Marlboro, Wawarsing, and Shawangunk (except for Wallkill and Shawangunk Prisons).

WAGES

WAGES:(per hour)	07/01/2024
Plumber/Steamfitter	$ 51.20

Note: For all work 40-60 feet above ground add $ 0.25 per hour, over 60 feet add $ 0.50 per hour.

SHIFT WORK
Shift Differential: When mandated by the governmental agency, an additional 15% premium will be paid for irregular workday or for 2nd and 3rd shift.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 45.57

*For overtime or shift differential work, $0.10 is paid at straight time, the remaining balance is paid at the same premium as the wages.

OVERTIME PAY
See (B, E, Q, *V) on OVERTIME PAGE
* A portion of the benefit amount is subject to the V code for overtime and shift differential work.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE
When a holiday falls on a Saturday, the day prior shall be considered and recognized as the holiday. When a holiday falls on a Sunday, the day proceeding shall be considered and recognized as the holiday to be observed.

REGISTERED APPRENTICES
(1) year terms at the following wages.

	07/01/2024
1st term	$ 17.92
2nd term	23.04
3rd term	28.16
4th term	33.28
5th term	40.96

Supplemental Benefits per hour:

1st term	$ 16.03*
2nd term	20.58*
3rd term	25.12*
4th term	29.68*
5th term	36.48*

*For overtime or shift differential work, $0.10 is paid at straight time, the remaining balance is paid at the same premium as the wages.

11-373 SF

Roofer 07/01/2024

JOB DESCRIPTION Roofer **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2024
Roofer/Waterproofer	$ 48.50 + $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: $ 31.87

OVERTIME PAY
See (B, H) on OVERTIME PAGE
Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HOLIDAY
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1) year term apprentices indentured prior to 01/01/2023

1st	2nd	3rd	4th
$ 16.97	$ 24.25 + 3.50*	$ 29.10 + 4.20*	$ 36.37 + 5.26*

Supplements:

1st	2nd	3rd	4th
$ 4.10	$ 16.17	$ 19.31	$ 24.02

* This portion is not subjected to overtime premiums.

(1) year term apprentices indentured after 01/01/2023

1st	2nd	3rd	4th	5th
$ 18.43	$ 21.82 + 3.16*	$ 24.25 + 3.50*	$ 29.10 + 4.20*	$ 36.37 + 5.26

Supplements:

1st	2nd	3rd	4th	5th
$ 7.73	$ 14.59	$ 16.17	$ 19.31	$ 24.02

* This portion is not subjected to overtime premiums.

9-8R

Sheetmetal Worker — 07/01/2024

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 8

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

	07/01/2024
SheetMetal Worker	$ 49.51 + 3.71*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

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 $ 46.20

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
$ 20.20 + 1.48*	$ 20.81 + 1.67*	$ 23.12 + 1.86*	$ 25.42 + 2.04*	$ 27.74 + 2.23*	$ 30.08 + 2.41*	$ 32.86 + 2.60*	$ 35.63 + 2.78*

*This portion of the benefit is NOT subject to the SAME PREMIUM as shown for overtime.

Supplemental Benefits per hour:

Apprentices	
1st term	$ 18.07
2nd term	22.24
3rd term	24.71
4th term	27.21
5th term	29.67
6th term	32.12
7th term	34.12
8th term	36.15

8-38

Sprinkler Fitter — 07/01/2024

JOB DESCRIPTION Sprinkler Fitter **DISTRICT** 1

ENTIRE COUNTIES
Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES
Per hour 07/01/2024

Sprinkler Fitter	$ 53.34

SUPPLEMENTAL BENEFITS
Per hour

Journeyworker	$ 30.77

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
$ 25.89	$ 28.77	$ 31.39	$ 34.27	$ 37.14	$ 40.02	$ 42.90	$ 45.77	$ 48.65	$ 51.53

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 9.18	$ 9.18	$ 20.90	$ 20.90	$ 21.15	$ 21.15	$ 21.15	$ 21.15	$ 21.15	$ 21.15

1-669.2

Teamster - Building / Heavy&Highway — 07/01/2024

JOB DESCRIPTION Teamster - Building / Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES
Dutchess, Orange, Rockland, Sullivan, Ulster

WAGES
GROUP 1: LeTourneau Tractors, Double Barrel Euclids, Athney Wagons and similar equipment (except when hooked to scrapers), I-Beam and Pole Trailers, Tire Trucks, Tractor and Trailers with 5 axles and over, Articulated Back Dumps and Road Oil Distributors, Articulated Water Trucks and Fuel Trucks/Trailers, positions requiring a HAZMAT CDL endorsement.

GROUP 1A: Drivers on detachable Gooseneck Low Bed Trailers rated over 35 tons.

GROUP 2: All equipment 25 yards and up to and including 30-yard bodies and cable Dump Trailers and Powder and Dynamite Trucks.

GROUP 3: All Equipment up to and including 24-yard bodies, Mixer Trucks, Dump Crete Trucks and similar types of equipment, Fuel Trucks, Batch Trucks and all other Tractor Trailers, Hi-Rail Truck.

GROUP 4: Tri-Axles, Ten Wheelers, Grease Trucks, Tillerman, Pattern Trucks, Attenuator Trucks, Water Trucks, Bus.

GROUP 5: Straight Trucks.

GROUP 6: Pick-up Trucks for hauling materials and parts, and Escort Man over-the-road.

WAGES: (per hour)	07/01/2024
GROUP 1	$ 34.58
GROUP 1A	35.72
GROUP 2	34.02
GROUP 3	33.80
GROUP 4	33.69
GROUP 5	33.57
GROUP 6	33.57

NOTE ADDITIONAL PREMIUMS:

- Employees engaged in hazardous/toxic waste removal, on a State or Federally designated hazardous/toxic waste site, where the employee comes in contact with hazardous/toxic waste material and when personal protective equipment is required for respiratory, skin, or eye protection, the employee shall receive an additional 20% premium above the hourly wage.

SHIFT WORK

- On projects requiring an irregular shift a premium of 10% will be paid on wages. The premium will be paid for off-shift or irregular shift work when mandated by Governmental Agency.

SUPPLEMENTAL BENEFITS

Per hour:	
First 40 hours	$ 44.59
Over 40 hours	36.99

OVERTIME PAY

See (*B, E, **E2, ***P, X) on OVERTIME PAGE
*Holidays worked Monday through Friday receive Double Time (2x) after 8 hours.
**Makeup day limited to the employees who were working on the site that week.
***Sunday Holidays are paid at a rate of double time and one half (2.5x) for all hours worked.

HOLIDAY

Paid: See (5, 6, 15, 25) on HOLIDAY PAGE
Overtime: See (*1) on HOLIDAY PAGE

- Any employee working two (2) days in any calendar week during which a holiday occurs shall receive a days pay for each holiday occurring during said week. This provision shall also apply if a holiday falls on a Saturday or Sunday.
*See OVERTIME PAY section for when additional premium is applicable on Holiday hours worked.

11-445B/HH

Teamster - Delivery - Building / Heavy&Highway — 07/01/2024

JOB DESCRIPTION Teamster - Delivery - Building / Heavy&Highway **DISTRICT** 11

ENTIRE COUNTIES

Dutchess, Orange, Rockland, Sullivan, Ulster

WAGES

Group 1 Tractor Trailer Drivers
Group 2 Tri- Axle

Wages:	07/01/2024
Group 1	$ 33.70
Group 2	29.70

Hazardous/Toxic Waste Removal additional 20% when personal protective equipment is required.

SUPPLEMENTAL BENEFITS

Per hour paid:	
First 40 hours	$ 32.30
Over 40 hours	0.00

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 13, 15, 16, 20, 22, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 13, 15, 16, 20, 22, 25, 26) on HOLIDAY PAGE
- Employee must work either the scheduled day of work before or the scheduled day of work after the holiday in the workweek.
- Any employee working one (1) day in the calendar week during which a holiday occurs shall receive a day's pay for each holiday occurring during said week. This provision shall also apply if a holiday falls on a Saturday.
- When any of the recognized holidays occur on Sunday and are celebrated any day before or after the holiday Sunday, such days shall be considered as the holiday and paid for as such.

11-445 B/HH Delivery

Welder 07/01/2024

JOB DESCRIPTION Welder **DISTRICT** 1

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, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES
Per hour 07/01/2024

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

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

New York State Department of Labor - Bureau of Public Work
State Office Building Campus
Building 12 - Room 130
Albany, New York 12226

REQUEST FOR WAGE AND SUPPLEMENT INFORMATION

As Required by Articles 8 and 9 of the NYS Labor Law

Fax (518) 485-1870 or mail this form for new schedules or for determination for additional occupations.

This Form Must Be Typed

Submitted By: (Check Only One) ☐ Contracting Agency ☐ Architect or Engineering Firm ☐ Public Work District Office Date:

A. Public Work Contract to be let by: (Enter Data Pertaining to Contracting/Public Agency)

1. Name and complete address ☐ (Check if new or change)

Telephone Fax

E-Mail:

2. NY State Units (see Item 5).

- ☐ 01 DOT
- ☐ 02 OGS
- ☐ 03 Dormitory Authority
- ☐ 04 State University Construction Fund
- ☐ 05 Mental Hygiene Facilities Corp.
- ☐ 06 OTHER N.Y. STATE UNIT
- ☐ 07 City
- ☐ 08 Local School District
- ☐ 09 Special Local District, i.e., Fire, Sewer, Water District
- ☐ 1O Village
- ☐ 11 Town
- ☐ 12 County
- ☐ 13 Other Non-N.Y. State (Describe)

3. SEND REPLY TO ☐ (check if new or change)
Name and complete address:

Telephone Fax

E-Mail:

4. SERVICE REQUIRED. Check appropriate box and provide project information.

☐ New Schedule of Wages and Supplements.

APPROXIMATE BID DATE :

☐ Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR THIS PROJECT :

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title

Description of Work

Contract Identification Number

Note: For NYS units, the OSC Contract No.

6. Location of Project:
Location on Site

Route No/Street Address

Village or City

Town

County

7. Nature of Project - Check One:

- ☐ 1. New Building
- ☐ 2. Addition to Existing Structure
- ☐ 3. Heavy and Highway Construction (New and Repair)
- ☐ 4. New Sewer or Waterline
- ☐ 5. Other New Construction (Explain)
- ☐ 6. Other Reconstruction, Maintenance, Repair or Alteration
- ☐ 7. Demolition
- ☐ 8. Building Service Contract

8. OCCUPATION FOR PROJECT :

- ☐ Construction (Building, Heavy Highway/Sewer/Water)
- ☐ Tunnel
- ☐ Residential
- ☐ Landscape Maintenance
- ☐ Elevator maintenance
- ☐ Exterminators, Fumigators
- ☐ Fire Safety Director, NYC Only
- ☐ Fuel Delivery
- ☐ Guards, Watchmen
- ☐ Janitors, Porters, Cleaners, Elevator Operators
- ☐ Moving furniture and equipment
- ☐ Trash and refuse removal
- ☐ Window cleaners
- ☐ Other (Describe)

9. Does this project comply with the Wicks Law involving separate bidding? YES ☐ NO ☐

10. Name and Title of Requester

Signature

SEE PAGE TWO FOR LAWS RELATING TO PUBLIC WORK CONTRACTS

NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE AWARDED ANY PUBLIC WORK CONTRACT

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements;
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements.

The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = New York State Department of Labor; NYC = New York City Comptroller's Office; AG = New York State Attorney General's Office; DA = County District Attorney's Office.

Debarment Database: To search for contractors, sub-contractors and/or their successors debarred from bidding or being awarded any public work contract or subcontract under NYS Labor Law Articles 8 and 9, or under NYS Workers' Compensation Law Section 141-b, access the database at this link: https://apps.labor.ny.gov/EDList/searchPage.do

For inquiries please call 518-457-5589.

NYSDOL Bureau of Public Work Debarment List 07/19/2024

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	DOL	*****5754	0369 CONTRACTORS, LLC		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL	*****5784	A.J.M. TRUCKING, INC.		PO BOX 2064 MONROE NY 10950	02/12/2024	02/12/2029
DOL	AG	*****1812	ADVANCED BUILDERS & LAND DEVELOPMENT, INC.		400 OSER AVE #2300HAUPPAUGE NY 11788	09/11/2019	09/11/2024
DOL	NYC		ALL COUNTY SEWER & DRAIN, INC.		7 GREENFIELD DR WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL	*****8387	AMERICAN PAVING & MASONRY, CORP.		8 FOREST AVE GLEN COVE NY 11542	05/24/2024	05/24/2029
DOL	DOL	*****8654	AMERICAN PAVING, INC.		8 FORREST AVE. GLEN COVE NY 11542	05/24/2024	05/24/2029
DOL	NYC		AMJED PARVEZ		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		ANGELO GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANGELO STANCO		8 FOREST AVE. GLEN COVE NY 11542	05/24/2024	05/24/2029
DOL	DOL		ANGELO TONDO		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	*****4231	ANKER'S ELECTRIC SERVICE, INC.		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	DOL		ANTHONY MONGELLI		PO BOX 2064 MONROE NY 10950	02/12/2024	02/12/2029
DOL	NYC		ARADCO CONSTRUCTION CORP		115-46 132RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL		ARNOLD A. PAOLINI		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC		ARSHAD MEHMOOD		168-42 88TH AVENUE JAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC		AVM CONSTRUCTION CORP		117-72 123RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	NYC		AZIDABEGUM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****8421	B & B DRYWALL, INC		206 WARREN AVE APT 1WHITE PLAINS NY 10603	12/14/2021	12/14/2026
DOL	DOL		B&L RENOVATION CO.		618 OCEAN PARKWAY APT A6BROOKLYN NY 11230	09/17/2020	09/17/2025
DOL	DOL		BERNARD BEGLEY		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	NYC	*****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL	*****3627	BJB CONSTRUCTION CORP.		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	DOL	*****5078	BLACK RIVER TREE REMOVAL, LLC		29807 ANDREWS ROAD BLACK RIVER NY 13032	10/17/2023	10/17/2028
DOL	DOL		BRADLEY J SCHUKA		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****4083	C.P.D. ENTERPRISES, INC		P.O BOX 281 WALDEN NY 12586	03/03/2020	03/03/2025
DOL	DOL	*****5161	CALADRI DEVELOPMENT CORP.		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	DOL	*****3391	CALI ENTERPRISES, INC.		1223 PARK STREET PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		CALVIN WALTERS		465 EAST THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL	*****4155	CASA BUILDERS, INC.	FRIEDLANDER CONSTRUCTION	64 N PUTT CONNERS ROAD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	AG	*****7247	CENTURY CONCRETE CORP		2375 RAYNOR ST RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****0026	CHANTICLEER CONSTRUCTION LLC		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	NYC	*****2117	CHARAN ELECTRICAL ENTERPRISES		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028

DOL	NYC		CHARLES ZAHRADKA		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL		CHRISTOPHER GRECO		26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL		CRAIG JOHANSEN		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	DOL	*****3228	CROSS-COUNTY LANDSCAPING AND TREE SERVICE, INC.	ROCKLAND TREE SERVICE	26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL	*****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL		DANIEL ROBERT MCNALLY		7 GREENFIELD DRIVE WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		DAVID FRIEDLANDER		64 NORTH PUTT CORNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	NYC		DAVID WEINER		14 NEW DROP LANE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL		DINA TAYLOR		64 N PUTT CONNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	DOL	*****5175	EAGLE MECHANICAL AND GENERAL CONSTRUCTION LLC		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	AG		EDWIN HUTZLER		23 NORTH HOWELLS RD BELLPORT NY 11713	08/04/2021	08/04/2026
DOL	DA		EDWIN HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	DOL		EUGENIUSZ "GINO" KUCHAR		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
DOL	DA		FREDERICK HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	NYC	*****6616	G & G MECHANICAL ENTERPRISES, LLC.		1936 HEMPSTEAD TURNPIKE EAST MEDOW NY 11554	11/29/2019	11/29/2024
DOL	DOL	*****2998	G.E.M. AMERICAN CONSTRUCTION CORP.		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
DOL	NYC		GAYATRI MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DA		GIOVANNA TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DA	*****0213	GORILLA CONTRACTING GROUP, LLC		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DOL		HANS RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027
DOL	DOL	*****9211	J. WASE CONSTRUCTION CORP.		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		J.M.J CONSTRUCTION		151 OSTRANDER AVENUE SYRACUSE NY 13205	11/21/2022	11/21/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	12/12/2022	12/12/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027

DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****7993	JBS DIRT, INC.		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****2435	JEFFEL D. JOHNSON	JMJ7 AND SON	5553 CAIRNSTRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JEFFEL JOHNSON ELITE CARPENTER REMODEL AND CONSTRUCTION		C2 EVERGREEN CIRCLE LIVERPOOL NY 13090	11/21/2022	11/21/2027
DOL	DOL	*****2435	JEFFREY M. JOHNSON	JMJ7 AND SON	5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	NYC		JENNIFER GUERRERO		1936 HEMPSTEAD TURNPIKE EAST MEADOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		JIM PLAUGHER		17613 SANTE FE LINE ROAD WAYNEFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		JMJ7 & SON CONSTRUCTION, LLC		5553 CAIRNS TRAIL LIVERPOOL NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 AND SONS CONTRACTORS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS		7014 13TH AVENUE BROOKLYN NY 11228	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS AND SONS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS, LLC		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JOHN GOCEK		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		JOHN MARKOVIC		47 MANDON TERRACE HAWTHORN NJ 07506	03/29/2021	03/29/2026
DOL	DOL		JOHN WASE		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		JORGE RAMOS		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DOL		JOSEPH K. SALERNO		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL		JOSEPH K. SALERNO II		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		JRN CONSTRUCTION CO, LLC		1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028

DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL		KARIN MANGIN		796 PHELPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	DOL		KATE E. CONNOR		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KEAN INDUSTRIES, LLC		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL	*****2959	KELC DEVELOPMENT, INC		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KIMBERLY F. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		KMA GROUP II, INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL	*****1833	KMA GROUP INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KMA INSULATION, INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KRIN HEINEMANN		2345 ROUTE 52, SUITE 2N HOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	NYC		KULWANT S. DEOL		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	11/07/2023	11/07/2028
DOL	AG	*****3291	LINTECH ELECTRIC, INC.		3006 TILDEN AVE BROOKLYN NY 11226	02/16/2022	02/16/2027
DOL	DOL		LOUIS A. CALICCHIA		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		LUBOMIR PETER SVOBODA		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	NYC		M & L STEEL & ORNAMENTAL IRON CORP.		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	DOL	*****2196	MAINSTREAM SPECIALTIES, INC.		11 OLD TOWN RD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DA		MANUEL P TOBIO		150 KINGS STREET BROOKLYN NY 14444	08/19/1998	08/19/2998
DOL	DA		MANUEL TOBIO		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		MAQSOOD AHMAD		618 OCEAN PKWY BROOKLYN NY 11230	09/17/2020	09/17/2025
DOL	NYC		MARIA NUBILE		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	NYC	*****9926	MILLENNIUM FIRE PROTECTION, LLC		325 W. 38TH STREET SUITE 204NEW YORK NY 10018	11/14/2019	11/14/2024
DOL	NYC	*****0627	MILLENNIUM FIRE SERVICES, LLC		14 NEW DROP LNE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL	*****1320	MJC MASON CONTRACTING, INC.		42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027
DOL	DOL	*****1320	MJC MASON CONTRACTING, INC.		42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
DOL	NYC		MUHAMMED A. HASHEM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	NYC		NAMOW, INC.		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DOL	*****7790	NATIONAL BUILDING & RESTORATION CORP		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL	*****1797	NATIONAL CONSTRUCTION SERVICES, INC		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	NYC		NAVIT SINGH		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		NELCO CONTRACTING, LLC		1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
DOL	DA		NICHOLAS T. ANALITIS		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028

DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTION, INC.	444 SCHANTZ ROAD ALLENTOWN PA 18104	09/17/2020	09/17/2025
DOL	NYC	*****5643	NYC LINE CONTRACTORS, INC.		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL		PAULINE CHAHALES		935 S LAKE BLVD MAHOPAC NY 10541	03/02/2021	03/02/2026
DOL	DOL		PETER STEVENS		11 OLD TOWN ROAD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DOL		PETER STEVENS		8269 21ST ST BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL	*****4168	PHANTOM CONSTRUCTION CORP.		95-27 116TH STREET QUEENS NY 11419	07/12/2024	07/12/2029
DOL	DOL	*****4168	PHANTOM CONSTRUCTION CORP.		95-27 116TH STREET QUEENS NY 11419	05/28/2024	05/28/2029
DOL	DOL	*****0466	PRECISION BUILT FENCES, INC.		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	NYC		RASHEL CONSTRUCTION CORP		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****1068	RATH MECHANICAL CONTRACTORS, INC.		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL	*****2633	RAW POWER ELECTRIC CORP.		3 PARK CIRCLE MIDDLETOWN NY 10940	07/11/2022	07/11/2027
DOL	DA	*****7559	REGAL CONTRACTING INC.		24 WOODBINE AVE NORTHPORT NY 11768	10/01/2020	10/01/2025
DOL	DOL		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	DOL		ROBBYE BISSESAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	07/11/2022	07/11/2027
DOL	DOL		RONALD MESSEN		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****7172	RZ & AL INC.		198 RIDGE AVENUE VALLEY STREAM NY 11581	06/06/2022	06/06/2027
DOL	DOL		SAL FRESINA MASONRY CONTRACTORS, INC.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		SAL MASONRY CONTRACTORS, INC.		(SEE COMMENTS) SYRACUSE NY 13202	07/16/2021	07/16/2026
DOL	DOL	*****9874	SALFREE ENTERPRISES INC		P.O BOX 14 2821 GARDNER RDPOMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		SALVATORE A FRESINA A/K/A SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	DOL		SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	NYC	*****0349	SAM WATERPROOFING INC		168-42 88TH AVENUE APT.1 AJAMAICA NY 11432	11/20/2019	11/20/2024
DOL	DA	*****0476	SAMCO ELECTRIC CORP.		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	NYC	*****1130	SCANA CONSTRUCTION CORP.		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL	*****2045	SCOTT DUFFIE	DUFFIE'S ELECTRIC, INC.	P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	DOL		SCOTT DUFFIE		P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	DA		SILVANO TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028

NYSDOL Bureau of Public Work Debarment List 07/19/2024

Article 8

DOL	DOL	*****0440	SOLAR GUYS INC.		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	NYC		SOMATIE RAMSUNAHAI		115-46 132ND ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL	*****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC	*****3661	SPANIER BUILDING MAINTENANCE CORP		200 OAK DRIVE SYOSSET NY 11791	03/14/2022	03/14/2027
DOL	DOL		STANADOS KALOGELAS		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL	*****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL	*****6844	STEAM PLANT AND CHX SYSTEMS INC.		14B COMMERCIAL AVENUE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL	*****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	DOL	*****9150	SURGE INC.		8269 21ST STREET BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL		SYED RAZA		198 RIDGE AVENUE NY 11581	06/06/2022	06/06/2027
DOL	DOL		TARLOK SINGH		95-27 116TH STREET QUEENS NY 11419	05/28/2024	05/28/2029
DOL	DOL		TARLOK SINGH		95-27 116TH STREET QUEENS NY 11419	07/12/2024	07/12/2029
DOL	DOL		TERRY THOMPSON		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL	*****9733	TERSAL CONSTRUCTION SERVICES INC		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13208	07/16/2021	07/16/2026
DOL	DOL		TERSAL CONTRACTORS, INC.		221 GARDNER RD P.O BOX 14POMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		TERSAL DEVELOPMENT CORP.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		TIMOTHY PERCY		29807 ANDREWS ROAD BLACK RIVER NY 13612	10/17/2023	10/17/2028
DOL	DA	*****1050	TRI STATE CONSTRUCTION OF NY CORP.		50-39 175TH PLACE FRESH MEADOWS NY 11365	03/28/2022	03/28/2027
DOL	DA	*****4106	TRIPLE H CONCRETE CORP		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****8210	UPSTATE CONCRETE & MASONRY CONTRACTING CO INC		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	*****6418	VALHALLA CONSTRUCTION, LLC.		796 PHLEPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	NYC	*****2426	VICKRAM MANGRU	VICK CONSTRUCTI ON	21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	NYC		VICKRAM MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		VIKTORIA RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC	*****3673	WALTERS AND WALTERS, INC.		465 EAST AND THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL	*****8266	WILLIAM CHRIS MCCLENDON	MCCLENDON ASPHALT PAVING	1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM CHRIS MCCLENDON		1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM G. PROERFRIEDT		85 SPRUCEWOOD ROAD WEST BABYLON NY 11704	01/19/2021	01/19/2026
DOL	DOL	*****5924	WILLIAM G. PROPHY, LLC	WGP CONTRACTIN G, INC.	54 PENTAQUIT AVE BAYSHORE NY 11706	01/19/2021	01/19/2026
DOL	DOL		XENOFON EFTHIMIADIS		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028

SECTION 01 08 00 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.
B. Owner's Project Requirements and Basis-of-Design documentation are included by reference for information only.

1.2 SUMMARY

A. Section Includes:

1. General requirements for coordinating and scheduling commissioning.
2. Commissioning meetings.
3. Commissioning reports.
4. Test equipment, instrumentation, and tools (including, but not limited to, proprietary test equipment, instrumentation, and tools) required to perform tests.
5. Use of test equipment, instrumentation, and tools for commissioning.
6. Construction checklist requirements, including, but not limited to, installation checks, startup, performance tests, and performance test demonstration.
7. Commissioning tests and commissioning test demonstration.
8. Adjusting, verifying, and documenting identified systems and assemblies.
9. Work to correct commissioning issues.
10. Work to repeat tests when equipment and systems fail acceptance criteria.

B. Related Requirements:

1. Section 01 33 00 "Submittal Procedures" for submittal procedures requirements for commissioning.

2. Section 01 77 00 "Closeout Procedures" for certificate of Construction Phase Commissioning Completion submittal requirements.

3. Section 01 78 23 "Operation and Maintenance Data" for preliminary operation and maintenance data submittal.

4. Section 23 08 00 "Commissioning of HVAC" for technical commissioning requirements for HVAC systems.

5. Section 26 08 00 "Commissioning of Electrical" for technical commissioning requirements for Electrical systems.

6. Individual Technical Specifications and Drawings: Equipment and systems design and installation, startup, field quality-control testing, and additional requirements indicated in the Contract Documents.

1.3 DEFINITIONS

A. Acceptance Criteria: Threshold of acceptable work quality or performance specified for a commissioning activity, including, but not limited to, construction checklists, performance tests, performance test demonstrations, commissioning tests and commissioning test demonstrations.

B. Basis-of-Design Document: A document prepared by Owner, Architect, or Commissioning Authority that records concepts, calculations, decisions, and product selections used to comply with Owner's Project Requirements and to suit applicable regulatory requirements, standards, and guidelines.

C. Commissioning Authority: An entity engaged by Owner, and identified in Section 01 12 00, to evaluate Commissioning-Process Work.

D. Commissioning Plan: A document, prepared by Commissioning Authority, that outlines the organization, schedule, allocation of resources, and documentation requirements of commissioning.

E. Commissioning: A quality-focused process for verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, and tested to comply with Owner's Project Requirements. The requirements specified here are limited to the construction phase commissioning activities. The scope of commissioning is defined in Section 011200 "Multiple Contract Summary."

F. Construction Phase Commissioning Completion: The stage of completion and acceptance of commissioning when resolution of deficient conditions and issues discovered during commissioning and retesting until acceptable results are obtained has been accomplished. Owner will establish in writing the date Construction Phase Commissioning Completion is achieved. See Section 017700 "Closeout Procedures" for certificate of Construction Phase Commissioning Completion submittal requirements.

1. Commissioning is complete when the work specified in this Section and related Sections has been completed and accepted, including, but not limited to, the following:

    a. Completion of tests and acceptance of test results.
    b. Resolution of issues, as verified by retests performed and documented with acceptance of retest results.
    c. Comply with requirements in Section 017900 "Demonstration and Training."
    d. Completion and acceptance of submittals and reports.

G. Owner's Project Requirements: A document written by Owner, Architect, or Commissioning Authority that details the functional requirements of a project and the expectations of how it will be used and operated, including Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

H. Owner's Witness: Commissioning Authority, Owner's Project Manager, or Architect-designated witness authorized to authenticate test demonstration data and to sign completed test data forms.

I. "Systems," "Assemblies," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment, and components.

J. Test: Performance tests, performance test demonstrations, commissioning tests, and commissioning test demonstrations.

K. Sampling Procedures and Tables for Inspection by Attributes: As defined in ASQ Z1.4.

1.4 COMPENSATION

A. Should Architect, Commissioning Authority, other Owner's witness, or Owner's staff perform additional services or incur additional expenses due to actions of Contractor listed below, compensate Owner for such additional services and expenses.

1. Failure to provide timely notice of commissioning activities schedule changes.
2. Failure to meet acceptance criteria for test demonstrations.

B. Contractor shall compensate Owner for such additional services and expenses at the rate of $175.00 per labor hour plus the current per mile rate for personnel travelling plus per diem allowances for meals and lodging according to current U.S. General Services Administration (GSA) Per Diem Rates.

1.5 COMMISSIONING TEAM

A. Members Appointed by Contractor(s):

1. Commissioning Coordinator: A person or entity employed by Contractor to manage, schedule, and coordinate commissioning.
2. Project superintendent and other employees that Contractor may deem appropriate for a particular portion of the commissioning.
3. Subcontractors, installers, suppliers, and specialists that Contractor may deem appropriate for a particular portion of the commissioning.
4. Appointed team members shall have the authority to act on behalf of the entity they represent.

B. Members Appointed by Owner:

1. Commissioning Authority, plus consultants that Commissioning Authority may deem appropriate for a particular portion of the commissioning.

2. Owner representative(s), facility operations and maintenance personnel, plus other employees, separate contractors, and consultants that Owner may deem appropriate for a particular portion of the commissioning.

3. Architect / Engineer, plus employees and consultants that Architect may deem appropriate for a particular portion of the commissioning.

1.6 SUBMITTALS

A. Comply with requirements in Section 013300 "Submittal Procedures" for submittal procedures general requirements for commissioning.

B. Commissioning Plan Information:

1. List of Contractor-appointed commissioning team members to include specific personnel and subcontractors to the performance of the various commissioning requirements.

2. Schedule of commissioning activities, integrated with the construction schedule. Comply with requirements in Section 013200 "Construction Progress Documentation" for construction schedule general requirements for commissioning.

3. Contractor personnel and subcontractors to participate in each test.

4. List of instrumentation required for each test to include identification of parties that will provide instrumentation for each test.

C. Commissioning Coordinator Letter of Authority:

1. Within 10 days after approval of Commissioning Coordinator qualifications, submit a letter of authority for Commissioning Coordinator, signed by a principal of Contractor's firm. Letter shall authorize Commissioning Coordinator to do the following:

   a. Make inspections required for commissioning.
   b. Coordinate, schedule, and manage commissioning of Contractor, subcontractors, and suppliers.
   c. Obtain documentation required for commissioning from Contractor, subcontractors, and suppliers.
   d. Report issues, delayed resolution of issues, schedule conflicts, and lack of cooperation or expertise on the part of members of the commissioning team.

D. Commissioning Coordinator Qualification Data: For entity coordinating Contractor's commissioning activities to demonstrate their capabilities and experience.

1. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

E. Commissioning schedule.

F. Two-week look-ahead schedules.

G. List test instrumentation, equipment, and monitoring devices. Include the following information:

1. Make, model, serial number, and application for each instrument, equipment, and monitoring device.

2. Brief description of intended use.

3. Calibration record showing the following:

   a. Calibration agency, including name and contact information.

b. Last date of calibration.
c. Range of values for which calibration is valid.
d. Certification of accuracy.
e. N.I.S.T. traceability certification for calibration equipment.
f. Due date of the next calibration.

H. Construction Checklists:

1. Material checks.
2. Installation checks.
3. Startup procedures, where required.

I. Test Reports:

1. Pre-Startup Report: Prior to start up of equipment or a system, submit signed, completed construction checklists.

2. Test Data Reports: At the end of each day in which tests are conducted, submit test data for tests performed.

3. Commissioning Issues Reports: Daily, at the end of each day in which tests are conducted, submit commissioning issue reports for tests for which acceptable results were not achieved.

4. Weekly Progress Report: Weekly, at the end of each week in which tests are conducted, submit a progress report.

5. Data Trend Logs: Submit data trend logs at the end of the trend log period.

6. System Alarm Logs: Daily, at the start of days following a day in which tests were performed, submit print-out of log of alarms that occurred since the last log was printed.

1.7 CLOSEOUT SUBMITTALS

A. Commissioning Report:

1. At Construction Phase Commissioning Completion, include the following:

a. Pre-startup reports.
b. Approved test procedures.
c. Test data forms, completed and signed.
d. Progress reports.
e. Commissioning issues report log.
f. Commissioning issues reports showing resolution of issues.
g. Correspondence or other documents related to resolution of issues.
h. Other reports required by commissioning.
i. List unresolved issues and reasons they remain unresolved and should be exempted from the requirements for Construction Phase Commissioning Completion.
j. Report shall include commissioning work of Contractor.

B. Request for Certificate of Construction Phase Commissioning Completion.

C. Operation and Maintenance Data: For proprietary test equipment, instrumentation, and tools to include in operation and maintenance manuals.

1.8 QUALITY ASSURANCE

A. Commissioning Coordinator Qualifications:

1. Certification of commissioning process expertise. The following certifications are acceptable upon receipt of information demonstrating that certification is current and in good standing. Owner reserves the right to accept or reject other certifications as evidence of qualification.

    a. Certified Commissioning Professional, by Building Commissioning Association.
    b. Certified Building Commissioning Professional, by Association of Energy Engineers.
    c. Existing Building Commissioning Professional, by Association of Energy Engineers.
    d. Commissioning Process Management Professional, by American Society of Heating, Refrigerating and Air-Conditioning Engineers.
    e. Accredited Commissioning Process Authority Professional, by University of Wisconsin.
    f. Accredited Commissioning Process Manager, by University of Wisconsin.
    g. Accredited Green Commissioning Process Provider, by University of Wisconsin.

2. Absent one of the certifications above, provide documented experience on at least three projects of similar scope and complexity commissioning systems of similar complexity to those contained in these documents. Provide written references from the lead Commissioning Authority of each project attesting to applicant experience, responsibilities, and proven capabilities in regards to commissioning being equal to those required to gain one of the listed certifications. Each reference must be certified in accordance with the above requirements.

B. Calibration Agency Qualifications: Certified by The American Association of Laboratory Accreditation that the calibration agency complies with minimum requirements of ISO/IEC 17025.

1.9 COMMISSIONING AUTHORITY'S RESPONSIBILITIES

A. Commissioning Authority Responsibilities: Comply with requirements in Section 011200 "Summary of Multiple Contracts."

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

A. Test equipment and instrumentation required to perform the commissioning shall remain the property of Contractor unless otherwise indicated.

B. Test equipment and instrumentation required to perform commissioning shall comply with the following criteria:

1. Be manufactured for the purpose of testing and measuring tests for which they are being used and have an accuracy to test and measure system performance within the tolerances required to determine acceptable performance.

2. Calibrated and certified.

a. Calibration performed and documented by a qualified calibration agency according to national standards applicable to the tools and instrumentation being calibrated. Calibration shall be current according to national standards or within test equipment and instrumentation manufacturer's recommended intervals, whichever is more frequent, but not less than within six months of initial use on Project. Calibration tags permanently affixed.

b. Repair and recalibrate test equipment and instrumentation if dismantled, dropped, or damaged since last calibrated.

3. Maintain test equipment and instrumentation.

4. Use test equipment and instrumentation only for testing or monitoring Work for which they are designed.

2.2 PROPRIETARY TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

A. Proprietary test equipment, instrumentation, and tools are those manufactured or prescribed by tested equipment manufacturer and required for work on its equipment as a condition of equipment warranty, or as otherwise required to service, repair, adjust, calibrate, or perform work on its equipment.

1. Identify proprietary test equipment, instrumentation, and tools required in the test equipment identification list submittal.
2. Proprietary test equipment, instrumentation, and tools shall become the property of Owner at Substantial Completion.

2.3 REPORT FORMAT AND ORGANIZATION

A. General Format and Organization:

1. Record report on compact disk.

2. Electronic Data: Portable document format (PDF); a single file with outline-organized bookmarks for major and minor tabs and tab contents itemized for specific reports.

B. Commissioning Report:

1. Include a table of contents and an index to each test.

2. Include major tabs for each Specification Section.

3. Include minor tabs for each test.

4. Within each minor tab, include the following:

a. Test specification.

b. Pre-startup reports.

c. Approved test procedures.

d. Test data forms, completed and signed.

e. Commissioning issue reports, showing resolution of issues, and documentation related to resolution of issues pertaining to a single test. Group data forms, commissioning issue reports showing resolution of issues, and documentation related to resolution of issues for each test repetition together within the minor tab, in reverse chronological order (most recent on top).

PART 3 - EXECUTION

3.1 PREPARATION

A. Review preliminary construction checklists and preliminary test procedures and data forms.

3.2 CONSTRUCTION CHECKLISTS

A. Construction checklists cannot modify or conflict with the Contract Documents.

B. Create construction checklists based on actual systems and equipment to be included in Project.

C. Material Checks: Compare specified characteristics and approved submittals with materials as received. Include factory tests and other evaluations, adjustments, and tests performed prior to shipment, if applicable.

1. Services connection requirements, including configuration, size, location, and other pertinent characteristics.

2. Included optional features.

3. Delivery Receipt Check: Inspect and record physical condition of materials and equipment on delivery to Project site, including agreement with approved submittals, cleanliness and lack of damage.

D. Installation Checklists: must in general document that equipment and systems are installed and started in accordance with the contract document requirements. See attachment #1 for sample checklists for a small group of representative equipment. Develop checklists in similar format with line items required designed to insure proper installation by installers:

1. Location according to Drawings and approved Shop Drawings.

2. Configuration.

3. Compliance with manufacturers' written installation instructions.

4. Attachment to structure.

5. Access clearance to allow for maintenance, service, repair, removal, and replacement without the need to disassemble or remove other equipment or building elements. Access coordinated with other building elements and equipment, including, but not limited to, ceiling and wall access panels, in a manner consistent with OSHA fall-protection regulations and safe work practices.

6. Utility connections are of the correct characteristics, as applicable.

7. Correct labeling and identification.

E. Startup Checks: Verify readiness of equipment to be energized. Include manufacturer's standard startup procedures and forms.

F. Startup: Perform and document initial operation of equipment to prove that it is installed properly and operates as intended according to manufacturer's standard startup procedures, minimum.

G. Performance Tests:

1. Static Tests: As specified elsewhere, including, but not limited to, duct and pipe leakage tests, insulation-resistance tests, and water-penetration tests.
2. Component Performance Tests: Tests evaluate the performance of an input or output of components under a full range of operating conditions.
3. Equipment and Assembly Performance Tests: Test and evaluate performance of equipment and assemblies under a full range of operating conditions and loads.
4. System Performance Tests: Test and evaluate performance of systems under a full range of operating conditions and loads.
5. Intersystem Performance Tests: Test and evaluate the interface of different systems under a full range of operating conditions and loads.

H. Deferred Construction Checklists: Obtain Owner approval of proposed deferral of construction checklists, including proposed schedule of completion of each deferred construction checklist, before submitting request for Certificate of Construction Phase Commissioning Completion. When approved, deferred construction checklists may be completed after date of Construction Phase Commissioning Completion. Include the following in request for Certificate of Construction Phase Commissioning Completion:

1. Identify deferred construction checklists by number and title.
2. Provide a target schedule for completion of deferred construction checklists.
3. Written approval of proposed deferred construction checklists, including approved schedule of completion of each deferred construction checklist.

I. Delayed Construction Checklists: Obtain Owner approval of proposed delayed construction checklists, including proposed schedule of completion of each delayed construction checklist, before submitting request for Certificate of Construction Phase Commissioning Completion. When approved, delayed construction checklists may be completed after date of Construction Phase Commissioning Completion. Include the following in request for Certificate of Construction Phase Commissioning Completion:

1. Identify delayed construction checklist by construction checklist number and title.
2. Provide a target schedule for completion of delayed construction checklists.
3. Written approval of proposed delayed construction checklists, including approved schedule of completion of each delayed construction checklist.

3.3 GENERAL EXECUTION REQUIREMENTS

A. Schedule and coordinate commissioning with the construction schedule.

B. Perform activities identified in construction checklists, including tests, and document results of actions as construction proceeds.

C. Perform test demonstrations for Owner's witness. Unless otherwise indicated in specific testing requirements, demonstrate tests for 100 percent of work to which the test applies.

D. Report test data and commissioning issue resolutions.

E. Schedule personnel to participate in and perform Commissioning-Process Work.

F. Installing contractors' commissioning responsibilities include, but are not limited to, the following:

1. Operating the equipment and systems they install during tests.
2. In addition, installing contractors may be required to assist in tests of equipment and systems with which their work interfaces.

3.4 COMMISSIONING COORDINATOR RESPONSIBILITIES

A. Management and Coordination: Manage, schedule, and coordinate commissioning, including, but not limited to, the following:

1. Coordinate with subcontractors on their commissioning responsibilities and activities.

2. Obtain, assemble, and submit commissioning documentation.

3. Attend periodic on-site commissioning meetings. Comply with requirements in Section 01 31 00 "Project Management and Coordination."

4. Develop and maintain the commissioning schedule. Integrate commissioning schedule into the construction schedule. Update schedule at specified intervals.

5. Review and comment on preliminary test procedures and data forms.

6. Report inconsistencies and issues in system operations.

7. Verify that tests have been completed and results comply with acceptance criteria, and that equipment and systems are ready before scheduling test demonstrations.

8. Direct and coordinate test demonstrations.

9. Coordinate witnessing of test demonstrations by Owner's witness.

10. Coordinate and manage training. Be present during training sessions to direct video recording, present training and direct the training presentations of others. Comply with requirements in Section 017900 "Demonstration and Training."

11. Prepare and submit specified commissioning reports.

12. Track commissioning issues until resolution and retesting is successfully completed.

13. Retain original records of Commissioning-Process Work, organized as required for the commissioning report. Provide Owner's representative access to these records on request.

14. Assemble and submit commissioning report.

3.5 COMMISSIONING TESTING

A. Quality Control: Construction checklists, including tests, are quality-control tools designed to improve the functional quality of Project. Test demonstrations evaluate the effectiveness of Contractor's quality-control process.

B. Owner's witness will be present to witness commissioning work requiring the signature of an owner's witness, including, but not limited to, test demonstrations. Owner's project manager will coordinate attendance by Owner's witness with Contractor's published commissioning schedule. Owner's witness will provide no labor or materials in the commissioning work. The only function of Owner's witness will be to observe and comment on the progress, completion, and results of commissioning.

C. Construction Checklists:

1. Complete construction checklists as Work is completed.

2. Distribute construction checklists to installers before they start work.

3. Installers:

   a. Verify installation using approved construction checklists as Work proceeds.
   b. Complete and sign construction checklists daily for work performed during the preceding day.

4. Provide Commissioning Authority access to construction checklists.

D. Installation Compliance Issues: Record as an installation compliance issue Work found to be incomplete, inaccessible, at variance with the Contract Documents, nonfunctional, or that does not comply with construction checklists. Record installation compliance issues on the construction checklist at the time they are identified. Record corrective action and how future Work should be modified before signing off the construction checklist.

E. Pre-Startup Audit: Prior to executing startup procedures, review completed installation checks to determine readiness for startup and operation. Report conditions, which, if left uncorrected, adversely impact the ability of systems or equipment to operate satisfactorily or to comply with acceptance criteria. Prepare pre-startup report for each system.

F. Test Procedures and Test Data Forms:

1. Test procedures shall define the step-by-step procedures to be used to execute tests and test demonstrations.

2. Test procedures shall be specific to the make, model, and application of the equipment and systems being tested.

3. Completed test data forms are the official records of the results of tests.

4. Commissioning Authority will provide to Contractor preliminary test procedures and test data forms for performance tests and commissioning tests after approval of Product Data, Shop Drawings, and preliminary operation and maintenance manual. Test procedures will in general be designed to demonstrate that operating characteristics conform to any or all required and / or approved performance characteristics.

5. Review preliminary test procedures and test data forms and provide comments within 14 days of receipt from Commissioning Authority. Review shall address the following:

   a. Equipment protection and warranty issues, including, but not limited to, manufacturers' installation and startup recommendations, and operation and maintenance instructions.

   b. Applicability of the procedure to the specific software, equipment, and systems approved for installation.

6. After Contractor has reviewed and commented on the preliminary test procedures and test data forms, Commissioning Authority will revise and reissue the approved revised test procedures and test data forms marked "Approved for Testing."

7. Use only approved test procedures and test data forms marked "Approved for Testing" to perform and document tests and test demonstrations.

G. Performance of Tests:

1. The sampling rate for tests is 100 percent. The sampling rate for test demonstrations is 100 percent unless otherwise indicated.

2. Perform and complete each step of the approved test procedures in the order listed.

3. Record data observed during performance of tests on approved data forms at the time of test performance and when the results are observed.

4. Record test results that are not within the range of acceptable results on commissioning issue report forms in addition to recording the results on approved test procedures and data forms according to the "Commissioning Compliance Issues" Paragraph in this Article.

5. On completion of a test, sign the completed test procedure and data form. Tests for which test procedures and data forms are incomplete, not signed, or which indicate performance that does not comply with acceptance criteria will be rejected. Tests for which test procedures and data forms are rejected shall be repeated and results resubmitted.

H. Performance of Test Demonstration:

1. Perform test demonstrations on a sample of tests after test data submittals are approved. The sampling rate for test demonstrations shall be 100 percent of components which are not typical of at least 10, and shall be 25% of components which are typical of at least 10, unless otherwise indicated in the individual test specification.

2. Notify Owner's witness at least seven days in advance of each test demonstration.

3. Perform and complete each step of the approved test procedures in the order listed.

4. Record data observed during performance of test demonstrations on approved data forms at the time of demonstration and when the results are observed.

5. Provide full access to Owner's witness to directly observe the performance of all aspects of system response during the test demonstration. On completion of a test demonstration, sign the completed data form and obtain signature of Owner's witness at the time of the test to authenticate the reported results.

6. Test demonstration data forms not signed by Contractor and Owner's witness at the time of the completion of the procedure will be rejected. Test demonstrations for which data forms are rejected shall be repeated and results shall be resubmitted.

a. Exception for Failure of Owner's Witness to Attend: Failure of Owner's witness to be present for agreed-on schedule of test demonstration shall not delay Contractor. If Owner's witness fails to attend a scheduled test, Contractor shall proceed with the scheduled test. On completion, Contractor shall sign the data form for Contractor and for Owner's witness, and shall note the absence of Owner's witness at the scheduled time and place.

7. False load test requirements are specified in related sections.

   a. Where false load testing is specified, provide temporary equipment, power, controls, wiring, piping, valves, and other necessary equipment and connections required to apply the specified load to the system. False load system shall be capable of steady-state operation and modulation at the level of load specified. Equipment and systems permanently installed in this work shall not be used to create the false load without Architect's written approval.

I. Deferred Tests:

1. Deferred Tests List: Identify, in the request for Certificate of Construction Phase Commissioning Completion, proposed deferred tests or other tests approved for deferral until specified seasonal or other conditions are available. When approved, deferred tests may be completed after the date of Construction Phase Commissioning Completion. Identify proposed deferred tests in the request for Certificate of Construction Phase Commissioning Completion as follows:

   a. Identify deferred tests by number and title.
   b. Provide a target schedule for completion of deferred tests.

2. Schedule and coordinate deferred tests. Schedule deferred tests when specified conditions are available. Notify Architect and Commissioning Authority at least seven calendar days (minimum) in advance of tests.

3. Where deferred tests are specified, coordinate participation of necessary personnel and of Architect, Commissioning Authority, and Owner's witness. Schedule deferred tests to minimize occupant and facility impact. Obtain Architect's approval of the proposed schedule.

J. Delayed Tests:

1. Delayed Tests List: Identify, in the request for Certificate of Construction Phase Commissioning Completion, proposed delayed tests. Obtain Owner approval of proposed delayed tests, including proposed schedule of completion of each delayed test, before submitting request for Certificate of Construction Phase Commissioning Completion. Include the following in the request for Certificate of Construction Phase Commissioning Completion:

   a. Identify delayed tests by test number and title.
   b. Written approval of proposed delayed tests, including approved schedule of completion of delayed tests.

2. Schedule and coordinate delayed tests. Schedule delayed tests when conditions that caused the delay have been rectified. Notify Architect and Commissioning Authority at least seven calendar days (minimum) in advance of tests.

3. Where delayed tests are approved, coordinate participation of necessary personnel and of Architect, Commissioning Authority, and Owner's witness. Schedule delayed tests to minimize occupant and facility impact. Obtain Architect's approval of the proposed schedule.

K. Commissioning Compliance Issues:

1. Test results that are not within the range of acceptable results are commissioning compliance issues.

2. Track and report commissioning compliance issues until resolution and retesting are successfully completed.

3. If a test demonstration fails, determine the cause of failure. Direct timely resolution of issue and then repeat the demonstration. If a test demonstration must be repeated due to failure caused by Contractor work or materials, reimburse Owner for billed costs for the participation in the repeated demonstration.

4. Test Results: If a test demonstration fails to meet the acceptance criteria, perform the following:

a. Complete a commissioning compliance issue report form promptly on discovery of test results that do not comply with acceptance criteria.
b. Submit commissioning compliance issue report form within 24 hours of the test.
c. Determine the cause of the failure.
d. Establish responsibility for corrective action if the failure is due to conditions found to be Contractor's responsibility.

5. Commissioning Compliance Issue Report: Provide a commissioning compliance issue report for each issue. Do not report multiple issues on the same commissioning compliance issue report.

a. Exception: If an entire class of devices is determined to exhibit the identical issue, they may be reported on a single commissioning compliance issue report. (For example, if all return-air damper actuators that are specified to fail to the open position are found to fail to the closed position, they may be reported on a single commissioning issue report. If a single commissioning issue report is used for multiple commissioning compliance issues, each device shall be identified in the report, and the total number of devices at issue shall be identified.

b. Complete and submit Part 1 of the commissioning compliance issue report immediately when the condition is observed.

c. Record the commissioning compliance issue report number and describe the deficient condition on the data form.

d. Resolve commissioning compliance issues promptly. Complete and submit Part 2 of the commissioning compliance issue report when issues are resolved.

6. Diagnose and correct failed test demonstrations as follows:

a. Perform diagnostic tests and activities required to determine the fundamental cause of issues observed.
b. Record each step of the diagnostic procedure prior to performing the procedure. Update written procedure as changes become necessary.
c. Record the results of each step of the diagnostic procedure.
d. Record the conclusion of the diagnostic procedure on the fundamental cause of the issue.
e. Determine and record corrective measures.
f. Include diagnosis of fundamental cause of issues in commissioning compliance issue report.

7. Retest:

a. Schedule and repeat the complete test procedure for each test demonstration for which acceptable results are not achieved. Obtain signature of Owner's witness on retest data forms. Repeat test demonstration until acceptable results are achieved. Except for issues that are determined to result from design errors or omissions, or other conditions beyond Contractor's responsibility, compensate Owner for direct costs incurred as the result of repeated test demonstrations to achieve acceptable results.

b. For each repeated test demonstration, submit a new test data form, marked "Retest."

8. Do not correct commissioning compliance issues during test demonstrations.

a. Exceptions will be allowed if the cause of the issue is obvious and resolution can be completed in less than five minutes. If corrections are made under this exception, note the deficient conditions on the test data form and issue a commissioning compliance issue report. A new test data form, marked "Retest," shall be initiated after the resolution has been completed.

3.6 COMMISSIONING MEETINGS

A. Commissioning Authority will schedule and conduct commissioning meetings. Comply with requirements in Section 013100 "Project Management and Coordination."

3.7 SEQUENCING

A. Sequencing of Commissioning Verification Activities: For a particular material, item of equipment, assembly, or system, perform the following in the order listed unless otherwise indicated:

1. Construction Checklists:

    a. Material checks.

    b. Installation checks.

    c. Start up, as appropriate. Some startup may depend on component performance. Such startup may follow component performance tests on which the startup depends.

    d. Performance Tests:

        1) Static tests, as appropriate.

        2) Component performance tests. Some component performance tests may depend on completion of startup. Such component performance tests may follow startup.

        3) Equipment and assembly performance tests.

        4) System performance tests.

        5) Intersystem performance tests.

2. Commissioning tests.

B. Before performing commissioning tests, verify that materials, equipment, assemblies, and systems are delivered, installed, started, and adjusted to perform according to construction checklists.

C. Verify readiness of materials, equipment, assemblies, and systems by performing tests prior to performing test demonstrations. Notify Architect if acceptable results cannot be achieved due to conditions beyond Contractor's control or responsibility.

D. Commence tests as soon as installation checks for materials, equipment, assemblies, or systems are satisfactorily completed. Tests of a particular system may proceed prior to completion of other systems, provided the incomplete work does not interfere with successful execution of test.

3.8 SCHEDULING

A. Commence commissioning as early in the construction period as possible.

B. Commissioning Schedule: Integrate commissioning into Contractor's construction schedule. See Section 01 32 00 "Construction Progress Documentation."

1. Include detailed commissioning activities in monthly updated Contractor's construction schedule and short interval schedule submittals.

2. Schedule the start date and duration for the following commissioning activities:

    a. Submittals.
    b. Preliminary operation and maintenance manual submittals.
    c. Installation checks.
    d. Startup, where required.
    e. Performance tests.
    f. Performance test demonstrations.
    g. Commissioning tests.
    h. Commissioning test demonstrations.

3. Schedule shall include a line item for each installation check, startup, and test activity specific to the equipment or systems involved.

4. Determine milestones and prerequisites for commissioning. Show commissioning milestones, prerequisites, and dependencies in monthly updated critical-path-method construction schedule and short interval schedule submittals.

C. Two-Week Look-Ahead Commissioning Schedule:

1. Two weeks prior to the beginning of tests, submit a detailed two-week look-ahead schedule. Thereafter, submit updated two-week look-ahead schedules weekly for the duration of commissioning.

2. Two-week look-ahead schedules shall identify the date, time, beginning location, Contractor personnel required, and anticipated duration for each startup or test activity.

3. Use two-week look-ahead schedules to notify and coordinate participation of Owner's witnesses.

D. Owner's Witness Coordination:

1. Coordinate Owner's witness participation via Architect.
2. Notify Architect of commissioning schedule changes at least two work days in advance for activities requiring the participation of Owner's witness.

3.9 COMMISSIONING REPORTS

A. Test Reports:

1. Pre-startup reports include observations of the conditions of installation, organized into the following sections:

    a. Equipment Model Verification: Compare contract requirements, approved submittals, and provided equipment. Note inconsistencies.

    b. Preinstallation Physical Condition Checks: Observe physical condition of equipment prior to installation. Note conditions including, but not limited to, physical damage, corrosion, water damage, or other contamination or dirt.

c. Preinstallation Component Verification Checks: Verify components supplied with the equipment, preinstalled or field installed, are correctly installed and functional. Verify external components required for proper operation of equipment correctly installed and functional. Note missing, improperly configured, improperly installed, or nonfunctional components.

d. Summary of Installation Compliance Issues and Corrective Actions: Identify installation compliance issues and the corrective actions for each. Verify that issues noted have been corrected.

e. Evaluation of System Readiness for Startup: For each item of equipment for each system for which startup is anticipated, document in summary form acceptable to Owner completion of equipment model verification, preinstallation physical condition checks, preinstallation component verification checks, and completion of corrective actions for installation compliance issues.

2. Test data reports include the following:

a. "As-tested" system configuration. Complete record of conditions under which the test was performed, including, but not limited to, the status of equipment, systems, and assemblies; temporary adjustments and settings; and ambient conditions.

b. Data and observations, including, but not limited to, data trend logs, recorded during the tests.

c. Signatures of individuals performing and witnessing tests.

d. Data trend logs accumulated overnight from the previous day of testing.

3. Commissioning Compliance Issues Reports: Report as commissioning compliance issues results of tests and test demonstrations that do not comply with acceptance criteria. Report only one issue per commissioning compliance issue report. Use sequentially numbered facsimiles of commissioning compliance issue report form included in this Section, or other form approved by Owner. Distribute commissioning compliance issue reports to parties responsible for taking corrective action. Identify the following:

a. Commissioning compliance issue report number. Assign unique, sequential numbers to individual commissioning compliance issue reports when they are created, to be used for tracking.

b. Action distribution list.

c. Report date.

d. Test number and description.

e. Equipment identification and location.

f. Briefly describe observations about the performance associated with failure to achieve acceptable results. Identify the cause of failure if apparent.

g. Diagnostic procedure or plan to determine the cause (include in initial submittal).

h. Diagnosis of fundamental cause of issues as specified below (include in resubmittal).

i. Fundamental cause of unacceptable performance as determined by diagnostic tests and activities.

j. When issues have been resolved, update and resubmit the commissioning issue report forms by completing Part 2. Identify resolution taken and the dates and initials of the persons making the entries.

k. Schedule for retesting.

4. Weekly progress reports include information for tests conducted since the preceding report and the following:

a. Completed data forms.
b. Equipment or system tested, including test number, system or equipment tag number and location, and notation about the apparent acceptability of results.
c. Activities scheduled but not conducted per schedule.
d. Commissioning compliance issue report log.
e. Schedule changes for remaining Commissioning-Process Work, if any.

5. Data trend logs shall be initiated and running prior to the time scheduled for the test demonstration.

a. Trend log data format shall be multiple data series graphs. Where multiple data series are trend logged concurrently, present the data on a common horizontal time axis. Individual data series may be presented on a segmented vertical axis to avoid interference of one data series with another, and to accommodate different axis scale values. Graphs shall be sufficiently clear to interpret data within the accuracy required by the acceptance criteria.

b. Attach to the data form printed trend log data collected during the test or test demonstration.

c. Record, print out, and attach to the data form operator activity during the time the trend log is running. During the time the trend log is running, operator intervention not directed by the test procedure invalidates the test results.

6. System Alarm Logs: Record and print out a log of alarms that occurred since the last log was printed. Evaluate alarms to determine if the previous day's work resulted in any conditions that are not considered "normal operation."

a. Conditions that are not considered "normal operation" shall be reported on a commissioning issue report attached to the alarm log. Resolve as necessary. The intent of this requirement is to discover control system points or sequences left in manual or disabled conditions, equipment left disconnected, set points left with abnormal values, or similar conditions that may have resulted from failure to fully restore systems to normal, automatic control after test completion.

3.10 CERTIFICATE OF CONSTRUCTION PHASE COMMISSIONING COMPLETION

A. When Contractor considers that construction phase commissioning, or a portion thereof which Owner agrees to accept separately, is complete, Contractor shall prepare and submit to Owner and Commissioning Authority through Architect a comprehensive list of items to be completed or corrected. Failure to include an item on such list does not alter Contractor's responsibility to compete commissioning.

B. On receipt of Contractor's list, Commissioning Authority will make an inspection to determine whether the construction phase commissioning or designated portion thereof is complete. If Commissioning Authority's inspection discloses items, whether or not included on Contractor's list, which are not sufficiently complete as defined in "Construction Phase Commissioning Completion" Paragraph in the "Definitions" Article, Contractor shall, before issuance of the Certificate of Construction Phase Completion, complete or correct such items on notification by Commissioning Authority. In such case, Contractor shall then submit a request for another inspection by Commissioning Authority to determine construction phase commissioning completion.

C. Contractor shall promptly correct deficient conditions and issues discovered during commissioning. Costs of correcting such deficient conditions and issues, including additional testing and inspections, the cost of uncovering and replacement, and compensation for Architect's and Commissioning Authority's services and expenses made necessary thereby, shall be at Contractor's expense.

D. When construction phase commissioning or designated portion is complete, Commissioning Authority will prepare a Certificate of Construction Phase Commissioning that shall establish the date of completion of construction phase commissioning. Certificate of Construction Phase Commissioning Completion shall be submitted prior to requesting inspection for determining date of Substantial Completion.

END OF SECTION 01 08 00

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:

1. Contingency allowances.

1.3 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances.

1.4 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work.

1.6 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect for Owner's purposes.

B. Allowance shall include cost to Contractor of specific products and materials under allowance and shall include taxes, freight, and delivery to Project site. Contractor's costs for receiving and handling at Project site, labor, installation, and similar costs related to products and materials under allowance shall be included as part of the allowance.

C. Overhead and profit related to the allowance shall be included as part of the Contract Sum and not part of the allowance.

1.7 ALLOWANCE PROCEDURES

A. Authorization for use of allowances is documented through Allowance Access Authorization form provided in the Project Manual, accompanied by substantiating data.
B. At Project closeout, unused amounts remaining in the allowances will be credited to Owner by Change Order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.2 SCHEDULE OF ALLOWANCES: CONTRACT 1 GC – GENERAL CONSTRUCTION WORK

A. Allowance No. GC-3: Contingency Allowance: Include the sum of **30,000** for use according to Owner's instructions and for hidden and unforeseen conditions.

3.3 SCHEDULE OF ALLOWANCES: CONTRACT 2 MPC – MECHANICAL & PLUMBING CONSTRUCTION WORK

A. Allowance No. MPC-3: Contingency Allowance: Include the sum of **20,000** for use according to Owner's instructions and for hidden and unforeseen conditions.

3.4 SCHEDULE OF ALLOWANCES: CONTRACT 3 EC – ELECTRICAL CONSTRUCTION WORK

A. Allowance No. EC-3: Contingency Allowance: Include the sum of **15,000** for use according to Owner's instructions and for hidden and unforeseen conditions.

3.5 SCHEDULE OF ALLOWANCES: CONTRACT 4 WC/AA – WINDOW & ABATEMENT OF HAZARDOUS MATERIAL CONSTRUCTION WORK

A. Allowance No. WC/AA-3: Contingency Allowance: Include the sum of **30,000** for use according to Owner's instructions and for hidden and unforeseen conditions.

B. Allowance No. WC/AA-4: Lump-Sum Allowance: Include the sum of **75,000** for use according to Owner's instructions and for lintel replacement and unforeseen conditions.

3.6 SCHEDULE OF ALLOWANCES: CONTRACT 5 SC – SITE CONSTRUCTION WORK

A. Allowance No. SC-3: Contingency Allowance: Include the sum of **15,000** for use according to Owner's instructions and for hidden and unforeseen conditions.

Attachment: Allowance Access Authorization

END OF SECTION 01 21 00

ALLOWANCE ACCESS AUTHORIZATION:

Project: Phase 3 Capital Improvement Project
Reconstruction to: Cornwall On Hudson Elementary School, Cornwall Elementary School, Cornwall Central Middles School.

Architect: **Tetra Tech Architects & Engineers** **Project No.** 363579-22001.3

Contractor:

AAA No.: **Initiation Date:**

The Allowance is allocated as follows:

Total original Contract Allowance was:	$
Amount of Contract Allowance Access previously authorized:	$
Adjusted Contract Allowance prior to this authorization is:	$
The amount of available Allowance will Decrease by this Access Authorization:	$
The remaining Contract Allowance, after this Access Authorization will be:	$

Recommended by:
Architect

By (Signature): _____

Date: _____

Recommended by:
Construction Manager [if applicable]

By (Signature): _____

Date: _____

Accepted by:
Contractor

By (Signature): _____

Date: _____

Approved by:
Owner

By (Signature): _____

Date: _____

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

1.3 DEFINITIONS

A. “Unit Price”: An amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES: CONTRACT 1 GC – GENERAL CONSTRUCTION WORK

A. Unit Price No. GC-UP-1 - Abatement Tents

1. Description: In areas where no containment has been established, provide labor and material pricing for Abatement Tents allowing for removal of pipe and/or fitting insulation within in accordance with Industrial Code Rule 56-7.11, details shown on drawings, and Division 02 Section "Asbestos Abatement." Owner's testing agency to verify actual quantities. Glovebag removal operation shall be accounted for using Unit Price No. GC-UP-2. Include installation, and cleaning, removal, and legal disposal of the tent.

2. Unit of Measurement: Per one (1) tent measuring 10 ft. x 10 ft. x 10 ft.

B. Unit Price No. GC-UP-2 - Glove Bag Removal

1. Description: Provide labor and material pricing to remove and dispose of asbestos pipe and / or fitting insulation using glove bags. Work shall be performed within tent enclosures. Perform all work in accordance with all regulations dictated by Division 02 Section "Asbestos Abatement." Actual quantities to be verified by Owner's testing agency. Include glove bag and legal disposal of the glove bag and its contents.

2. Unit of Measurement: Per one (1) glove bag.

C. Unit Price No. GC-UP-3 - Pipe Abatement

1. Description: Provide pricing for all labor, materials, equipment, and associated items required to abate selected pipe, pipe insulation, pipe fittings, pipe accessories as required and noted on drawings for bathroom alternates.

2. Unit of Measurement: Per one (1) linear foot.

D. Unit Price No. GC-UP-4 - Ceramic Mosaic Floor Tile

1. Description: Provide labor and material pricing for removal of existing ceramic floor tiles, grout, moisture control system, adhesives and joint sealants, including all scraping, cleaning and preparation of existing substrate; and installation of new factory-mounted unglazed ceramic mosaic tile type CFT1 flooring, grout, patching of substrate, primer, adhesives and joint sealants, and moisture control system per Division 9 Section "Ceramic Tiling" and in accordance with other applicable specifications in the Contract Documents.

2. Unit of Measurement: Per one (1) square foot installed.

E. Unit Price No. GC-UP-5 - Glazed Wall Tile

1. Description: Provide labor and material pricing for removal of existing glazed wall tiles, grout, adhesives and joint sealants, including all scraping, cleaning and preparation of existing substrate; and installation of new glazed wall tile type CWT1 flooring, grout, patching of substrate, primer, adhesives and joint sealants, and moisture control system per Division 9 Section "Ceramic Tiling" and in accordance with other applicable specifications in the Contract Documents.

2. Unit of Measurement: Per one (1) square foot installed.

F. Unit Price No. GC-UP-6 - Cast-In-Place Concrete

1. Description: Provide labor and material pricing for new cast-in-place concrete for use in footings, foundations, slabs-on-grade, and miscellaneous concrete work, delivered to the site and installed, mix design in accordance with Concrete Mixtures for Building Elements (most stringent option) in Division 3 Section "Cast-In-Place Concrete" and in accordance with other applicable specifications in the Contract Documents.

2. Unit of Measurement: Per one (1) cubic yard installed.

G. Unit Price No. GC-UP-7 - Interior Painting

1. Description: Provide interior painting systems preparation of substrates and recoating in accordance with Division 09 Section "Painting" (Interior Painting Schedule, Gypsum Board Substrates). Actual locations and quantities to be field verified by Construction Manager.

2. Unit of Measurement: Per 500 sf. of interior painting.

3.2 SCHEDULE OF UNIT PRICES: CONTRACT 2 MPC – MECHANICAL & PLUMBING CONSTRUCTION WORK

Not Used

3.3 SCHEDULE OF UNIT PRICES: CONTRACT 3 EC – ELECTRICAL CONSTRUCTION WORK

Not Used

3.4 SCHEDULE OF UNIT PRICES: CONTRACT 4 AA – WINDOW & ABATEMENT OF HAZARDOUS MATERIAL CONSTRUCTION WORK

A. Unit Price No. WC/AA-UP-1 - Caulk Abatement

1. Description: In addition to the caulk Work required by Base Bid shown on Drawings, provide pricing for all labor, materials, equipment, and associated items required to remove.

2. Unit of Measurement: Per one (1) linear foot.

B. Unit Price No. WC/AA-UP-2 - Steel Lintel Replacement Work

1. Description: Provide removal and replacement of existing deteriorated steel lintels and related framing, shoring and supports, associated components, priming and painting of steel, and adjacent exterior wall reconstruction and finish restoration as shown on Drawing BA752 "Exterior Lintel Replacement" detail. Perform all steel lintel work in accordance with Division 05 Section "Metal Fabrications," masonry reconstruction and restoration work per Division 04 Sections "Unit Masonry Restoration" and "Unit Masonry," and painting systems per Division 09 Sections "Painting" (Wall Substrate: Interior Painting Schedule, Gypsum Board Substrates) and "High-Performance Coatings" (Exterior Lintels, All Surfaces: Exterior High-Performance Coating Schedule, Steel Substrates) and factory painted. Actual locations and quantities to be field verified by Construction Manager.

2. Unit of Measurement: Per one Window Type W1 masonry opening.

3.5 SCHEDULE OF UNIT PRICES: CONTRACT 5 SC – SITE CONSTRUCTION WORK

A. Unit Price No. SC-UP-1 - Unsuitable Soils

1. Description: In addition to the excavation Work required by Base Bid shown on Drawings, provide pricing for all labor, materials, equipment, and associated items required to excavate, remove, and legally dispose of unsuitable soils off-site, and replace with structural fill, placed and compacted per Division 31 Section "Earth Moving" and in accordance with other applicable specifications in the Contract Documents. Owner's geotechnical engineer will determine exact extent of unsuitable soil to be removed.

2. Unit of Measurement: Per one (1) cubic yard.

B. Unit Price No. SC-UP-2 - Mass Rock Removal

1. Description: In addition to the excavation Work required by Base Bid shown on Drawings, provide pricing for all labor, materials, equipment, and associated items required to trench, uncover, excavate, remove, and legally dispose of mass rock removals and overburden off-site, and replace with structural fill, placed and compacted per Division 31 Section "Earth Moving" and in accordance with other applicable specifications in the Contract Documents. Owner's geotechnical engineer will determine exact extent of mass rock to be removed.

2. Unit of Measurement: Per one (1) cubic yard in place.

C. Unit Price No. SC-UP-3 - Hot-Mix Asphalt Paving Top Course

1. Description: In addition to the hot-mix asphalt paving top course Work required by Base Bid, provide pricing for all labor, materials, equipment, tack coat, and associated items required to provide rolled and finished auto duty hot-mix asphalt paving top course trucked on-site per "Asphalt Paving – Auto Duty" detail on Drawings and specified per Division 32 Section "Asphalt Paving" and in accordance with other applicable specifications in the Contract Documents.

2. Unit of Measurement: Per one (1) ton installed.

D. Unit Price No. SC-UP-4 - Hot-Mix Asphalt Paving Binder Course

1. Description: In addition to the hot-mix asphalt paving binder course Work required by Base Bid, provide pricing for all labor, materials, equipment, and associated items required to provide rolled and finished auto duty hot-mix asphalt paving binder course over aggregate base trucked on-site per "Asphalt Paving – Auto Duty" detail on Drawings and specified per Division 32 Section "Asphalt Paving" and in accordance with other applicable specifications in the Contract Documents.

2. Unit of Measurement: Per one (1) ton installed.

E. Unit Price No. SC-UP-5 - Import Clean Fill Suitable Soils

Description: In addition to imported clean fill suitable soils Work required by Base Bid, provide pricing for all labor, materials, equipment, and associated items to provide imported non-granular fill trucked on-site in accordance with "Imported Non-Granular Fill" per Division 31 31 Section "Earth Moving" and in accordance with other applicable specifications in the Contract Documents.

1. Unit of Measurement: Per one (1) cubic yard.

F. Unit Price No. SC-UP-6 - Concrete Paving

1. Description: Provide labor and material pricing for new cast-in-place concrete for use in sidewalks, curbs and gutters, concrete reconstruction and corrections, and miscellaneous concrete work, delivered to the site, installed, and finished, mix design in accordance with Concrete Mixtures for Exterior Concrete (most stringent option) in Division 3 Section "Cast-In-Place Concrete" and Division 32 Section "Concrete Paving" and in accordance with other applicable specifications in the Contract Documents.

2. Unit of Measurement: Per one (1) cubic yard installed.

END OF SECTION 01 22 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.

2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. B1 – NOT USED

B. Alternate No. B2 - Second & Third Floor Restroom Reconstruction Additional Work

1. Description: Provide following Work to Cornwall-On-Hudson Elementary School:

a. Base Bid: No Work to Toilets B201, B302, and B303.

b. By Alternate: In lieu of Work by Base Bid, provide reconstruction/renovation Work to Toilets B102 and B103: hazardous materials abatement, demolition and preparation, architectural and interiors, mechanical, electrical, plumbing, and all associated Work, as shown on Drawings and specified in Project Manual.

1) Provide all associated demolition and preparation Work.
2) Provide complete and finished systems.

2. This Alternate affects the following Prime Contracts:

a. Contract 1 GC – General Construction Work (To include any associated abatement related to alternate)
b. Contract 2 MPC – Mechanical & Plumbing Construction Work
c. Contract 3 EC – Electrical Construction Work

C. Alternate No. B3 - Window Lintel Paint

1. Description: Provide following Work to Cornwall-On-Hudson Elementary School:

a. Base Bid: No paint to window lintels.

b. By Alternate: In lieu of Work by Base Bid, provide scheduled work to window lintels including cleaning and priming of lintels, and all associated work to provide painted lintels as shown on Drawings and specified in Project Manual.

1) Provide all associated cleaning and preparation Work.
2) Provide complete and finished systems.

2. This Alternate affects the following Prime Contracts:

a. Contract 4 WC/AA – Window & Abatement of Hazardous Material Construction Work

D. Alternate No. D1 - C-Wing Restrooms Reconstruction Additional Work

1. Description: Provide following Work to Cornwall Central Middle School:

   a. Base Bid: No Work to Toilet A201 and Toilet A202.

   b. By Alternate: In lieu of Work by Base Bid, provide reconstruction/renovation Work to Toilet A201 and Toilet A202 including: hazardous materials abatement, demolition and preparation, architectural and interiors, mechanical, electrical, plumbing, and all associated Work, as shown on Drawings and specified in Project Manual.

      1) Provide all associated demolition and preparation Work.
      2) Provide complete and finished systems.

2. This Alternate affects the following Prime Contracts:

   a. Contract 1 GC – General Construction Work (To include any associated abatement related to alternate)
   a. Contract 2 MPC – Mechanical & Plumbing Construction Work
   b. Contract 3 EC – Electrical Construction Work

E. Alternate No. D2 - A-Wing Restroom Reconstruction Additional Work

1. Description: Provide following Work to Cornwall Central Middle School:

   a. Base Bid: No Work to Toilet D17, and Toilet D18.

   b. By Alternate: In lieu of Work by Base Bid, provide renovation/reconstruction Work to Toilet D17, and Toilet D18 including: hazardous materials abatement, demolition and preparation, architectural and interiors, mechanical, electrical, plumbing, and all associated Work, as shown on Drawings and specified in Project Manual.

      1) Provide all associated demolition and preparation Work.
      2) Provide complete and finished systems.

2. This Alternate affects the following Prime Contracts:

   a. Contract 1 GC – General Construction Work (To include any associated abatement related to alternate)
   b. Contract 2 MPC – Mechanical & Plumbing Construction Work
   c. Contract 3 EC – Electrical Construction Work

F. Alternate No. D3 - D-Wing Restroom Reconstruction Additional Work

1. Description: Provide following Work to Cornwall Central Middle School:

   a. Base Bid: No Work to Toilet B102, and Toilet B103.

   b. By Alternate: In lieu of Work by Base Bid, provide renovation/reconstruction Work to Toilet B102, and Toilet B103 including: hazardous materials abatement, demolition and preparation, architectural and interiors, mechanical, electrical, plumbing, and all associated Work, as shown on Drawings and specified in Project Manual.

      1) Provide all associated demolition and preparation Work.
      2) Provide complete and finished systems.

2. This Alternate affects the following Prime Contracts:

   a. Contract 1 GC – General Construction Work (To include any associated abatement related to alternate)
   b. Contract 2 MPC – Mechanical & Plumbing Construction Work
   c. Contract 3 EC – Electrical Construction Work

END OF SECTION 01 23 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor,

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use the “Request for Substitution” form attached to this Specification Section. Complete all sections of the form.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Information to support identification of the proposed substitution as “for Cause” or “for Convenience”.

b. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

c. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.

d. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

e. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

f. Samples, where applicable or requested.

g. Certificates and qualification data, where applicable or requested.

h. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

i. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

j. Evidence of compliance with building code in effect for Project.

k. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

l. Cost information, including a proposal of change, if any, in the Contract Sum.

m. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

n. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation. Such additional information or documentation may include detailed side-by-side comparison charts of the specified product and the proposed substitution, and other data. Only one substitution request for each product will be considered. Architect will make final determination as to whether the substitution is “for Cause” or “for Convenience”.

   a. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution.
   b. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

b. Substitution request is fully documented and properly submitted.

c. Requested substitution will not adversely affect Contractor's construction schedule.

d. Requested substitution is compatible with other portions of the Work.

e. Requested substitution has been coordinated with other portions of the Work.

f. Requested substitution provides specified warranty.

g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 15 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

b. Requested substitution does not require extensive revisions to the Contract Documents.

c. Requested substitution is consistent with the Contract Documents and will produce indicated results.

d. Substitution request is fully documented and properly submitted.

e. Requested substitution will not adversely affect Contractor's construction schedule.

f. Requested substitution is compatible with other portions of the Work.

g. Requested substitution has been coordinated with other portions of the Work.

h. Requested substitution provides specified warranty.

i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

Attachment: Request for Substitution Form

END OF SECTION 01 25 00

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Request for Substitution

This form must be completely filled in with all relevant data by the Prime Contractor and submitted to the Architect in accordance with Project Manual Requirements for consideration before any request to change the drawing or specification requirements will be considered.

REFERENCE DATA

Project name: _____ Date of Request: _____

Location: _____ Architect's Project No: _____

Request by Contractor: _____

Address: _____

Contact person: _____ Phone: _____ Email: _____

SUBSTITUTION REQUEST DATA

(Provide statement indicating why specified product, fabrication or installation cannot be provided.)

SUBSTITUTION REQUESTED IS FOR:

☐ Named product.

☐ Product type, material, finish or formulation.

☐ Fabrication or installation methods.

Reason for request: _____

Note whether substitution is for cause or convenience: _____

PRODUCT / MATERIAL / METHOD FOR WHICH SUBSTITUTION IS REQUESTED IS SHOWN ON THE FOLLOWING DOCUMENTS:

Specification: Section No: _____ Page(s): _____ Paragraph/Item No.: _____

Drawings: (List No's of all Drawings affected): _____

DETAILED COMPARISON

Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

COST/BENEFIT ANALYSIS

Describe in detail any alteration to any other part of the Works required by use of the requested substitution, including work by other Prime Contractors:

If applicable total net cost of any such other project required alterations, including overhead and profit: $ _____
(Indicate if cost is an "Add" or "Deduct" to contract sum.

Benefits to Owner other than financial: _____

Schedule impact (Note any impact on project schedule by proposed substitution): _____

ADDITIONAL INFORMATION REQUIRED

PRIME CONTRACTOR TO PROVIDE ADDITIONAL INFORMATION AS NECESSARY AND ATTACH THE FOLLOWING INFORMATION:

1. Manufacturer's technical data sheets on proposed products, including test results as applicable.
2. Manufacturer's standard form of warranty.
3. Letter on manufacturer's letterhead stating that manufacturer will warrant products as specified, if specification requires specific warranties not included in manufacturer's standard form of warranty.
4. Letter(s) from other Prime Contractor(s) responsible for works affected by proposed substitution which state the total cost(s) of all such work, if any alteration of other work is required. Prime Contractor submitting this Request for Substitution will be responsible to fully reimburse the Owner for all such additional costs; processed via a deduct Change Order.

CONTRACTOR'S CERTIFICATION

1. BY SUBMISSION OF THIS SUBSTITUTION REQUEST AND PER SIGNATURE BELOW, CONTRACTOR CERTIFIES THIS SUBSTITUTION REQUEST HAS BEEN REVIEWED AND APPROVED BY THE CONTRACTOR IN ACCORDANCE WITH THE PROJECT MANUAL REQUIREMENTS.
2. BY SUBMISSION OF THIS SUBSTITUTION REQUEST AND PER SIGNATURE BELOW CONTRACTOR CERTIFIES THE PROPOSED SUBSTITUTION COMPLIES WITH ALL APPLICABLE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND REFERENCED CODES AND STANDARDS.
3. BY SUBMISSION OF THIS SUBSTITUTION REQUEST AND PER SIGNATURE BELOW CONTRACTOR HEREBY WAIVES ALL RIGHTS TO ADDITIONAL COMPENSATION OR TIME THAT MAY SUBSEQUENTLY BECOME NECESSARY BECAUSE OF FAILURE OF PROPOSED MATERIAL TO PRODUCE THE INDICATED AND REQUIRED RESULTS.

Name of Authorized Contractor Representative: _____

Signature of Authorized Contractor Representative: _____

Name of Contractor_____

Date_____

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, via the electronic form procedures outlined in Division 01 Section “Project Management and Coordination” and during the preconstruction conference.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time, via the electronic form procedures outlined in Division 01 Section “Project Management and Coordination” and during preconstruction conference. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.

2. Unless otherwise noted, within 14 days after receipt of Proposal Request, submit a quotation listing adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

    c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may submit a request for a change to the Architect through Construction Manager.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

7. Proposal Request Form: Use form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request response, Architect will issue a Change Order for signatures of Owner, Architect, Construction Manager and Contractor .

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

B. AIA Document: Current, authorized editions of standard forms issued by the American Institute of Architects (AIA).

1. Where AIA Documents are identified in this Section, the use of facsimiles of AIA documents or non-AIA documents is prohibited.

1.4 SCHEDULE OF VALUES

A. Submit the schedule of values to Architect through Construction Manager at earliest possible date, but no later than fourteen days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content:

1. Use AIA Document G703 as form for schedule of values, with entries typewritten. Unless noted otherwise, provide the following:

a. Subschedules for Separate Elements of Work: Provide subschedules for each building.

1) List allowances on subschedules only where exclusively part of separate element of work.

b. Summary Schedule: Provide summary schedule listing each subschedule and its total and each allowance; total of all subschedules and allowances shall equal the Contract Sum.

2. Identification: Include the following Project identification on the schedule of values:

    a. Project name and location.
    b. Architect's project number.
    c. Contractor's name and address.
    d. Date of submittal.

3. Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide line item(s) for each Specification Section.

4. Arrange the schedule of values to indicate the following for each item listed, completing columns A, B and C of AIA Document G703:

    a. Column A: Indicate Specification Section number.
    b. Column B: Indicate Specification Section title, and provide separate line items for labor and materials.
    c. Column C: Provide separate line item dollar values for labor and materials. Round amounts to nearest whole dollar.

5. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment. In addition to line items for each applicable specification section, include the following:

    a. Multiple line items for amounts in excess of five percent of Contract Sum, broken out to subcomponents equaling not greater than five percent each.

    b. Project Startup:

        1) Include separate line items for project startup requirements, including the following separate line items:

            a) Insurance, based on actual invoice amount.
            b) Performance and payment bonds, based on actual invoice amount.
            c) Mobilization.
            d) Temporary facilities and controls.

    c. Allowances: Provide a separate line item in the summary schedule of values for each allowance.

    d. Submittals: Include a minimum of Two percent of Contract Sum.

    e. Supervision: Include a minimum of Two percent of Contract Sum.

    f. Safety and Field Reports: Include a minimum of One percent of Contract Sum.

    g. Coordination Drawings: Provide a separate line item in the schedule of values for Coordination Drawings. Include a minimum of the following percentages of Contract Sum.

        1) Mechanical Contract: Three percent of the Contract Sum.
        2) All Other Contracts: Two percent of the Contract Sum.

h. Meetings: Provide a separate line item in the schedule of values for Contractor attendance at meetings. Include a minimum of Two percentage of Contract Sum.

i. Wood Blocking: Provide a separate line item in the schedule of values for wood blocking.

j. Testing and Balancing (TAB): Include a minimum of Three percent of the Contract Sum (Mechanical Contract: Four) percent as separate line items for testing and balancing requirements, as follows:

1) Pre-TAB activities (20 percent of TAB).
2) TAB activities (40 percent of TAB).
3) Final TAB reports. (40 percent of TAB).

k. Punch List: Three percent of Contract Sum.

l. Project Closeout:

1) Include separate line items for project closeout requirements, as follows:

a) Demobilization.
b) Warranties.
c) Final cleaning.
d) Operation and maintenance manuals.
e) Project record documents.
f) Demonstration and training.

2) The total value of all project closeout line items shall equal to not less than the following:

a) Three percent of the Contract Sum.

6. Each item in the schedule of values shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications as certified by Architect and Construction Manager.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Construction Manager.

C. Application for Payment Forms: Use AIA Document G732 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Construction Manager will return incomplete applications without action.

1. Entries shall match data on the schedule of values.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received.
3. Include amounts of fully-executed Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Enter in column F (Materials Presently Stored) of AIA Document G703 the value of materials presently stored for which payment is sought. Recalculate the total of the column at the end of each pay period. This value covers both materials newly stored for which payment is sought and materials previously stored which are not yet incorporated into the Project. Payment by the Owner for stored materials does not result in a deduction from this column. Only as materials are incorporated into the Project is their value deducted from this column and incorporated into column E (Work Completed--This Period.).

2. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.

3. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.

F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Construction Manager.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule.
4. Certificates of insurance and insurance policies.
5. Performance and payment bonds.

H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited to, two originals and two copies each of the following:

1. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
2. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
3. AIA Document G707, "Consent of Surety to Final Payment."

END OF SECTION 01 29 00

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Stored Materials Invoicing Documentation

Project: _____

Project No.: _____ **Contract Type:** _____

Contractor: _____ **Subcontractor:** _____

Reason for Request:

_____

_____

Application for Payment No.: _____ **Date:** _____

1. **Material Identification**

Description: Quantity:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Provide Specific Location of Materials Stored:

_____

_____

_____

_____

_____

2. **Material Value** $ _____

☐ Attach an Invoice or Quantified Statement of Value.

3. **Certificate of Insurance**

☐ Attach a Certificate of Insurance for the above specified materials. Certificate shall name _____ (Name of District) as a loss payee with respect to the specified materials.

4. **Transfer of Title**

The Contractor hereby agrees to transfer complete ownership of all listed materials to _____ (Name of District) at the time payment is made to Contractor for the above referenced Application for Payment. The Contractor remains responsible for all contractual requirements for the above listed materials including complete installation and providing all warranties.

Signed Date

_____ _____

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Digital data files.
3. Coordination drawings.
4. Owner's Project Representative activities.
5. Electronic form procedures.
6. Requests for Information (RFIs).
7. Project meetings.

1.3 COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation. Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components.
2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Installation and removal of temporary facilities and controls.
3. Project meetings.
4. Project closeout activities.

C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.4 DIGITAL DATA FILES

A. Architect's Digital Data Files: Upon request, and at Architect's sole discretion, electronic copies of the Contract Drawings may be provided by Architect for Contractor's use in preparing submittals.

1. Architect may furnish Contractor digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.

a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

b. Format: The Contract Drawings may be available in .dwg and .pdf formats.

1) Architect's charge for drawings in .dwg format: $50 per drawing.
2) Architect's charge for drawings in .pdf format: $50 per request.

c. Contractor shall fill out and submit a Request for Electronic Drawing Files form included in Project Manual for any drawing files.

d. Contractor shall also execute a Terms of Electronic File Transfer (TOFT) included in Project Manual for any drawing files furnished in AutoCAD format.

e. The following drawings may be furnished for the appropriate discipline:

1) Site base file drawings.
2) Floor plans.
3) Reflected ceiling plans.
4) Mechanical ductwork plans.
5) Electrical lighting plans.

1.5 COORDINATION DRAWINGS

A. Each Contractor:

1. Participate in the Coordination Drawing process as required to ensure work is coordinated with associated Contractors to fulfill the scope and schedule of the project. Contractors with work in areas where more than one Contractor has Contract Work must participate in coordination process for that area of work.

2. Architect will furnish Contractor with digital media copies of architectural, structural, mechanical, plumbing, and electrical base information, not including drawing sheets or details, at no charge, upon providing Architect with a fully-executed indemnification agreement.

3. At an initial coordination meeting scheduled by the Mechanical Contractor and Construction Manager in accordance with schedule defined in Division 01 Section Multiple Project Summary – Project Schedule, coordinate the schedule of the creation and revision of Coordination Drawings with the Architect, Construction Manager, Owner, and involved Contractors as required to meet the construction schedule.

4. Revise Coordination Drawings identifying work of applicable Contract that requires coordination with building systems or that presents potential interference with existing construction or construction provided by another Contractor. Examples of these components and work include (but are not limited to):

    a. Systems located above ceilings or integrated into ceiling system such as ducts, piping, lighting, cable trays, electrical conduits, joist cross bracing, structure, supports, fire protection systems, diffusers, grilles, access doors, etc.

    b. Components of systems installed on roofs requiring roof penetrations, structural support, lightning protection, etc.

    c. Components suspended or otherwise inside spaces such as gymnasium backstops, light fixtures, ducts, gymnasium dividers, web spaces of trusses with duct/pipe, etc.

    d. Clearances required for service access or by codes. Show service access locations including brief note such as “service access to filters”.

    e. Equipment located adjacent to building that may need coordination with landscaping such as dust collectors, transformers, gas metering stations, chillers and condensing units, pads, louvers, etc.

5. Resolution of Conflicts and Interferences:

    a. Schedule additional coordination meetings through Construction Manager with Architect, Owner, and other Contractors and attend additional coordination meetings as required to fully resolve conflicts and complete process.

    b. Review draft revisions of respective trades and Owner at subsequent coordination meetings with involved parties. Resolve conflicts and interferences at these meetings.

    c. Reposition proposed locations of components and equipment in applicable Contracts as required to resolve conflicts and address Owner’s serviceability concerns after review of Coordination Drawings. For exposed work, adjust and coordinate configuration of components to achieve aesthetics consistent with the scope of the Project without increase in Contract Sum.

d. Notify Construction Manager, Architect, Owner's Representative, and affected Contractors in case of unresolved interferences or conflicts prior to installation of construction. Schedule meetings and take other measures to resolve interferences or conflicts and revise applicable Coordination Drawings as required. Re-process revised Coordination Drawings in accordance with "Processing of Coordination Drawings" below to ensure all Contractors are aware of revisions in Coordination Drawings.

e. When all conflicts have been resolved on each complete Coordination Drawing, each applicable Contractor shall digitally sign and date the drawings, and deliver to the Mechanical Contractor for additional distribution. A copy of the signed originals will be stored in the Construction Manager's jobsite offices for reference for the duration of the construction.

f. Each Contractor will be provided with a copy of each coordination drawing and may transcribe additional information from the copies stored in the Construction Manager's jobsite offices.

6. Do not proceed with work in Contract in each area until agreement is reached with all Contractors and the Construction Manager, Architect and Owner on exact arrangements for each room or area, unless otherwise directed by the Construction Manager, Architect or Owner.

a. If Contractor proceeds prior to resolving conflicts and receiving above agreement or direction and conflicts ensue as a result, Contractor must modify installed construction as required to permit other Contractors to proceed with coordinated installation at no change in Contract Sum.

B. Mechanical Contract:

1. In accordance with the Coordination Drawing creation schedule agreed to as described above, prepare and distribute Coordination Drawings as specified in the Division 23 Sections "Common Work Results for HVAC" and "Ductwork", for all areas with any construction work, including indoor areas and rooms, roofs, and near building areas with mechanical equipment. Consider construction of other Contracts as shown in Contract Documents to avoid conflicts. Prepare and revise the Coordination Drawings in the order and within the schedule agreed upon.

2. Coordinate the scheduling of coordination meetings with the project schedule, Construction Manager, involved Contractors, and Owner. Schedule the meetings at the agreed upon schedule.

3. Deliver two prints and one electronic file in format as required elsewhere and as agreed to at the initial coordination meeting, of each Coordination Drawing simultaneously to Construction Manager, Architect, Owner, and each Contractor listed below and obtain written dated receipts from other contractors. Include additional print copy and electronic copy to Electrical Contractor, to become "Complete Coordination Drawing" for subsequent distribution and complete final coordination documentation as described below. Submit copy of receipts to Architect and Construction Manager.

4. Duplicate and deliver final complete drawings as required by Division 23 Section "Ductwork."

C. Contractors other than Mechanical Contractor:

1. Obtain Coordination Drawings and prepare draft revisions to Coordination Drawings showing applicable work of respective Contract and indicating perceived conflicts, proposed resolution of conflicts with existing conditions and construction of other Contracts as shown in Coordination Drawings.

2. Revise the Coordination Drawings in the order and within the schedule agreed upon.

3. Obtain Complete Coordination Drawing prints and revise showing components and work of applicable Contract including resolution of conflicts with construction of other Contracts as agreed to and as shown on revised draft Coordination Drawings.

4. Processing of Coordination Drawings: Receive, revise, and deliver Complete Coordination Drawings initially prepared by Mechanical Contractor according to the following sequence as applicable to Project.

5. Each Contractor: Obtain written dated receipt from subsequent recipient of Complete Coordination Drawings and submit copy of receipts to Architect and Construction Manager:

a. General Contract.
b. Mechanical Contract.
c. Electrical Contract.
d. Plumbing Contract.

1.6 OWNER'S PROJECT REPRESENTATIVE ACTIVITIES

A. Project Representative shall:

1. Serve as liaison between Architect, Contractors and Owner.

2. Perform on-site observations of the progress and quality of the Work as may be reasonably necessary to assist the Architect determine, in general, if the Work is being performed in a manner indicating that the Work when completed will be in conformance with the Contract Documents. Notify the Architect if, in the Project Representative's opinion, Work does not conform to the Contract Documents or requires special inspection or testing.

3. Monitor the Contractor's construction schedules on an ongoing basis and alert the Architect to conditions that may lead to delays in completion of the Work.

4. Coordinate shared access to work areas.

5. Coordinate and issue written approvals for acceptable interruptions of utilities and potentially disruptive activities.

6. Receive and review suggestions proposed by the Contractor, and submit them, together with recommendations, to the Architect.

7. Attend all meetings and report to the Architect on the proceedings.

8. Notify Architect when tests required by the Contract Documents and inspections by authorities having jurisdiction will be performed. Observe tests required by the Contract Documents and inspections by authorities having jurisdiction. Record and report to the Architect on test procedures, inspections, and results. Verify testing is performed in accordance with specified requirements and at appropriate times.

9. Maintain records at the construction site in an orderly manner, including correspondence, Contract Documents, Change Orders, Construction Change Directives, reports of meetings, Shop Drawings, Product Data and similar submittals; supplementary drawings, color schedules and requests for payment; and names, addresses telephone numbers, and email addresses of the Contractors, Subcontractors and principal material suppliers.

10. Maintain a daily log of activities at the site, including weather conditions, nature and location of Work being performed, verbal instructions and interpretations given to the Contractor, and specific observations. Record any occurrence or Work that might result in a claim for a change in Contract Sum or Contract Time. Maintain a list of visitors, their titles, and time and purpose of their visit.

11. Notify the Architect if any portion of the Work requiring Shop Drawings, Product Data or Samples is commenced before such submittals have been approved by the Architect. Receive and log Samples required at the site, notify the Architect when they are ready for examination, record the Architect’s action and maintain custody of approved Samples.

12. Review the Contractor's record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications at intervals appropriate to the stage of construction and notify the Architect of any apparent failure by the Contractor to maintain up-to-date records.

13. Review Applications for Payment and forward to the Architect with recommendations for disposition.

14. Assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion.

15. Assist the Architect in receipt and transmittal to the Owner of documentation required of the Contractor at completion of the Work.

B. Project Representative shall not:

1. Authorize deviations from the Contract Documents.

2. Approve submittals or substitute materials or equipment.

3. Personally conduct or participate in tests or third party inspections.

4. Assume any of the responsibilities of the Contractor's superintendent or of Subcontractors.

5. Expedite the Work for the Contractor.

6. Have control over or charge of or be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work.

7. Authorize or suggest that the Owner occupy the Project in whole or in part.

1.7 ELECTRONIC FORM PROCEDURES

A. Use Submittal Exchange for the following processes:

1. Submittals, refer to Division 01 “Submittal Procedures”.
2. Request for Information (RFI).
3. Architect’s Supplemental Instruction (ASI), refer to Division 01 Section “Contract Modification Procedures”.
4. Proposal Request (PR), refer to Division 01 Section “Contract Modification Procedures”.
5. Change Order (CO), refer to Division 01 Section “Contract Modification Procedures”.
6. Contractor Quotes, refer to Division 01 Section “Contract Modification Procedures”.
7. Allowance Access Authorization (AAA), refer to Division 01 Section “Contract Modification Procedures
8. Payment Applications, refer to Division 01 Section “Payment Procedures”.
9. Inspection Reports.

B. Contractor and other parties granted access by the Architect to Submittal Exchange shall follow instructions issued by the Architect during the preconstruction conference.

1.8 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified, via the electronic form procedures outlined.

1. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of others.

B. Content of the RFI: Include a detailed description of item needing information or interpretation and the following:

1. Project number.

2. RFI number.

3. Contract number and title.

4. Name of Contractor.

5. Name of Contractor’s contact person.

6. Email address of Contractor’s contact person.

7. RFI subject.

8. Question: Fully describe question or information requested. Include:

    a. Specification Section number and title and related paragraphs, as appropriate.
    b. Drawing number and detail references, as appropriate.
    c. Field dimensions and conditions, as appropriate.
    d. Contractor's suggested resolution. If Contractor's solution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.

9. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow reasonable time for Architect's response for each RFI.

1. The following RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for coordination information already indicated in the Contract Documents.
    d. Requests for adjustments in the Contract Time or the Contract Sum.
    e. Requests for interpretation of Architect's actions on submittals.
    f. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information.

3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within seven days of receipt of the RFI response.

D. On receipt of Architect's action, immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within seven days if Contractor disagrees with response.

E. Electronic RFI Log: Architect will maintain a tabular log of RFIs organized by RFI number.

1.9 PROJECT MEETINGS

A. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner, Construction Manager, and Architect, but no later than 15 days after date of Notice of Award.

1. Attendees: Authorized representatives of Owner, Commissioning Authority, , Construction Manager, Architect, and their consultants; Contractor and its superintendent; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Designation of key personnel and their duties.
b. Lines of communications.
c. Bonds and insurance.
d. Subcontract list.
e. Schedule of values.
f. Payment request estimate.
g. Applications for Payment.
h. Contractor's construction schedule.
i. Submittals.
j. Electronic form procedures (RFIs, ASIs, PRs).
k. Procedures for processing Change Orders and Construction Change Directives.
l. Quality control.
m. Adjoining properties.
n. Project schedule.
o. Contractor review of Contract Documents, including Drawings and Specifications.
p. Project meetings.
q. Project closeout procedures.
r. Electronic drawings.
s. AIA and Word documents.

3. Report: Construction Manager will prepare and distribute meeting report.

B. Site Preconstruction Conference: Construction Manager will schedule and conduct a site preconstruction conference, at a time convenient to Owner, Construction Manager and Architect.

1. Attendees: Authorized representatives of Owner, Owner's testing agency, Construction Manager, Architect, and their consultants; Geotechnical Engineer of Record; Contractor and its superintendent; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance, including the following:

a. Designation of key personnel and their duties.
b. Lines of communication.

c. Electronic form procedures (RFIs, ASIs, PRs).
d. Submittal procedures.
e. Subcontracts.
f. Construction schedule.
g. Temporary facilities and controls.
h. Use of premises.
i. Permits.
j. Soil erosion and sediment control.
k. Procedures for testing and inspecting.
l. Roles and responsibilities of each party.
m. Topsoil.
n. Seeding/sodding.
o. Planting.
p. Concrete.
q. Retaining walls.
r. Railings.

3. Report: Construction Manager will prepare and distribute meeting report.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Review each Specification Section for requirements for preinstallation conferences.

a. No later than 15 days after date of Notice of Award, submit to Architect complete listing of preinstallation conferences to be held.

2. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, Construction Manager, and Commissioning Authority of scheduled meeting dates.

3. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Deliveries.
c. Submittals.
d. Review of mockups.
e. Time schedules.
f. Weather limitations.
g. Manufacturer's written instructions.
h. Warranty requirements.
i. Compatibility of materials.
j. Acceptability of substrates.
k. Temporary facilities and controls.
l. Space and access limitations.
m. Testing and inspecting requirements.
n. Installation procedures.
o. Coordination with other work.

p. Required performance results.
q. Protection of adjacent work.

4. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

5. Reporting: Distribute report of the meeting to each party present and to other parties requiring information.

6. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Slab Pre-Pour Conference: Construction Manager will schedule and conduct a slab pre-pour conference, at a time convenient to Owner, Construction Manager and Architect, but no later than seven days before the first slab pour.

1. Attendees: Authorized representatives of Owner, Owner's testing agency, Construction Manager, Architect, and their consultants; Contractor and its superintendent; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance, including the following:

a. Schedule.
b. Procedures for testing and inspecting.
c. Procedures for sub-base preparation.
d. Concrete mix designs.
e. Concrete delivery.
f. Placing, curing, finishing, and protecting concrete.
g. Slab joints.
h. Slab flatness and levelness.

3. Report: Construction Manager will prepare and distribute meeting report.

E. Progress Meetings: Construction Manager will conduct progress meetings at biweekly intervals, unless otherwise necessitated.

1. Attendees: In addition to representatives of Owner, Commissioning Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review report of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Review present and future needs of each entity present, including the following:

1) Report of progress since previous meeting.

2) Architect/Engineer discussion items.

3) Status of ASIs, PRs, Change Orders.

4) Status of submittals.

5) Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule.

a) Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

b) Review schedule for next period.

6) Date of Substantial Completion.

7) Status of RFIs.

8) Owner discussion items.

9) Discussion items for each Contract.

10) General and administrative items, including such items as:

a) Project documentation.
b) Prohibitions.
c) Identification cards.
d) Separation.
e) Egress.
f) Conservation.

3. Report: Construction Manager will prepare and distribute the meeting report to each party present and to parties requiring information.

F. Health and Safety Committee Meetings: Owner will conduct health and safety committee meetings as needed, in accordance with requirements of Regulations of the Commissioner of Education, Part 155 (8 NYCRR 155), Section 155.5(c)(2).

1. Attendees: In addition to representatives of the Owner and Construction Manager, each contractor shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance, including the following:

   a. Health and safety matters related to the construction project.

3. Report: Owner will prepare and distribute meeting report to each party present and to parties requiring information.

G. Project Closeout Conference: Construction Manager will schedule and conduct a project closeout conference, at a time convenient to Owner, Construction Manager and Architect, but no later than 90 days prior to final scheduled date of Substantial Completion.

1. Attendees: Authorized representatives of Owner, Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

   a. Preparation of record documents.
   b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
   c. Submittal of written warranties.
   d. Requirements for preparing operations and maintenance data.
   e. Requirements for delivery of material samples, attic stock, and spare parts.
   f. Requirements for demonstration and training.
   g. Owner's occupancy requirements.
   h. Responsibility for removing temporary facilities and controls.

3. Report: Construction Manager will prepare and distribute meeting report.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

Attachment: Request for Electronic Drawing Files
Terms of Electronic File Transfer (TOFT)

END OF SECTION 01 31 00

TETRA TECH
ARCHITECTS & ENGINEERS

Cornell Business + Technology Park
10 Brown Road
Ithaca, New York 14850
Tel. (607) 277-7100
Fax (607) 277-1410

Request for Electronic Drawing Files – Business Office

Prime Contractor Name:

Prime Contractor Address:

Contact to Receive Invoice:

Project Name:

Project Number:

Project Manager:

Drawing Type: Some drawings may be only available as a PDF file and may NOT be available as an AutoCAD file.

☐ PDF Files ($50 per request) ☐ AutoCAD type files ($50 per file)

For PDF files:

List each Drawing # Requested – If requesting entire set note "All".

For AutoCAD files:

Number of drawing files

List each Drawing # Requested

Contractor Signature _____

TETRA TECH
ARCHITECTS & ENGINEERS

Cornell Business + Technology Park
10 Brown Road
Ithaca, New York 14850
Tel. (607) 277-7100
Fax (607) 277-1410

Request for Electronic Drawing Files – Business Office

Prime Contractor Name:

Prime Contractor Address:

Contact to Receive Invoice:

Project Name:

Project Number:

Project Manager:

Drawing Type: Some drawings may be only available as a PDF file and may NOT be available as an AutoCAD file.

☐ PDF Files ☐ AutoCAD type files

For PDF files:

List each Drawing # Requested – If requesting entire set note "All".

For AutoCAD files:

Number of drawing files

List each Drawing # Requested

Contractor Signature _____

TETRA TECH
ARCHITECTS & ENGINEERS

Cornell Business + Technology Park
10 Brown Road
Ithaca, New York 14850
Tel. (607) 277-7100
Fax (607) 277-1410

Terms of Electronic File Transfer (TOFT)

The purpose of this document is to establish the terms of use and liability related to the electronic transfer of files from Tetra Tech Engineers, Architects & Landscape Architects, P.C. d/b/a Tetra Tech Architects & Engineers (hereinafter "Tetra Tech") to the Recipient (designated below). This Agreement covers all electronic files transmitted to the Recipient, associated with the Project(s) listed below, that are not otherwise covered by a contractual agreement to provide such files.

Project(s) & Project #s: _____

_____

Recipient of Electronic Files:

Company Name: _____

Company Address: _____

_____

Terms of Electronic File Transfer:

1. The electronic files (Files) furnished by Tetra Tech to the person or entity receiving the Files (Recipient) are provided only for the convenience of the Recipient, and only for its sole use. RECIPIENT AGREES THAT, BY OPENING THE PACKAGE CONTAINING THE FILES, RECIPIENT SHALL BE BOUND BY AND SUBJECT TO THE TERMS OF THIS DISCLAIMER.

2. Recipient recognizes that the Files may not be adequate or appropriate for Recipient's needs. In the case of any defects in the Files or any discrepancies between the Files and the hardcopy of the Files bearing the seal of Tetra Tech's professional registrant (if applicable), the sealed hardcopy shall govern. Recipient accepts the Files on an "as-is" basis, with any and all faults. There are no express warranties made by Tetra Tech with respect to the Files, and any implied warranties are excluded.

3. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. Tetra Tech assumes no responsibility for the accuracy or completeness of the Files, and any use or reuse of such electronic data for any purpose shall be at the Recipient's sole risk.

4. Furthermore, in consideration of the use of the electronic data and the Files, Recipient agrees, to the fullest extent permitted by law, to defend (by legal counsel selected by Tetra Tech), indemnify, and hold Tetra Tech harmless from any and all claims, damages, losses, costs, and expenses, including attorney's fees and court costs (including the costs of any appeals) arising out of or resulting from Recipient's use, reuse, or use by others, regardless of whether such claims, damages, losses, costs, and expenses are caused in whole or in part by Tetra Tech. The duty to defend, indemnify, and hold Tetra Tech harmless shall apply regardless of whether such claims, damages, losses, costs, and expenses arise out of causes of action for tort, including negligence, contract, warranty, or strict liability.

5. The Recipient agrees to the following use restrictions of the electronic files:

a. The use of these files is limited only to the operation and maintenance of the above referenced project(s).

_____

6. By signing below, the Recipient accepts full responsibility for the use of all electronic files received from and/or produced by Tetra Tech for the Project(s) listed above and any documents, instructions, or otherwise produced there from by the Recipient along with all Terms of Electronic Transfer indicated herein. A copy of this Agreement, executed by Tetra Tech, will be provided before or with the first electronic file transmittal.

Signature	Type or Print Name	Title	Date
_____	_____	_____	_____

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Reports.

1.3 INFORMATIONAL SUBMITTALS

A. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period. Follow format outlined in attachment at end of this Section.
B. Site Condition Reports: Submit at time of discovery of differing conditions.
C. Special Reports: Submit at time of unusual event.

1.4 COORDINATION

A. Secure time commitments for performing critical elements of the Work from entities involved.
B. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.5 CONTRACTOR’S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
B. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

1.6 CONTRACTOR’S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, horizontal, Gantt-chart-type, Contractor's construction schedule per requirements of Division 01 Section “Multiple Contract Project Summary – Project Schedule”.

1. Format: Refer to accompanying “Format for Construction Schedule”.

B. Preparation: Indicate each significant construction activity separately, by Specification Section, coordinated with the schedule of values. Provide line item(s) for each Specification Section.

C. Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.

D. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties with a need-to-know schedule responsibility.

1. When revisions are made, distribute updated schedules to the same parties.

1.7 REPORTS

A. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

B. Special Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information.

PART 2 - PRODUCTS (Not Used)

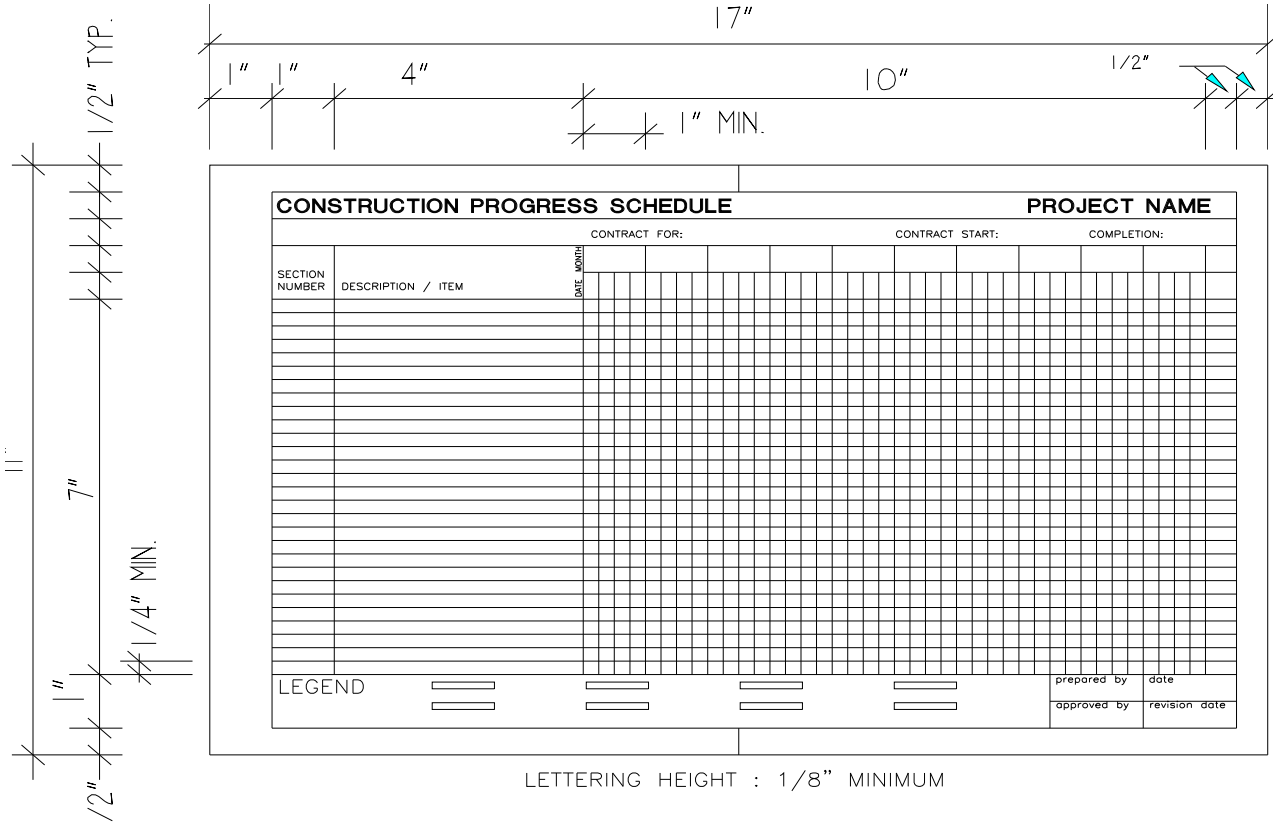
PART 3 - EXECUTION (Not Used)

Attachment: Format for Construction Schedule

END OF SECTION 01 32 00

SECTION 01 32 00 - PROJECT SCHEDULE - Attachment #1

FORMAT FOR
CONSTRUCTION SCHEDULE



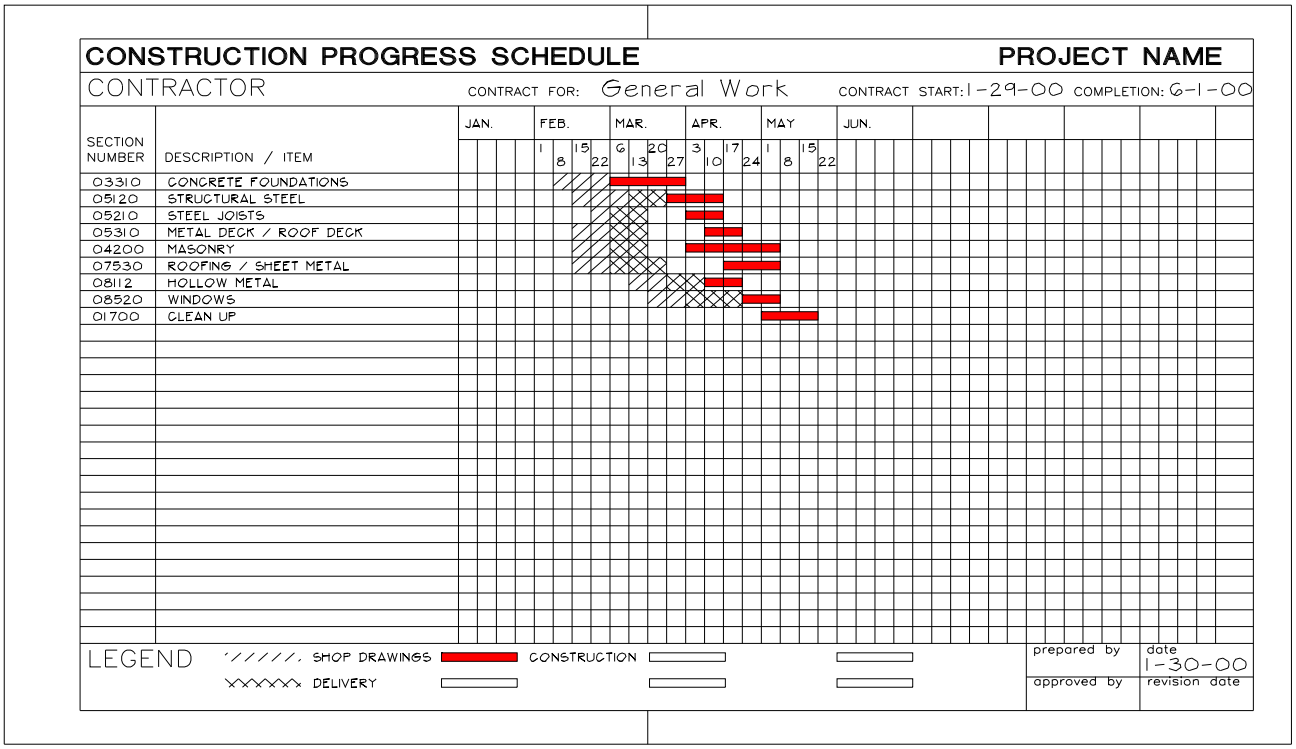
Format

Provide separate bar for each item in sequential order from beginning of Project to completion with the following information included for each item:

Related Technical Specification number.
Distinct graphic delineation, indicating area of building where schedule item in located.
Shop drawing submittal date and required acceptance date.
Product procurement date and anticipated delivery date.
Projected start and completion dates for each item.

SECTION 01 32 00 - PROJECT SCHEDULE - Attachment #1

FORMAT FOR
CONSTRUCTION SCHEDULE



Sample

Provide separate bar for each item in sequential order from beginning of Project to completion with the following information included for each item:

Related Technical Specification number.
Distinct graphic delineation, indicating area of building where schedule item in located.
Shop drawing submittal date and required acceptance date.
Product procurement date and anticipated delivery date.
Projected start and completion dates for each item.

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1. Process designated submittals for the Project electronically through designated Electronic Submittal System. PDF files must be opened, viewed, modified and printed using Adobe Acrobat PDF software to view reviewer comments/stamps.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's and Construction Manager’s responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. As-Specified Products: Products to be incorporated into Project as specified by manufacturer name and product designation and including all options in Part 2 of technical specifications, intended to be installed as specified in Part 3 of technical specifications, and from a product category specifically identified as eligible to be considered as an “as-specified product” in the Action Submittals Article in Part 1 of technical specifications.

C. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Construction Manager’s responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

E. Electronic Submittal System: A method to transmit certain electronic submittals between the Contractor, Construction Manager, Architect, and Owner, using Submittal Exchange website service.

1. For consistency, the standard file format will be PDF. Convert paper originals and other file formats to PDF prior to submission.

2. In the event of system malfunction, process submittals in accordance with the Architect’s instructions, until the system malfunction has been corrected.

3. For this Project, process the following submittal types through the designated electronic submittal system:

    a. Product Data.
    b. Shop Drawings.
    c. Product Schedules.
    d. Qualification Data.
    e. Certificates (Welding, Installer, Manufacturer, Product, and Material, as applicable).
    f. Test Reports (Material, Product, Preconstruction, Compatibility, and Field, as applicable).
    g. Research Reports.
    h. Warranty (sample).
    i. Design Data, including calculations.
    j. Coordination Drawings.
    k. Delegated-Design Services Certifications.

4. For Samples, provide electronic submittal of Sample cover sheet, identifying location and actual delivery date of Samples. Deliver Samples to location (Architect's office, Project site, etc.) as directed by the Architect.

1.4 COLOR SCHEDULE

A. Color Schedule: Within 30 days after date of Notice of Award, submit a complete list of proposed manufacturers and complete product designations (i.e. model, grade, series, product line, etc.) for each item requiring color selection by Architect.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Where indicated, submit all submittal items required for each Specification Section concurrently.

3. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect and Construction Manager reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing Time: Allow sufficient time for submittal review, including time for resubmittals. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Include a cover sheet on each submittal item for identification. Do not combine different submittals under same cover sheet; only one submittal is to be provided per email.

   a. Cover Sheet Form: Use PDF version of sample form included in Project Manual. Complete each item on form, sign and date. Architect will furnish PDF version of sample form.

2. Name submittal file as directed by Architect.

3. Transmit each submittal via Electronic Submittal System.

4. Transmit each submittal to Architect using the Submittal Exchange website www.submittalexchange.com.

D. Resubmittals: Make resubmittals in same form and, for non-electronic submittals, in the same number of copies as initial submittal.

1. Note date and content of revision in label or title block and clearly indicate extent of revision.

2. Resubmit submittals until they are marked with approval notation from Architect and Construction Manager.

3. Refer to the General Conditions for provisions allowing Owner to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of certain resubmittals.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.

F. Use for Construction: Retain complete electronic copies of submittals on Project site during Construction. Also maintain one complete set of hard paper copies of all approved submittals on Project site during Construction. Use only final action submittals that are marked with approval notation from Architect and Construction Manager.

G. Use of As-Specified Verification Form: The As-Specified Verification Form is intended to reduce certain action submittal paperwork for select products to be incorporated into the Work. If product to be incorporated into Project is specified by name and product designation in Part 2 of the Technical Specification Section and is from a product category specifically identified as eligible to be considered as an “as-specified product” in the Action Submittals Article in Part 1 of technical specifications, submit **“As-Specified Verification Form”** attached to this Specification Section.

1.6 ENVIRONMENTAL REQUIREMENTS

A. All products provided for use in construction of this Project are to be free of asbestos. Refer to Division 01 Section "Closeout Procedures" for certification required to be provided. The Owner may provide random testing of installed products/ construction for asbestos content. Any Contractor-installed product found to contain asbestos shall be classified as defective work. Defective work shall be corrected by the Contractor as specified in the General Conditions.

1.7 SUBMITTAL PROCEDURES, GENERAL

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1.8 ELECTRONIC SUBMITTAL REQUIREMENTS

A. Use the designated electronic submittal system for submittals in this Article.

1. Review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents including verification of manufacturer / product, dimensions and coordination of information with other parts of the work.

2. Transmit each submittal to Construction Manager and Architect using the Submittal Exchange website, www.submittalexchange.com.

3. For Action Submittals, Architect / Engineer and Construction Manager review comments will be made available on the Submittal Exchange website for downloading. Contractor will receive email notice of completed review.

4. Distribution of reviewed submittals to subcontractors and suppliers is the responsibility of the Contractor.

5. After award of contract, training will be provided by Submittal Exchange regarding use of website and PDF submittals. Contact Submittal Exchange at 1-800-714-0024.

6. Internet Service and Equipment Requirements:

    a. Email address and Internet access at Contractor's main office.
    b. Adobe Acrobat (www.adobe.com), for applying electronic stamps and comments.

7. Contractor shall bear the cost of the Submittal Exchange project subscription.

8. Retain one electronic copy of all approved submittals, as part of the project records required at Project Closeout.

9. Tetra Tech Architects and Engineers will be the Submittal Exchange Project Leader and Subscriber.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. Mark submittal to show which products and options are applicable.

2. Include the following information, as applicable:

   a. Manufacturer's catalog cuts.
   b. Statement of compliance with specified referenced standards.
   c. Testing by recognized testing agency.

3. For equipment, include the following in addition to the above, as applicable:

   a. Printed performance curves.
   b. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

C. As-Specified Submittals: Complete the **"As-Specified Verification Form"**.

1. Refer to the Action Submittals Article of technical specification sections. If the product to be incorporated into the Project is an "as-specified product" as defined in this Section, then submit **"As-Specified Verification Form"** in lieu of Product Data, otherwise submit full Product Data.

2. Do not use **"As-Specified Verification Form"** unless specifically indicated in technical specification.

3. The **"As-Specified Verification Form"** alone serves as the submittal for the specific product and no additional action submittal data is due at the time of the submittal. The full specific product technical data, however, is required to be included in the Operation and Maintenance Manual. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data".

D. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of dimensions established by field measurement.
   e. Relationship and attachment to adjoining construction clearly indicated.
   f. Seal and signature of professional engineer if specified.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.

F. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

G. Certificates:

1. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS or ASME forms as applicable. Include names of firms and personnel certified.

2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

4. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

5. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

H. Test Reports:

1. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

2. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

3. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

4. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

5. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

I. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

J. Warranty: Submit sample warranties as required in individual Specification Sections.

K. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

L. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

M. Delegated-Design Services Certification: Submit certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 SUBMITTAL REQUIREMENTS FOR COMMISSIONING

A. Provide the Commissioning Authority with a copy of all submittals for equipment to be commissioned.

1. The Commissioning Authority will review and approve Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the Architect’s review.

B. Data for Commissioning:

1. Refer to the technical Division Commissioning Section for listing of systems to be commissioned. Provide specific information needed about each piece of commissioned equipment or system in submittal as required to facilitate commissioning. Typically, this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any Ownerr-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians for pre-functional testing shall be submitted to the Commissioning Authority.

2. The Commissioning Authority may request further documentation necessary for the commissioning process. This data request may be made prior to submittals, during review, or subsequently as additional requirements become evident.

3. Much of this information is contained in the regular Operation and Maintenance (O&M) manual submittals normally submitted in the Project. For commissioned projects, this information is typically required prior to the regular formal O&M manual submittals and will be duplicated therein, facilitating the later creation of the O&M manual.

C. Contractor's responsibility for deviations in submittals from requirements of the Contract Documents is not relieved by the Commissioning Authority's review .

1.10 NON-ELECTRONIC SUBMITTAL REQUIREMENTS

A. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:

   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit two full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Deliver one set to Architect's office, deliver the other set to the construction trailer at the job site.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit two sets of Samples. Deliver one set to Architect's office, deliver the other set to the construction trailer at the job site.

        1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

B. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.

3. Submit subcontract list in the following format:

    a. Number of Copies: Four paper copies of subcontractor list, unless otherwise indicated. Architect will return one copy.

C. List of Key Personnel Names: No later than 15 days after date of Notice of Award, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site.

1. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including emergency, office, and cellular telephone numbers and email addresses.

    a. Number of Copies: Four paper copies of key personnel list, unless otherwise indicated.

1.11 MISCELLANEOUS SUBMITTAL REQUIREMENTS

A. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

B. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

1.12 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.13 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Identify any deviations from Contract Document requirements. Mark cover sheet with approval before submitting to Architect and Construction Manager.

1. Sign and date statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
2. If using Adobe Acrobat to electronically sign the Submittal Cover Sheet do not use the Certify Sign, Time Stamp feature as this will lock the document for further editing.

1.14 ARCHITECT'S AND CONSTRUCTION MANAGER'S ACTION

A. General: Architect and Construction Manager will not review submittals that do not bear Contractor's approval and will return them without action.

B. Action Submittals: Architect and Construction Manager will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect and Construction Manager will mark submittal appropriately to indicate action, as follows:

1. Final Unrestricted Release: Where the submittal is marked "Approved," the Work covered by the submittal may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.

2. Final-but-Restricted Release: Where the submittal is marked "Approved As Noted," the Work covered by the submittal may proceed provided it complies both with Architect's notations and corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.

3. Rejected: Where the submittal is marked "Rejected," do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.

4. Incomplete - Resubmit: Where the submittal is marked "Incomplete, Submit Additional Information," do not proceed with the Work covered by the submittal. Prepare additional information requested, or required by the Contract Documents, that indicates compliance with requirements, and resubmit.

C. Informational Submittals: Architect and Construction Manager will review each submittal and will not return it, or will return it if it does not comply with requirements.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Limit information submitted to specific products indicated. Do not submit extraneous matter. Submittals containing excessive extraneous matter will be returned for resubmittal without review.

F. Submittals not required by the Contract Documents may be returned by the Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

Attachments:
Tt Cover Sheet
As-Specified Verification Form
Tt Cover Sheet for Closeout Submittals (Sections 01 78 23 and 01 78 39)
Consultant Coversheet Submittal Form
Delegated Design Submittal Form (Refer to Sections 08 41 13, 08 51 13, 08 80 00, 13 12 60, 21 13 13)

END OF SECTION 01 33 00

CONTRACTOR: _____ **SUBMITTAL DATE** ____/____ /____

_____ Check following as applicable:

ARCHITECT: Tetra Tech Architects & Engineers ☐ First Submission

☐ Re-Submission No. ____

PROJECT IDENTIFICATION

Architect's
Project No.: 363579-22001.3

Proj. Name: Phase 3 Reconstruction

Location: Cornwall Central School District

PRODUCT IDENTIFICATION

Specification Section No. _____

Name of Product: _____

_____

Name of Manufacturer: _____

SUBCONTRACTOR

_____

SUPPLIER

_____

RELATIONSHIP TO STRUCTURE

Building
Name _____

_____
(Room #) *(Room Name)*

Contract Drawing No.: _____

RESERVED FOR USE BY TETRA TECH

ACTION SUBMITTAL:

☐ Approved

☐ Approved As Noted

☐ Rejected

☐ Incomplete, Submit Additional Information

INFORMATIONAL SUBMITTAL:

☐ No Action Taken

☐ Returned for Resubmittal

Reviewed By: _____

Date: _____

Reviewed only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. Review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures.

DEVIATION FROM CONTRACT DOCUMENTS: _____

_____

CONTRACTOR COMMENTS: _____

_____

ARCHITECT'S COMMENTS: _____

_____

CONTRACTOR'S STAMP

CONTRACTOR'S CERTIFICATION
I CERTIFY THAT THIS SUBMITTAL HAS BEEN REVIEWED AND APPROVED BY THE CONTRACTOR IN ACCORDANCE WITH THE GENERAL CONDITIONS. PRODUCTS/MATERIALS ARE FREE OF ASBESTOS AS REQUIRED BY THE CONTRACT DOCUMENTS.

BY _____

CONSTRUCTION MANAGER'S CERTIFICATION
I CERTIFY THAT THIS SUBMITTAL HAS BEEN REVIEWED AND APPROVED BY THE CONSTRUCTION MANAGER IN ACCORDANCE WITH THE GENERAL CONDITIONS.

BY _____

CM Submittal No. _____

TETRA TECH
ARCHITECTS & ENGINEERS

As-Specified Verification Form

Project Number: 363579-22001.3

Project Title: Phase 3 Reconstruction

Technical Specification Section: _____
(Include Section Number and Title as shown in Project Manual)

Specified Product: _____
(Include manufacturer's name and product designation)

The undersigned, hereinafter called the Contractor, hereby warrants that the Specified Product listed above will be incorporated into the Project in accordance with requirements specified in the Technical Specification Section identified above without modification or alteration.

By acceptance of this form, Tetra Tech Architects & Engineers (hereinafter called Tetra Tech), agrees that limited submittals identified in the Technical Specification Section identified above are not required, unless otherwise stated in the Submittals article in the Technical Specification Section.

The Contractor is advised that use of this As-Specified Verification Form does not relieve the Contractor from providing remaining submittal documentation required in Technical Specification sections and all information required in Division 1 Closeout section of the Project Manual or from complying with requirements of the General Conditions.

Products/Materials are free of asbestos as required by the Contract Documents.

_____
(Name of Contractor)

_____
(Authorized Signature)

_____
(Title of Signatory)

_____
(Date)

RESERVED FOR USE BY TETRA TECH

ACTION SUBMITTAL:

☐ Approved / Approved As Noted

☐ Rejected

Reviewed By: _____

Date: _____

Reviewed only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. Review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures.

ARCHITECT'S COMMENTS: _____

CONTRACTOR: _____

_____

SUBMITTAL DATE ____/____/____

Check following as applicable:

☐ First Submission ____

☐ Re-Submission No. ____

ARCHITECT: Tetra Tech Architects & Engineers

PROJECT IDENTIFICATION

Architect's
Project No.: 363579-22001.3

Proj. Name: Phase 3 Reconstruction

Location: Cornwall Central School District

PRODUCT IDENTIFICATION

Specification Section No. **01 78 23 OR 01 78 39** *(circle correct one)*

Name of Product: _____

_____

Name of Manufacturer: _____

SUBCONTRACTOR: _____

SUPPLIER: _____

RESERVED FOR USE BY TETRA TECH

INFORMATIONAL SUBMITTAL:

☐ No Action Taken

☐ Returned for Resubmittal

Reviewed By: _____

Date: _____

Reviewed only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. Review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures.

DEVIATION FROM CONTRACT DOCUMENTS: _____

_____

CONTRACTOR COMMENTS: _____

_____

CONSTRUCTION MANAGER'S COMMENTS: _____

_____

ARCHITECT'S COMMENTS: _____

_____

CONTRACTOR'S STAMP

CONTRACTOR'S CERTIFICATION

I CERTIFY THAT THIS SUBMITTAL HAS BEEN REVIEWED AND APPROVED BY THE CONTRACTOR IN ACCORDANCE WITH THE GENERAL CONDITIONS. PRODUCTS/MATERIALS ARE FREE OF ASBESTOS AS REQUIRED BY THE CONTRACT DOCUMENTS.

BY _____

CONSTRUCTION MANAGER'S CERTIFICATION

I CERTIFY THAT THIS SUBMITTAL HAS BEEN REVIEWED BY THE CONSTRUCTION MANAGER IN ACCORDANCE WITH THE GENERAL CONDITIONS. AND IN ACCORDANCE WITH THE CONSTRUCTION MANAGER'S CONTRACTUAL OBLIGATIONS WITH THE OWNER.

Approved _____ Rejected_____

BY _____

CM Submittal No. _____

CONTRACTOR: _____ **SUBMITTAL DATE** ____/____/____

_____

Check following as applicable:

CONSULTANT: _____ ☐ First Submission ____

☐ Re-Submission No. ____

PROJECT IDENTIFICATION

Architect's
Project No.: 363579-22001.3

Proj. Name: Phase 3 Reconstruction

Location: Cornwall Central School District

PRODUCT IDENTIFICATION

Specification Section No._____

Name of Product:_____

_____

Name of Manufacturer:_____

SUBCONTRACTOR: _____

_____

SUPPLIER: _____

RELATIONSHIP TO STRUCTURE: _____

_____

Building Name:_____

_____
(Room #) *(Room Name)*

Contract Drawing No.:_____

[CONSULTANT NAME] OWNER'S DIRECT CONSULTANT

ACTION SUBMITTAL:

☐ Approved

☐ Approved As Noted

☐ Rejected

☐ Incomplete, Submit Additional Information

INFORMATIONAL SUBMITTAL:

☐ No Action Taken

☐ Returned for Resubmittal

Reviewed By: _____

Date: _____

DEVIATION FROM CONTRACT DOCUMENTS: _____

_____

CONTRACTOR COMMENTS: _____

_____

OWNER'S CONSULANT COMMENTS: _____

_____

CONTRACTOR'S STAMP

CONTRACTOR'S CERTIFICATION

I CERTIFY THAT THIS SUBMITTAL HAS BEEN REVIEWED AND APPROVED BY THE CONTRACTOR IN ACCORDANCE WITH THE GENERAL CONDITIONS. PRODUCTS/MATERIALS ARE FREE OF ASBESTOS AS REQUIRED BY THE CONTRACT DOCUMENTS.

BY _____

CONSTRUCTION MANAGER'S CERTIFICATION

I CERTIFY THAT THIS SUBMITTAL HAS BEEN REVIEWED AND APPROVED BY THE CONSTRUCTION MANAGER IN ACCORDANCE WITH THE GENERAL CONDITIONS.

BY _____

CM Submittal No. _____

DELEGATED DESIGN SUBMITTAL

CONTRACTOR: _____ **SUBMITTAL DATE** ____ /____ /____

DESIGN PROFESSIONAL: _____ Check following as applicable:

ARCHITECT: Tetra Tech Architects & Engineers

☐ First Submission

☐ Re-Submission No. ___

PROJECT IDENTIFICATION

Architect's
Project No.: 363579-22001.3

Proj. Name: Phase 3 Reconstruction

Location: Cornwall Central School District

PRODUCT IDENTIFICATION

Specification Section No. _____

Name of Product: _____

_____

Name of Manufacturer: _____

SUBCONTRACTOR

_____

SUPPLIER

_____

RELATIONSHIP TO STRUCTURE

Building
Name _____

_____
(Room #) *(Room Name)*

Contract Drawing No.: _____

DEVIATION FROM CONTRACT DOCUMENTS:

_____

_____

_____

RESERVED FOR USE BY TETRA TECH

ACTION SUBMITTAL:

☐ Approved

☐ Approved As Noted

☐ Rejected

☐ Incomplete, Submit Additional Information

INFORMATIONAL SUBMITTAL:

☐ No Action Taken

☐ Returned for Resubmittal

Reviewed By: _____

Date: _____

Reviewed only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. Review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures.

DESIGN PROFESSIONAL'S COMMENTS: _____

CONTRACTOR COMMENTS: _____

ARCHITECT'S COMMENTS: _____

CONSTRUCTION MANAGER'S CERTIFICATION
I certify that this submittal has been reviewed and approved by the Construction Manager in accordance with the General Conditions.

BY _____

CM Submittal No. _____

CONTRACTOR'S STAMP

DESIGN PROFESSIONAL'S CERTIFICATION
I certify that I am a design professional currently licensed in New York State and confirm my responsibility for work included in this submittal in accordance with the General Conditions. Further, I certify that to the best of my knowledge, information and belief, the plans and specifications are in accordance with applicable requirements of the New York State Uniform Fire Prevention and Building Code, the State Energy Conservation Construction Code and construction standards of the Education Department.

BY _____

CONTRACTOR'S CERTIFICATION
I certify that this submittal has been reviewed and approved by the Contractor in accordance with the General Conditions. Products/Materials
Are free of asbestos as required by the Contract Documents.

BY _____

SECTION 01 35 26 – GOVERNMENTAL SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Safety requirements included in 8 NYCRR 155.5 Uniform Safety Standards for School Construction and Maintenance Projects.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Provide all measures, including (but not limited to) materials, equipment, and procedures, required to comply with following requirements of 8 NYCRR 155.5 Uniform Safety Standards for School Construction and Maintenance Projects.

B. Certificate of Occupancy:

1. 8 NYCRR 155.5 (a): "The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy."

C. General Safety and Security Standards for Construction Projects:

1. 8 NYCRR 155.5 (e)(1): "All construction materials shall be stored in a safe and secure manner."

2. 8 NYCRR 155.5 (e)(2): "Fences around construction supplies or debris shall be maintained."

3. 8 NYCRR 155.5 (e)(3): "Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry."

4. 8 NYCRR 155.5 (e)(4): "During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry."

5. 8 NYCRR 155.5 (e)(5): "Workers shall be required to wear photo identification badges at all times for identification and security purposes while working at occupied sites."

D. Separation of Construction Areas from Occupied Spaces:

1. 8 NYCRR 155.5 (f): "Construction areas which are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas."

2. 8 NYCRR 155.5 (f)(1): "A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs or elevators designated for students or school staff."

E. Cleaning Occupied Areas:

1. 8 NYCRR 155.5 (f)(2): "Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building."

2. 8 NYCRR 155.5 (f)(3): "All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session."

F. Exiting and Ventilation:

1. 8 NYCRR 155.5(g): Maintain exiting and ventilation during school construction projects.
2. 8 NYCRR 155.5(g)(1): "Required exits, temporary stairs, ramps, exit signs, and door hardware shall be provided at all times."
3. 8 NYCRR 155.5(g)(2): "Required ventilation to occupied spaces affected by construction will be maintained during the project."

G. Noise Control:

1. 8 NYCRR 155.5 (i): "Construction and maintenance operations shall not produce noise in excess of 60 dba in occupied spaces or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical abatement measures shall be taken."

H. Control of Fumes, Gases and Contaminants:

1. 8 NYCRR 155.5 (j): The contractor shall be responsible for the control of chemical fumes, gases, and other contaminants produced by welding, gasoline or diesel engines, roofing, paving, painting, and other fumes to ensure they do not enter occupied portions of the building or air intakes.

I. "Off-Gassing" of Volatile Organic Compounds:

1. 8 NYCRR 155.5 (j)(1): The contractor shall be responsible to ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paint, furniture, carpeting, wall coverings, drapery, etc. are scheduled, cured or ventilated in accordance with manufacturer's recommendations before a space can be occupied.

J. Asbestos Isolation:

1. 8 NYCRR 155.5 (k): "Large and small asbestos abatement projects as defined by 12 NYCRR 56 shall not be performed while the building is occupied." Note, it is NYSED's interpretation that the term "building", as referenced in this section of 8 NYCRR 155.5, means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction. The isolated portion of the building must contain exits that do not pass through the occupied portion and ventilation systems must be physically separated and sealed at the isolation barrier.

2. Exterior work such as roofing, flashing, siding, or soffit work may be performed on occupied buildings provided proper variances are in place as required, and complete isolation of ventilation systems and at windows is provided. Care must be taken to schedule work so that classes are not disrupted by noise or visual distraction.

K. Lead and Asbestos Testing:

1. 8 NYCRR 155.5 (c)(1): "All school areas to be disturbed during renovation or demolition shall be tested for lead and asbestos."

a. Asbestos and Asbestos-Containing Materials:

1) Be advised that asbestos and asbestos-containing materials are required to be abated as part of this Project. Refer to Division 02 Section "Asbestos Abatement".

a) The extent of asbestos to be abated as part of the Project is indicated on Drawings included in the Contract Documents.

b) Prior to beginning Work, review Owner's "Asbestos Management Plan" to ensure asbestos or asbestos-containing materials identified in that document are not disturbed.

2) Be advised that if materials suspected to be asbestos, or to contain asbestos, that are not included in the Project and not identified in the Contract Documents are encountered during construction, immediately notify Owner and take precautions as required to avoid disturbing materials until directed by Owner.

3) Transmission Electron Microscopy (TEM): All asbestos abatement work that requires clearance air sampling in accordance with New York State Industrial Code Rule 56 shall have clearance air samples collected and analyzed using Transmission Electron Microscopy as per the Asbestos Hazard Emergency Response Act (40 CFR 763). Refer to Division 02 Section "Asbestos Abatement".

b. Lead and Lead-Containing Materials:

1) Be advised that a lead inspection has been performed as required by New York State Education Department and a copy of the lead inspection report is available at the Owner's offices.

L. Code Rule 56:

1. 8 NYCRR 155.5(k): "All asbestos abatement projects shall comply with all applicable Federal and State laws including but not limited to the New York State Department of Labor industrial code rule 56 (12 NYCRR 56), and the Federal Asbestos Hazard Emergency Response Act (AHERA), 40 CFR part 763 (Code of Federal Regulations, 1998 Edition, Superintendent of Public Documents, U.S. Government Printing Office, Washington, DC 20402; 1998; available at the Office of Facilities Planning, Education Building Annex, Room 360, State Education Department, Albany, NY 12234."

M. Lead:

1. 8 NYCRR 155.5 (l): Surfaces that will be disturbed by reconstruction must have a determination made as to the presence of lead. Projects which disturb surfaces that contain lead shall have in the specifications a plan prepared by a certified Lead Risk Assessor or Supervisor which details provisions for occupant protection, worksite preparation, work methods, cleaning and clearance testing which are in general accordance with the HUD Guidelines.

a. Be advised that disturbance of lead and lead-containing materials is not anticipated as part of this Project.

b. Contractor is responsible for complying with requirements of all applicable federal, state and local regulations, including (but not limited to) OSHA Lead in Construction Standard 29 CFR 1926.62, when construction activities involve disturbance of materials containing 1.0 mg/sq cm or 0.5 percent of lead or less, including (but not limited to) lead-based paint, ceramic tile, and similar materials.

c. If materials suspected to contain lead above 1.0 mg/sq cm or above 0.5 percent that are not included in Project or identified in Contract Documents are encountered during construction, immediately notify Owner and take applicable precautions to avoid disturbing materials until directed by Owner.

N. Disposal of Lead Abatement Waste:

1. Test all debris from lead abatement activities to determine whether it is hazardous or non-hazardous waste.

2. Transport and dispose of debris determined to be hazardous waste in accordance with applicable regulations.

3. Package, label, and mark all hazardous waste materials in accordance with applicable requirements of 49 CFR 173, 178 and 179.

4. Maintain hazardous waste manifest from date of transport until date of disposal, destruction or recycling.

5. Return fully executed hazardous waste manifests to Owner within 60 days after date waste accepted by initial transporter.

6. Dispose of material determined to be Construction and Demolition Debris in accordance with 6 NYCRR 360 and 364. Provide trip tickets or other documentation clearly identifying generating site, Owner, transporter, disposal site and amount of material removed from site, transported to and disposed of at disposal site.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 35 26

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

D. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

E. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

A. Informational Submittals:

1. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

2. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

    a. Specification Section number and title.
    b. Entity responsible for performing tests and inspections.
    c. Description of test and inspection.
    d. Identification of applicable standards.
    e. Identification of test and inspection methods.
    f. Number of tests and inspections required.
    g. Time schedule or time span for tests and inspections.

1.6 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.

6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.8 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.9 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section, and as follows:

1. Notifying Architect, Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

2. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, through Construction Manager, with copy to Contractor and to authorities having jurisdiction.

3. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.

5. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Construction Manager’s, reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

Attachment: Statement of Special Inspections

END OF SECTION 01 40 00

TETRA TECH
ARCHITECTS & ENGINEERS

STATEMENT OF SPECIAL INSPECTIONS

Project: *Phase 3 Reconstruction Project*

Location: *Cornwall, New York*

Owner: *Cornwall Central School District*

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code of New York State. It includes a schedule of Special Inspection services applicable to this project. *Refer to individual technical specification sections for additional testing requirements*.

This document includes the following parts:

Qualifications of Inspectors and Testing Technicians

Schedule of Special Inspection Services

Qualifications of Inspectors and Testing Technicians

The qualifications of all personnel performing Special Inspection and testing activities are subject to the approval of the Building Official. The credentials of all Inspectors and testing technicians shall be provided if requested.

Key for Minimum Qualifications of Inspection Agents:

When the Registered Design Professional in Responsible Charge deems it appropriate that the individual performing a stipulated test or inspection have a specific certification or license as indicated below, such designation shall appear below the *Qualifications* on the Schedule.

PE	Structural Engineer – a licensed PE specializing in the design of building structures
PE/GE	Geotechnical Engineer – a licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – a graduate engineer who has passed the Fundamentals of Engineering examination

American Concrete Institute (ACI) Certification

ACI-CFTT	Concrete Field Testing Technician – Grade 1
ACI-CCI	Concrete Construction Inspector
ACI-LTT	Laboratory Testing Technician – Grade 1&2
ACI-STT	Strength Testing Technician

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector
AWS/AISC-SSI	Certified Structural Steel Inspector

American Society of Non-Destructive Testing (ASNT) Certification

ASNT	Non-Destructive Testing Technician – Level II or III.

International Code Council (ICC) Certification

ICC-SMSI	Structural Masonry Special Inspector
ICC-SWSI	Structural Steel and Welding Special Inspector
ICC-SFSI	Spray-Applied Fireproofing Special Inspector
ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector

National Institute for Certification in Engineering Technologies (NICET)

NICET-CT	Concrete Technician – Levels I, II, III & IV
NICET-ST	Soils Technician - Levels I, II, III & IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III & IV

Association of the Wall and Ceilings Industries International (AWCI)

AWCI 12-B	Standard Practice for the Testing and Inspection of Field Applied Thin-Film Intumescent Fire-Resistive Materials; an Annotated Guide.

Schedule of Special Inspection Services

INSPECTION AND TESTING *("Continuous" & "Periodic" defined by the Code; refer to applicable Technical Specification Section for specific frequency requirements)*	**REQUIRED** (*Required if checked; Not Applicable if not* checked)	**TECHNICAL SPECIFICATION SECTION** (*Refer to for additional information*)	**CONTINUOUS**	**PERIODIC**
Cast-in-Place Concrete (1705.3)				
1. Inspection of reinforcing steel and verify placement	☒	03 30 00	☐	☒
2. Inspection of reinforcing steel welding:				
a. Verification of ASTM A706 material	☐	03 30 00	☐	☒
b. Inspect single-pass fillet welds, maximum 5/16"	☐	03 30 00	☐	☒
c. Inspect all other welds	☐	03 30 00	☒	☐
3. Inspection of anchors to be installed in concrete prior to and during placement	☒	03 30 00	☒	☐
4. Inspect anchors post-installed in hardened concrete				
a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.	☐	03 30 00	☒	☐
b. Mechanical anchors and adhesive anchors not defined in 4a.	☒	03 30 00	☐	☒
5. Verify use of required design mix	☒	03 30 00	☐	☒
6. Sampling fresh concrete for fabricating specimens for strength testing, perform slump and air content tests, and measure temperature of concrete	☒	03 30 00	☒	☐
7. Inspection of concrete and shotcrete placement for proper application techniques	☒	03 30 00	☒	☐
8. Verify maintenance of specified curing temperature and techniques	☒	03 30 00	☐	☒
9. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete, and prior to removal of shores and forms from beams and structural slabs	☒	03 30 00	☐	☒
10. Inspection of formwork for shape, location and dimensions of the concrete member being formed	☒	03 30 00	☐	☒
11. Inspection of post-tensioning operations	☐	03 38 16	☒	☐

Precast Concrete (1705.3)				
1. Inspection of reinforcing steel	☐	03 41 00	☐	☒
2. Verify use of required design mix	☐	03 41 00	☐	☒
3. Inspection of prestressed operations				
a. Application of prestressing forces	☐	03 41 00	☒	☐
b. Grouting of bonded prestressing tendons in the seismic-force-resisting system	☐	03 41 00	☒	☐
4. Sampling fresh concrete; slump, air content, temperature, strength test specimens	☐	03 41 00	☒	☐
5. Inspection of formwork for shape, location and dimensions of the concrete member being formed	☐	03 41 00	☐	☒
6. Inspection of concrete placement for proper application techniques	☐	03 41 00	☒	☐
7. Inspection for maintenance of specified curing temperature and techniques	☐	03 41 00	☐	☒
8. Erection of precast concrete members	☐	03 41 00, 03 48 10	☐	☒

Fabricated Items (1704.2.5 and 1705.10)				
1. Inspection of structural, load-bearing or lateral load-resisting members or assemblies as noted on Contract Documents that are fabricated in a fabricator's shop	☐	?? ?? ??	☐	☐
Exceptions: a. The fabricator has been approved to perform work without special inspections per NYSBC 1704.2.5.1. b. The members or assemblies are to be fabricated on site. Then refer to the respective material categories for inspections.				

Masonry (1705.4)				
Level 1	☒	04 20 00		
1. Prior to construction, verify certificates of compliance used in masonry construction	☐	04 20 00	☐	☐
Level 2 Level 3	☐ Level 2 ☐ Level 3	04 20 00		
1. Prior to construction, verify compliance with the approved submittals.	☐	04 20 00	☐	☐
2. Prior to construction, verify *f'm*, except where specifically exempted by the Code	☐	04 20 00	☐	☐
3. During construction, verify Slump flow and Visual Stability Index (VSI) when self-consolidating grout is delivered to the project site	☐	04 20 00	☐	☐
4. During construction, verify *f'm* for every 5,000 sqft	☐	04 20 00	☐	☐
5. During construction, verify proportions of materials in premixed or preblended mortar, and grout other than self-consolidating grout, as delivered to the project site.	☐	04 20 00	☐	☐
6. At start of masonry construction, verify to ensure compliance:				
a. Proportions of site prepared mortar.	☐	04 20 00	☐	☒
b. Grade, type and size of reinforcement, connectors, and anchor bolts.	☐	04 20 00	☐	☒
c. Sample panel construction.	☐	04 20 00	☐	☒
7. Prior to grouting, verify that the following are in compliance:				
a. Grout space	☐	04 20 00	☐	☒
b. Placement of reinforcement, connectors, and anchor bolts	☐	04 20 00	☐	☒
c. Proportions of site-prepared grout	☐	04 20 00	☐	☒
8. During construction, verify compliance of the following:				
a. Materials and procedures with the approved submittals.	☐	04 20 00	☐	☒
b. Placement of masonry units and mortar joint construction.	☐	04 20 00	☐	☒
c. Size and location of structural members.	☐	04 20 00	☐	☒
d. Type, size and location of anchors including anchorage of masonry to structural members, frames or other construction	☐	04 20 00	☐	☒
e. Welding of reinforcing bars	☐	04 20 00	☒	☐
f. Preparation, construction and protection of masonry during cold or hot weather	☐	04 20 00	☐	☒
g. Placement of grout.	☐	04 20 00	☒	☐
9. Observe preparation of grout specimens, mortar specimens and/or prisms	☐	04 20 00	☐	☒

Structural Steel (1705.2.1)				
1. Minimum inspections prior to welding per AISC 360 (including but not limited to material verification, welder qualification and fit-up of joints).	☐	05 12 00	☒	☐
2. Minimum inspections during welding per AISC 360	☐	05 12 00	☒	☐
a. Placement and installation of steel headed stud anchors	☐	05 12 00	☒	☐
b. Verification of ASTM A 706 material	☐	05 12 00	☐	☒
c. Testing of resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement.	☐	05 12 00	☒	☐
3. Minimum inspections after welding per AISC 360 (including but not limited to size, length and location of welds; welds meet visual acceptance criteria; and repair activities)	☐	05 12 00	☒	☐
4. Inspection of welding via UT for CJP groove welds subject to transversely applied tension loading in butt, T-, and Corner joints				
a. Risk Category III or IV structures	☐	05 12 00	☒	☐
b. Risk Category II structures	☐	05 12 00	☐	☒
5. Minimum inspections prior to high-strength bolting (except for snug-tight joints) per AISC 360 (including but not limited to material verification of high-strength bolts, nuts, and washers; and bolting procedures)	☐	05 12 00	☒	☐
6. Minimum inspections during high-strength bolting (except for snug-tight joints) per AISC 360 (included but not limited to assemblies and positioning)	☐	05 12 00		
a. For pretension/slip-critical connections using turn-of-nut with match marking method, direct-tension-indicator method, or twist-off-type tension control bolt method.	☐	05 12 00	☐	☒
b. For pretension/slip-critical connections using calibrated wrench method or turn-of-nut method without matchmarking	☐	05 12 00	☒	☐
7. Minimum inspections after high-strength bolting per AISC 360	☐	05 12 00	☐	☒
8. Inspection of fabricated and/or erected steel to verify compliance with the construction drawings.	☐	05 12 00	☐	☒
a. Details such as bracing and stiffeners	☐	05 12 00	☐	☒
b. Member locations	☐	05 12 00	☐	☒
c. Joint details	☐	05 12 00	☐	☒
9. Inspection during placement of anchor rods and other embedded items supporting structural steel for compliance with construction drawings.	☐	05 12 00	☒	☐
8. Material verification of structural steel: Identification markings to conform to ASTM standards specified in the approved construction documents	☐	05 12 00	☐	☐

Open-Web Steel Joists and Joist Girders (1705.2.3)				
1. Installation of open-web steel joists and joist girders				
a. End connections – welded or bolted per SJI	☐	05 21 00	☐	☒
b. Bridging – horizontal or diagonal				
1. Standard bridging per SJI	☐	05 21 00	☐	☒
2. Bridging that differs from SJI specification	☐	05 21 00	☐	☒

Cold-Formed Steel Deck (1705.2.2)				
1. Inspection or Execution Tasks Prior to Deck Placement per SDI QA/QC (including but not limited to compliance of materials with construction documents)	☐	05 31 00	☐	☒
2. Inspection or Execution Tasks After to Deck Placement per SDI QA/QC (including but not limited to compliance of installation with construction documents)	☐	05 31 00	☐	☒
3. Inspection or Execution Tasks Prior to Welding per SDI QA/QC (including but not limited to verification of procedures and certifications)	☐	05 31 00	☐	☒
4. Inspection or Execution Tasks During Welding per SDI QA/QC	☐	05 31 00	☒	☐
5. Inspection or Execution Tasks After Welding per SDI QA/QC (including but not limited to size, length and location of welds; welds meet visual acceptance criteria; and repair activities)	☐	05 31 00	☐	☒
6. Inspection or Execution Tasks Prior to Mechanical Fastening per SDI QA/QC (including but not limited to material verification)	☐	05 31 00	☐	☒
7. Inspection or Execution Tasks During Mechanical Fastening per SDI QA/QC (including but not limited to verification of positioning and installation)	☐	05 31 00	☒	☐
8. Inspection or Execution Tasks After Mechanical Fastening per SDI QA/QC (including but not limited to verification of spacing, type and location; repair activities)	☐	05 31 00	☐	☒

Cold-Formed Steel Trusses (1705.2.4)				
1. For trusses spanning 60 feet or greater:				
a. Verify the temporary installation restraint/bracing is installed per the approved truss submittal package.	☐	05 40 00	☐	☒
b. Verify the permanent individual truss member restraint/bracing is installed per the approved truss submittal package.	☐	05 40 00	☐	☒

Wood Construction (170505)				
1. For Metal-plate connected wood trusses spanning 60 feet or greater:				
a. Verify the temporary installation restraint/bracing is installed per the approved truss submittal package.	☐	06 10 00, 06 16 00, 06 17 53	☐	☒
b. Verify the permanent individual truss member restraint/bracing is installed per the approved truss submittal package.	☐	06 10 00, 06 16 00, 06 17 53	☐	☒
2. Inspect High-load diaphragms for grade and thickness of sheathing material; nominal size of framing members; fastener diameter and length; fastener layout and spacing	☐	06 10 00	☐	☒

Exterior Insulation and Finish Systems (EIFS) (1705.16)				
Not required if water-resistive barrier is installed with a means of draining moisture to the exterior. Also not required for EIFS applications over masonry or concrete walls. 1. Inspection of water-resistive batter coating when installed over a sheathing substrate.	☐	07 24 13	☐	☐

Sprayed Fire-resistant Materials (1705.14)				
1. Verify surface preparation in accordance with manufacturer's written instructions.	☐	07 81 00	☐	☐
2. Verify temperature and area ventilation before and after application in accordance with manufacturer's written instructions.	☐	07 81 00	☐	☐
3. Verify thickness of sprayed fire-resistant materials				
a. Minimum of 4 measurements per 1,000 sq ft of floor, roof and wall assembly areas, or part thereof at each story.	☐	07 81 00	☐	☐
b. Minimum of 25% of structural members at each story.	☐	07 81 00	☐	☐
4. Verify density of sprayed fire-resistant materials.				
a. Minimum of one sample per 2,500 sq ft of floor, roof and wall assembly areas, or part thereof at each story.	☐	07 81 00	☐	☐
b. Minimum of one sample from each type of structural framing member per 2,500 sq ft of floor area or part thereof at each story.				
5. Verify cohesive/adhesive bond strength of sprayed fire-resistant materials.				
a. Minimum of one sample per 2,500 sq ft of floor, roof and wall assembly areas or part thereof at each story.	☐	07 81 00	☐	☐
b. Minimum of one sample from each type of structural framing member per 2,500 sq ft of floor area or part thereof at each story	☐	07 81 00	☐	☐
c. Bond tests to qualify a primer, paint, or encapsulant when acceptable bond strength performance between those coatings and the fire-resistant material has not been determined.	☐	07 81 00	☐	☐

Mastic and Intumescent Fire-resistant Coatings (1705.15)				
1. Verify surface preparation, application, and thickness when applied to structural elements and decks in accordance with AWCI 12-B	☐	07 81 23	☐	☐

Fire-Resistant Penetrations and Joints (1705.17)				
1. Inspection of through-penetrations and membrane penetration firestops in buildings in Risk Category III or IV per ASTM E2174	☐	07 84 13	☒	☐
2. Inspections of fire-resistant joint systems and perimeter fire barrier systems in buildings in Risk Category III or IV per ASTM E2393	☐	07 84 43, 07 95 13.13	☐	☐

Soils (1705.6)				
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity	☒	31 20 00	☐	☒
2. Verify excavations are extended to proper depth and have reached proper material	☒	31 20 00	☐	☒
3. Perform classification and testing of compacted fill materials	☒	31 20 00	☐	☒
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill	☒	31 20 00	☒	☐
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly	☒	31 20 00	☐	☒

Driven Deep Foundations (1705.7)				
1. Verify element materials, sizes and lengths comply with the requirements	☐	31 62 13, 31 62 16, 31 62 19, 31 22 23	☒	☐
2. Determine capacities of test elements and conduct additional load tests, as required	☐	31 62 13, 31 62 16, 31 62 19, 31 22 23	☒	☐
3. Inspect driving operations and maintain complete and accurate records for each element	☐	31 62 13, 31 62 16, 31 62 19, 31 22 23	☒	☐
4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element	☐	31 62 13, 31 62 16, 31 62 19, 31 22 23	☒	☐
5. For steel elements, perform additional special inspections in accordance with 1705.2	☐	31 62 13, 31 62 16, 31 62 19, 31 22 23	☐	☐
6. For concrete elements and concrete-filled elements, perform additional special inspections in accordance with Section 1705.3	☐	31 62 13, 31 62 16, 31 62 19, 31 22 23	☐	☐
7. For specialty elements, perform additional inspections	☐	31 62 13, 31 62 16, 31 62 19, 31 22 23	☐	☐

Cast-In-Place Deep Foundations (1705.8)				
1. Inspect drilling operations and maintain complete and accurate records for each element	☐	03 30 00	☒	☐
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable), and adequate end bearing strata capacity. Record concrete or grout volumes.	☐	03 30 00	☒	☐
3. For concrete elements, perform tests and additional special inspections in accordance with Section 1705.3	☐	03 30 00	☐	☐

Helical Pile Foundations (1705.9)				
1. Inspect installation operations and maintain complete and accurate records for each pier	☐	??	☒	☐
2. Verify and record installation equipment used, pile dimensions, tip elevations, final depth, final installation torque other data as required	☐	??	☒	☐

Wind Resistance Inspections (1705.11)				
1. Structural wood – of elements in main windforce-resisting system				
a. Inspection of gluing operations.	☐	06 10 00, 06 16 00, 06 17 53	☒	☐
b. Inspection of nailing, bolting, anchoring and other fastening	☐	06 10 00, 06 16 00, 06 17 53	☐	☒
2. Cold-formed steel light-frame construction – of elements in main windforce-resisting systems.				
a. Inspection of welding operations	☐	05 40 00	☐	☒
b. Inspection of screw attachment, bolting, anchoring and other fastening	☐	05 40 00	☐	☒
3. Wind-resisting components:				
a. Inspection of roof covering, roof deck and roof framing connections	☐	05 12 00, 05 21 00, 05 31 00, 07 53 23	☐	☒
b. Inspection of exterior wall covering and wall connections to roof and floor diaphragms and framing	☐	04 20 00, 07 24 13, 08 41 13, 08 44 13	☐	☒

Seismic Resistance Inspections (1705.12)				
1. Structural steel:				
SDC B, C, D, E, or F – refer to 1705.12.1.1 for exceptions a. Seismic force-resisting systems – inspection in accordance with AISC 341	☐	05 12 00	☒	☐
SDC B (R>3), C (R>3), D, E, or F b. Structural steel elements - inspection in accordance with AISC 341	☐	05 12 00	☒	☐
SDC C, D, E, or F, refer to 1705.12.2 for exceptions 2. Structural wood, seismic-force-resisting systems:				
a. Inspection of field gluing operations.	☐	06 10 00, 06 17 00, 06 17 53	☒	☐
b. Inspection of nailing, bolting, anchoring and other fastening	☐	06 10 00, 06 17 00, 06 17 53	☐	☒
SDC C, D, E, or F, refer to 1705.12.3 for exceptions 3. Cold-formed steel framing - of elements in seismic-force-resisting systems				
a. Inspection of welding operations of seismic-force-resisting systems	☐	05 40 00	☐	☒
b. Inspection of screw attachment, bolting, anchoring and other fastening	☐	05 40 00	☐	☒
SDC C, D, E or F; coord with 13.2.2 of ASCE 7 4. Designated seismic systems – Inspection systems requiring Seismic Qualification per ASCE 7. Verify label, anchorage and mounting conforms to certificate of compliance	☐	??	☐	☒

5. Architectural components				
a. Inspection of erection and fastening of exterior cladding	☐		☐	☒
b. Inspection of erection and fastening of interior and exterior nonbearing walls	☐		☐	☒
c. Inspection of erection and fastening of interior and exterior veneer	☐		☐	☒
d. Access floors – inspection of anchorage	☐		☐	☒
6. Mechanical and electrical components:				
SDC C, D, E or F a. Inspection of anchorage of electrical equipment for emergency power systems	☐		☐	☒
SDC E or F b. Inspection of anchorage installation or other electrical equipment	☐		☐	☒
SDC C, D, E or F c. Inspection of installation and anchorage of piping systems and associated mechanical units designed to carry hazardous materials	☐		☐	☒
SDC C, D, E, or F d. Inspection of installation and anchorage of ductwork designed to carry hazardous materials	☐		☐	☒
SDC, C, D, E, or F e. Inspection of installation and anchorage of vibration isolation systems	☐		☐	☒
SDC, C, D, E, or F f. Inspection of installation of mechanical and electrical equipment where automatic fire sprinkler systems are installed to verify clearances	☐		☐	☒
SDC B, C, D, E or F 7. Seismic isolation system: Inspection during fabrication and installation of isolator units and energy dissipation devices that are part of the seismic isolation system	☐		☐	☒
SDC D, E or F 8. Cold-formed steel special bolted moment frames: Inspection during installation of frames part of the seismic isolation system	☐		☐	☒

Seismic Resistance Structural Testing				
1. Structural steel:				
SDC B, C, D, E, or F a. Seismic force-resisting systems: Non-destructive testing in accordance with quality assurance requirements of AISC 341	☐	05 12 00	☐	☐
b. Structural steel elements: nondestructive testing in accordance with the quality assurance requirements of AISC 341	☐	05 12 00	☐	☐
SDC B, C, D, E, or F 2. Nonstructural Components: Confirm certification of compliance of seismic qualification for supports and attachments has been submitted by manufacturer for specified systems	☐		☐	☐
SDC C, D, E or F 3. Designated seismic systems: Confirm certification of compliance of seismic qualification has been submitted for designated seismic systems	☐	??	☐	☐
SDC B, C, D, E, or F 4. Seismic isolation systems: Testing per ASCE 7, Section 17.8	☐		☐	☐

Structural Observations				
One or more of: RC IV; high-rise building; special structures as determined by RDP; required by building official 1. Structural observations for structures	☐			
SDC D, E, or F where RC III or IV or SDC E where RC I or II and > 2 stories above grade plane 2. Structural observations for seismic resistance	☐			
V = 130 mph or greater and RC III or IV 3. Structural observations for wind resistance	☐			

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

B. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

C. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

D. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

E. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project Site.

F. "Provide": Furnish and install, complete and ready for the intended use.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

1. When the building code in effect for the Project cites a different edition, comply with the building code-cited edition.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AA - Aluminum Association (The); www.aluminum.org.
2. AABC - Associated Air Balance Council; www.aabc.com.
3. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
4. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
5. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
6. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
7. ABBA - Air Barrier Association of America; www.airbarrier.org.
8. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
9. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
10. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
11. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
12. AF&PA - American Forest & Paper Association; www.afandpa.org.
13. AGA - American Gas Association; www.aga.org.
14. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
15. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
16. AI - Asphalt Institute; www.asphaltinstitute.org.
17. AIA - American Institute of Architects (The); www.aia.org.
18. AISC - American Institute of Steel Construction; www.aisc.org.
19. AISI - American Iron and Steel Institute; www.steel.org.
20. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
21. ALSC - American Lumber Standard Committee, Incorporated; www.alsc.org.
22. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
23. ANSI - American National Standards Institute; www.ansi.org.
24. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
25. APA - APA - The Engineered Wood Association; www.apawood.org.
26. APA - Architectural Precast Association; www.archprecast.org.
27. API - American Petroleum Institute; www.api.org.
28. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
29. ARI - American Refrigeration Institute; (See AHRI).
30. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
31. ASCE - American Society of Civil Engineers; www.asce.org.
32. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
33. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
34. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
35. ASNT - American Society for Nondestructive Testing (The); www.asnt.org
36. ASSE - American Society of Safety Engineers (The); www.asse.org.
37. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
38. ASTM - ASTM International; www.astm.org.
39. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
40. AWCI - Association of the Wall and Ceiling Industry; www.awci.org.

41. AWEA - American Wind Energy Association; www.awea.org.
42. AWI - Architectural Woodwork Institute; www.awinet.org.
43. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
44. AWPA - American Wood Protection Association; www.awpa.com.
45. AWS - American Welding Society; www.aws.org.
46. AWWA - American Water Works Association; www.awwa.org.
47. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
48. BIA - Brick Industry Association (The); www.gobrick.com.
49. BICSI - BICSI, Inc.; www.bicsi.org.
50. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.com.
51. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
52. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bwfbadminton.org.
53. CDA - Copper Development Association; www.copper.org.
54. CE – Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/.
55. CEA - Canadian Electricity Association; www.electricity.ca.
56. CEA - Consumer Electronics Association; www.ce.org.
57. CFFA - Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
58. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
59. CGA - Compressed Gas Association; www.cganet.com.
60. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
61. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
62. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
63. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
64. CPA - Composite Panel Association; www.pbmdf.com.
65. CPPA – (Formerly: Corrugated Polyethylene Pipe Association; a Division of the Plastic Pipe Institute); www.plasticpipe.org/drainage/.
66. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
67. CRRC - Cool Roof Rating Council; www.coolroofs.org.
68. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
69. CSA - Canadian Standards Association; www.csa.ca.
70. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
71. CSI - Construction Specifications Institute (The); www.csinet.org.
72. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
73. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
74. CWC - Composite Wood Council; (See CPA).
75. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
76. DHI - Door and Hardware Institute; www.dhi.org.
77. ECA - Electronic Components Association;(See ECIA).
78. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
79. ECIA – Electronic Components Industry Association; www.eciaonline.org.
80. EIA - Electronic Industries Alliance; (See TIA).
81. EIMA - EIFS Industry Members Association; www.eima.com.
82. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
83. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
84. ESTA - Entertainment Services and Technology Association; (See PLASA).
85. ETL - Intertek (See Intertek); www.intertek.com.
86. EVO - Efficiency Valuation Organization; www.evo-world.org.

87. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
88. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
89. FM Approvals - FM Approvals LLC; www.fmglobal.com.
90. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
91. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
92. FSA - Fluid Sealing Association; www.fluidsealing.com.
93. FSC - Forest Stewardship Council U.S.; www.fscus.org.
94. FSEC - Florida Solar Energy Center; www.fsec.ucf.edu.
95. GA - Gypsum Association; www.gypsum.org.
96. GANA - Glass Association of North America; www.glasswebsite.com.
97. GS - Green Seal; www.greenseal.org.
98. HI - Hydraulic Institute; www.pumps.org.
99. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
100. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
101. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
102. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
103. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
104. IAS – International Accreditation Service; www.iasonline.org.
105. IAS - International Approval Services; (See CSA).
106. ICBO - International Conference of Building Officials; (See ICC).
107. ICC - International Code Council; www.iccsafe.org.
108. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
109. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
110. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
111. IEC - International Electrotechnical Commission; www.iec.ch.
112. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
113. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
114. IESNA - Illuminating Engineering Society of North America; (See IES).
115. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
116. IGCC - Insulating Glass Certification Council; www.igcc.org.
117. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
118. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
119. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
120. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
121. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
122. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
123. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
124. ISO - International Organization for Standardization; www.iso.org.
125. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
126. ITU - International Telecommunication Union; www.itu.int/home.
127. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
128. LMA - Laminating Materials Association; (See CPA).
129. LPI - Lightning Protection Institute; www.lightning.org.

130. MBMA - Metal Building Manufacturers Association; www.mbma.com.
131. MCA - Metal Construction Association; www.metalconstruction.org.
132. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
133. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
134. MHIA - Material Handling Industry of America; www.mhia.org.
135. MIA - Marble Institute of America; www.marble-institute.com.
136. MMPA - Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); www.wmmpa.com.
137. MPI - Master Painters Institute; www.paintinfo.com.
138. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
139. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
140. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
141. NADCA - National Air Duct Cleaners Association; www.nadca.com.
142. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
143. NALP – National Association of Landscape Professionals (Formerly Professional Landcare Network); www.landscapeprofessionals.org.
144. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
145. NBI – New Buildings Institute; www.newbuildings.org.
146. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
147. NCMA - National Concrete Masonry Association; www.ncma.org.
148. NEBB - National Environmental Balancing Bureau; www.nebb.org.
149. NECA - National Electrical Contractors Association; www.necanet.org.
150. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
151. NEMA - National Electrical Manufacturers Association; www.nema.org.
152. NETA - InterNational Electrical Testing Association; www.netaworld.org.
153. NFHS - National Federation of State High School Associations; www.nfhs.org.
154. NFPA - National Fire Protection Association; www.nfpa.org.
155. NFPA - NFPA International; (See NFPA).
156. NFRC - National Fenestration Rating Council; www.nfrc.org.
157. NHLA - National Hardwood Lumber Association; www.nhla.com.
158. NICET - National Institute for Certification in Engineering Technologies; www.nicet.org.
159. NLGA - National Lumber Grades Authority; www.nlga.org.
160. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
161. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
162. NRCA - National Roofing Contractors Association; www.nrca.net.
163. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
164. NSF - NSF International; www.nsf.org.
165. NSPE - National Society of Professional Engineers; www.nspe.org.
166. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
167. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
168. NWFA - National Wood Flooring Association; www.nwfa.org.
169. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
170. PDI - Plumbing & Drainage Institute; www.pdionline.org.
171. PLANET - Professional Landcare Network; (See NALP).
172. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
173. PTI - Post-Tensioning Institute; www.post-tensioning.org.
174. RCSC - Research Council on Structural Connections; www.boltcouncil.org.

175. RFCI - Resilient Floor Covering Institute; www.rfci.com.
176. RIS - Redwood Inspection Service; www.redwoodinspection.com.
177. SAE - SAE International; www.sae.org.
178. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
179. SDI - Steel Deck Institute; www.sdi.org.
180. SDI - Steel Door Institute; www.steeldoor.org.
181. SEFA - Scientific Equipment and Furniture Association; www.sefalabs.com.
182. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
183. SGCC - Safety Glazing Certification Council; www.sgcc.org.
184. SIA - Security Industry Association; www.siaonline.org.
185. SJI - Steel Joist Institute; www.steeljoist.org.
186. SMA - Screen Manufacturers Association; www.smainfo.org.
187. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
188. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
189. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
190. SPIB - Southern Pine Inspection Bureau; www.spib.org.
191. SPRI - Single Ply Roofing Industry; www.spri.org.
192. SRCC - Solar Rating and Certification Corporation; www.solar-rating.org.
193. SSINA - Specialty Steel Industry of North America; www.ssina.com.
194. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
195. STI - Steel Tank Institute; www.steeltank.com.
196. SWI - Steel Window Institute; www.steelwindows.com.
197. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
198. TABB - Testing, Adjusting and Balancing Bureau; www.tabbcertified.org.
199. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
200. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
201. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
202. TIA - Telecommunications Industry Association; (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
203. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
204. TMS - The Masonry Society; www.masonrysociety.org.
205. TPI - Truss Plate Institute; www.tpinst.org.
206. TPI - Turfgrass Producers International; www.turfgrasssod.org.
207. TRI - Tile Roofing Institute; www.tileroofing.org.
208. UFAC - Upholstered Furniture Action Council; www.ufac.org.
209. UL - Underwriters Laboratories Inc.; www.ul.com.
210. ULC - Underwriters Laboratories of Canada; www.ulc.ca.
211. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
212. USAV - USA Volleyball; www.usavolleyball.org.
213. USBA - United States Badminton Association; www.usabadminton.org.
214. USGBC - U.S. Green Building Council; www.usgbc.org.
215. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
216. WA – Wallcoverings Association; www.wallcoverings.org.
217. WASTEC - Waste Equipment Technology Association; www.wastec.org.
218. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
219. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
220. WDMA - Window & Door Manufacturers Association; www.wdma.com.

221. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); www.wicnet.org.
222. WMMPA - Wood Moulding & Millwork Producers Association; (See MMPA).
223. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
224. WWPA - Western Wood Products Association; www.wwpa.org.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
2. ICC - International Code Council; www.iccsafe.org.
3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; http://quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FCC - Federal Communications Commission; www.fcc.gov.
9. FG - Federal Government Publications; www.gpo.gov.
10. GSA - General Services Administration; www.gsa.gov.
11. HUD - Department of Housing and Urban Development; www.hud.gov.
12. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; http://eetd.lbl.gov.
13. NIST - National Institute of Standards and Technology; www.nist.gov.
14. OSHA - Occupational Safety & Health Administration; www.osha.gov.
15. SD - Department of State; www.state.gov.
16. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
17. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
18. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
19. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
20. USP - U.S. Pharmacopeia; www.usp.org.
21. USPS - United States Postal Service; www.usps.com.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. ADAAG - Accessibility Guidelines for Buildings and Facilities, Available from United States Access Board; www.access-board.gov.
2. AHERA - Asbestos Hazard Emergency Response Act, Available from US Environmental Protection Agency; www.epa.gov.
3. BCNYS - Building Code of New York State, Available from New York State Department of State; www.dos.ny.gov/DCEA/.
4. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
5. IBC - International Building Code, Available from International Code Council; www.iccsafe.org.
6. LEED - Leadership in Energy and Environmental Design (Green Building Rating Systems), Available from U.S. Green Building Council; www.usgbc.org.
7. NEC - National Electrical Code, Available from NFPA (National Fire Protection Association); www.nfpa.org.
8. NSPC - National Standard Plumbing Code, Available from Plumbing-Heating-Cooling Contractors Association; www.phccweb.org.
9. NYSED/MPS - New York State Education Department Manual of Planning Standards, Available from New York State Education Department (Facilities Planning); www.p12.nysed.gov/facplan/forms.html.
10. USAB - United States Access Board; www.access-board.gov.
11. UFAS - Uniform Federal Accessibility Standards Available from Access Board; www.access-board.gov.
12. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF - State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. NYSDEC - New York State Department of Environmental Conservation; www.dec.ny.gov.
3. NYSDOH - New York State Department of Health; www.health.ny.gov.
4. NYSDOT - New York State Department of Transportation; www.dot.ny.gov.
5. NYSED - New York State Education Department (Facilities Planning); www.p12.nysed.gov/facplan/.
6. NYSERDA - New York State Energy Research and Development Authority; www.nyserda.ny.gov.
7. OSHPD - Office of Statewide Health Planning and Development (State of California); www.oshpd.ca.gov.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.

2. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request.

   a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

B. The use of asbestos containing building materials is prohibited.

1. Contractor is responsible for providing closeout documentation certifying no asbestos containing building materials have been used in the Work.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for review and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Warranty periods related to Boilers and Accessory Equipment, and Air Conditioning Equipment do not begin until one year after the date of substantial completion.
3. See individual Specification Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.

5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Products:

a. Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

2. Manufacturers:

a. Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers, or a product by an unnamed manufacturer that complies with requirements. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents,that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

3. Evidence that proposed product provides specified warranty.

4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.

5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Examination of conditions.
2. Preparation for construction.
3. Construction layout.
4. Field engineering and surveying.
5. Installation of the Work.
6. Cutting and patching.
7. Progress cleaning.
8. Starting and adjusting.
9. Protection of installed construction.
10. Correction of the Work.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor / professional engineer, as applicable.
B. Structural Layout Plan: Survey of Structural Grid in relation to existing building(s).

1.5 CLOSEOUT SUBMITTALS

A. Certificates: Submit certificate signed by land surveyor / professional engineer, as applicable, certifying that location and elevation of improvements comply with requirements.
B. Certified Surveys: Submit two copies signed by land surveyor / professional engineer, as applicable.

1.6 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

C. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly.

B. General: Engage a land surveyor / professional engineer, as applicable, to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Architect and Construction Manager when deviations from required lines and levels exceed allowable tolerances.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

1. Structural Layout Plan: Perform Survey of Structural Grid as provided in Contract Documents, including any specific Layout Notes and/or Plan. Provide Structural Layout Plan for review by Engineer prior to performing any additional work.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.

5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

2. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."
B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.

    1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Architect may issue "Construction Deficiency Report" for items identified by Architect as needing correction. Promptly repair or remove and replace defective construction identified in Construction Deficiency Report. Provide written notification to Architect when identified item has been corrected.

C. Restore permanent facilities used during construction to their specified condition.

D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. All Submittals identified in Section 01 77 00 are classified as “Informational Submittals” in accordance with Specification Section 01 33 00.

1.3 SUBSTANTIAL COMPLETION PROCEDURES

A. Submittals Prior to Substantial Completion: Complete the following before Contract-scheduled date of Substantial Completion:

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, electrical inspection reports, preliminary balance reports, and similar releases.

2. Submit notarized letter on Contractor’s letterhead certifying no asbestos containing building materials have been used in the Work. Also include a copy in the Operation and Maintenance Manuals.

3. Submit testing, adjusting, and balancing records. Also include a copy in the Operation and Maintenance Manuals.

4. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

B. Procedures Prior to Substantial Completion: Complete the following before Contract-scheduled date of Substantial Completion:

1. Advise Owner of pending insurance changeover requirements.

2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

3. Complete startup and testing of systems and equipment.

4. Perform preventive maintenance on equipment used prior to Substantial Completion. Maintenance to be performed by a factory authorized service representative so as not to void the equipment warranty.

5. Advise Owner of changeover in heat and other utilities.

6. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.

7. Complete all items on any Field Observation and Construction Deficiency Reports and submit a copy of the reports to the Architect and Construction Manager identifying how each item was addressed in detail, including the date of completion.

8. Complete final cleaning requirements as specified below, including touchup painting.

9. Repair and restore marred exposed finishes to eliminate visual defects.

10. Complete all items noted as requiring completion/correction from the Commissioning consultant and TAB (Testing and Balancing) consultant.

C. Inspection: No later than 14 days prior to the Contract-scheduled date of Substantial Completion, submit a letter to the Architect and Construction Manager confirming the work is on schedule for Substantial Completion by the contract specified date. No later than seven days after Contract-scheduled date of Substantial Completion (including authorized adjustments), the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. Absent the Contractor letter confirming readiness of work, the Architect may elect to postpone the Substantial Completion inspection.

1. Additional Inspections: Request additional Substantial Completion inspections when the work that was not complete for the scheduled Substantial Completion inspection is now ready to inspect.

    a. Costs for such additional Substantial Completion inspections will be deducted from sums otherwise due the Contractor by deduct Change Order.

2. Results of completed inspection will form the basis of requirements for final completion.

1.4 FUNCTIONAL COMPLETION PROCEDURES

A. Functional Completion applies to Contract Work being Commissioned. The commissioning of Divisions 01, 22, 23, and 26 (as applicable to each Contractor) must be complete prior to Functional Completion, except for the following:

1. Deferred Work approved in writing by the Architect.
2. Control system training planned to be performed after occupancy and final acceptance.

3. Any required seasonal TAB work to be formed during Warranty period.
4. Other approved deferred testing.

B. Completion of Commissioning required to demonstrate Functional Completion includes the following as applicable for all systems, but is not limited to:

1. Completed and signed pre-functional checklists and start-up documentation.
2. Requested trend logs complete, data and forms submitted and approved.
3. Completion of all functional testing.
4. Required training of Owner personnel completed and approved.
5. Submission of final approved TAB report.
6. Submission of final approved commissioning report.
7. Submission of the approved O&M manuals.
8. All identified deficiencies have been corrected or are approved in writing by the Owner to be excepted from this milestone.

C. The Architect will determine the date of Functional Completion after reviewing the Commissioning Agent's recommendation for Functional Completion.

1.5 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before final inspection for determining final completion, complete the following:

1. Submit copy of Architect's Substantial Completion inspection list of items to be completed or corrected. The copy of the list shall state that each item has been completed or otherwise resolved for acceptance, what corrective action was taken, and the date of completion. Items that are in dispute shall have an explanation attached.

2. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training."

3. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, property surveys, and similar final record information.

4. Submit closeout submittals specified in individual Specification Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

5. Submit maintenance material submittals specified in individual Specification Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Contractor to provide a transmittal detailing all delivered maintenance materials and obtain Owner signature confirming delivery of such; a copy of transmittal with Owner's signature shall be provided with Closeout submittals. Label with manufacturer's name and model number where applicable. All keys shall be tagged and labeled.

6. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

7. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."

B. Inspection: No later than seven days after the Contract-scheduled date for final completion, Architect and Construction Manager will proceed with the final completion inspection. The Architect will review the final Certificate for Payment after the inspection or will notify the Contractor of the outstanding items that must be completed or corrected before the certificate will be processed.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete has been completed or corrected. The Owner and Architect and Construction Manager reserve the right to add items to the Substantial Completion and final completion inspection lists as long as it is part of the Contractor's work. Complete all Contract requirements prior to the final completion inspection to avoid any further re-inspection cost.

a. Costs for such reinspections and any costs for extension of the Architect's and Construction Manager's services will be deducted from sums otherwise due the Contractor.

1.6 SUBMITTAL OF PROJECT WARRANTIES

A. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual. Warranties for all equipment, materials, and systems on the Project are to start no sooner than the date of substantial completion. Provide extended warranties for all equipment, materials, and systems that may have been turned over to the Owner for its use regardless of the phased completion of the Project.

B. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit two digital media copies, PDF on thumb drive.

C. Warranties in Paper Form:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

4. Submit two paper copies, as listed above.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Remove surface dust and dirt from all vertical and horizontal painted surfaces. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

g. Sweep concrete floors broom clean in unoccupied spaces using sweeping compound that is compatible with new finishes.

h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.

j. Remove labels that are not permanent.

k. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.

p. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to condition acceptable to Construction Manager.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

   a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Manual Format: Submit operation and maintenance manuals in the following format:

1. Two paper copies as listed below.
2. Two digital media copies, PDF format on thumb drive.

B. Prior to submission of paper copies and thumb drives as listed above, submit electronic files in PDF format for review and approval.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

    b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.

4. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

B. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.5 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title Page: Include the following information:

    a. Subject matter included in manual.
    b. Name and address of Project.
    c. Date of submittal.
    d. Name and contact information for Contractor.

2. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

    a. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

3. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1.6 OPERATION AND MAINTENANCE MANUALS

A. Operation Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.

    a. Product name and model number. Use designations for products indicated on Contract Documents.
    b. Manufacturer's name.
    c. Equipment identification with serial number of each component.
    d. Equipment function.
    e. Complete nomenclature and number of replacement parts.

2. Operating Procedures: Include the following, as applicable:

    a. Startup procedures.
    b. Routine and normal operating instructions.
    c. Regulation and control procedures.
    d. Normal shutdown instructions.
    e. Seasonal and weekend operating instructions.
    f. Special operating instructions and procedures.

3. Emergency Procedures: Include the following, as applicable:

    a. Instructions on stopping.
    b. Shutdown instructions for each type of emergency.
    c. Operating instructions for conditions outside normal operating limits.
    d. Special operating instructions and procedures.

4. Wiring diagrams.

5. Control diagrams.

6. Piped system diagrams.

    a. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

7. Precautions against improper use.

8. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

B. Maintenance Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, manufacturers' maintenance documentation, maintenance and service schedules, spare parts list and source information, maintenance service contracts, repair materials and sources, and warranties and bonds, as described below.

1. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

2. Product Information: Include the following, as applicable:

    a. Product name and model number.
    b. Manufacturer's name.
    c. Color, pattern, and texture.
    d. Material and chemical composition.
    e. Reordering information for specially manufactured products.

3. Maintenance Procedures: Include manufacturer's written recommendations and the following:

    a. Inspection procedures.
    b. Types of cleaning agents to be used and methods of cleaning.
    c. List of cleaning agents and methods of cleaning detrimental to product.
    d. Schedule for routine cleaning and maintenance.
    e. Repair instructions.

4. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

    a. Standard maintenance instructions and bulletins.
    b. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
    c. Identification and nomenclature of parts and components.
    d. List of items recommended to be stocked as spare parts.

5. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

    a. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
    b. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

6. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

7. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

8. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

9. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

    a. Include procedures to follow and required notifications for warranty claims.

1.7 MANUAL PREPARATION

A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

    1. Do not use original project record documents as part of operation and maintenance manuals.

D. Submittals: Include copy of each product submittal approved by Architect.

    1. If the “As-Specified Verification Form” was used as the product submittal, include all pertinent product data as described in this Section.

E. Safety Data Sheets (SDS): Include copy of SDS for each product installed.

F. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Miscellaneous record submittals.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Contractor to submit a full set of marked-up record drawings pertaining to their contract. Provide each drawing, whether or not changes and additional information were recorded. Comply with the following:

1. Submit one full size set of the original, marked-up record prints.
2. Submit two digital media copies, in color, in PDF format on thumb drives. PDFs to be saved and submitted as one file.
3. Prior to submission of paper copies and thumb drives as listed above, submit electronic files in PDF format for review and approval.

B. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities.

1. Submit two paper copies of each submittal.

1.4 RECORD DRAWINGS

A. Record Prints: Architect will provide Contractor with one paper set of Contract Drawings at beginning of Work at no cost.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

   a. Dimensional changes to Drawings.
   b. Revisions to details shown on Drawings.
   c. Revisions to routing of piping and conduits.
   d. Revisions to electrical circuitry.
   e. Locations of concealed internal utilities.
   f. Changes made by Addendum.
   g. Changes made by Architect's Supplemental Instruction (ASI) forms.
   h. Changes made by Change Order or Construction Change Directive.
   i. Changes made following Architect's written orders.

3. Mark record sets with red, permanent marker.

B. Record Digital Data Files: Prepare a full set of digital data files of the Contract Drawings from the marked-up record prints.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Indicate name of Contractor.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.

2. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.

1.5 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.6 RECORDING AND MAINTENANCE

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's , Construction Manager's and Owner's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Instruction in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

1.3 CLOSEOUT SUBMITTALS

A. Attendance Record: For each demonstration and training session, submit list of participants, subjects covered, and length of instruction time.

B. Demonstration and Training Video Recordings: Submit two copies of each demonstration and training session.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name of Architect.
c. Name of Construction Manager.
d. Name of Contractor.
e. Name of service representative providing training.
f. Name of instructor.
g. Date of video recording.

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

1.6 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training for each system and for equipment not part of a system, as required by individual Specification Sections. Include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

   a. System, subsystem, and equipment descriptions.
   b. Operating standards.

2. Documentation: Review the following items in detail:

   a. Manuals.
   b. Warranties and bonds.

3. Operations: Include the following, as applicable:

   a. Startup procedures.
   b. Routine and normal operating instructions.
   c. Regulation and control procedures.
   d. Safety procedures.
   e. Normal shutdown instructions.
   f. Operating procedures for emergencies.
   g. Seasonal and weekend operating instructions.
   h. Special operating instructions and procedures.

4. Adjustments: Include the following:

   a. Noise and vibration adjustments.
   b. Economy and efficiency adjustments.

5. Troubleshooting: Include the following:

   a. Diagnostic instructions.
   b. Test and inspection procedures.

6. Maintenance: Include the following:

   a. Types of cleaning agents to be used and methods of cleaning.
   b. Procedures for routine cleaning
   c. Procedures for preventive maintenance.
   d. Procedures for routine maintenance.

7. Repairs: Include the following:

   a. Diagnosis instructions.
   b. Repair instructions.

1.7 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Construction Manager, with at least seven days' advance notice.

1.8 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode.

1. Submit video recordings on thumb drive.

B. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 79 00

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

A. "Remove": Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
B. "Remove and Salvage": Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
C. "Remove and Reinstall": Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
D. "Existing to Remain": Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress.

3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
4. Review areas where existing construction is to remain and requires protection.

1.6 SUBMITTALS, GENERAL

A. General: Submit all informational submittals required by this Section concurrently.

1.7 INFORMATIONAL SUBMITTALS

A. Predemolition Photographs or Video: Show existing conditions, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit photos or video recordings on thumb drive before Work begins. Include copy of key plan indicating each photograph's or video's location and direction.

1. Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modification.

2. Photographs: Provide high-resolution color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels.

    a. Name each image with date photograph was taken, location, and unique sequential number keyed to accompanying key plan in file name.

3. Video: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels.

    a. Name each video recording with date video recording was recorded, location, and unique sequential number keyed to accompanying key plan in file name.

    b. Begin narration of each video recording with Contractor's name, videographer's name, and location in Project.

        1) Describe scenes on video recording by audio narration.
        2) Confirm date and time at beginning and end of recording.

1.8 CLOSEOUT SUBMITTALS

A. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.9 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.10 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.11 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

E. Record existing conditions by use of preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by demolition operations.

2. Inventory and record the condition of items to be removed and reinstalled. Provide photographs or video of conditions that might be misconstrued as damage caused by demolition operations.

F. Beginning selective demolition constitutes Contractor's acceptance of conditions.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off utilities with utility companies.

2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.

c. Equipment to Be Removed: Disconnect and cap services and remove equipment.

d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.

3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

4. Cover and protect furniture, furnishings, and equipment that have not been removed.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

5. Maintain adequate ventilation when using cutting torches.

6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

9. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and restore items to functional condition adequate for intended reuse.

2. Pack or crate items after cleaning and restoring. Identify contents of containers.

3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for Removal of Resilient Floor Coverings."

E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Division 07 Sections for new roofing requirements.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 028200 - ASBESTOS REMOVAL

PART 1 GENERAL

1.1 SCOPE OF WORK

A. This asbestos abatement Project will consist of the removal and disposal of asbestos containing materials (ACM) and presumed asbestos containing materials (PACM) at the:
   1. Cornwall Elementary School - 99 Lee Road Cornwall, New York 12518
   2. Cornwall-On-Hudson Elem. School - 234 Hudson Street, Cornwall-On-Hudson, New York 12520
   3. Cornwall Central Middle School - 122 Main Street, Cornwall, New York 12518

B. The work shall include but not be limited to the removal of the following materials:
   1. Cornwall Elementary School
      a. Remove and dispose of chase walls & pipe insulation & mudded fittings on plumbing and heating piping behind walls. Typ. For 30 lin. ft. of TSI & 60 sq. ft. of wall.
      b. Remove and dispose of all electrical wiring, lighting fixtures, boxes and the like. Typ. for 4 light fixtures & 100 lin. ft. of wiring.
   2. Cornwall-On-Hudson Elem. School
      a. Remove and dispose of chase walls & pipe insulation & mudded fittings on plumbing and heating piping behind walls. Typ. for 250 lin. ft. of tsi & 1,200 sq. ft. of wall.
      b. Remove and dispose of textured plaster wall coating and underlying wall plaster. Typ. for 1,400 sq. ft.
      c. Remove and dispose of all electrical wiring, lighting fixtures, boxes and the like. Typ. for 17 light fixtures & 1,000 lin. ft. of wiring.
      d. Remove and dispose of ceilings and pipe insulation & mudded fittings on piping above ceilings. Typ. for 140 sq. ft. of ceilings. TSI quantity included in item 'a.' above.
      e. Remove and dispose of exterior window caulking. All caulking shall be removed in its entirety from window frames and from adjacent building substrates to remain. Window frames may be disposed of as general construction debris after removal and cleaning of all acm caulk & transite panels from frames. Typ. for 1,030 lin. ft. of caulking.
      f. Remove and dispose of transite spandrel panels. Typ. for 1,500 sq. ft.
   3. Cornwall Central Middle School
      a. Remove and dispose of chase walls & pipe insulation & mudded fittings on plumbing and heating piping behind walls. Typ. for 220 lin. ft. of TSI & 800 sq. ft. of wall.
      b. Remove and dispose of all electrical wiring, lighting fixtures, boxes and the like. Typ. for 12 light fixtures & 300 lin. ft. of wiring.
      c. Remove and dispose of ceiling tile & underlying adhesive. Typ. for 100 sq. ft.
      d. Remove and dispose of 12x12 and underlying 9x9 floor tile. Typ. for 100 sq. ft.

C. The Contractor shall be aware of all conditions of the Project and is responsible for verifying quantities and locations of all Work to be performed. Failure to do so shall not relieve the Contractor of its obligation to furnish all labor and materials necessary to perform the Work.

D. All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply.

E. Working hours shall be as required and approved by the Owner. Asbestos abatement activities including, but not limited to, work area preparation, gross removal activities, cleaning activities, waste removal, etc. may need to be performed during 'off-hours' (including nights and weekends). In addition, multiple mobilizations may be required to perform the work identified in this project. The Contractor shall coordinate and schedule all Work with the facility and Owner's representative.

1.2 SPECIAL JOB CONDITION

A. All final air clearances associated with this project must be run by TEM, as described in 40 CFR Part 763 Asbestos, Subpart E, 763.90 and as per New York State Education Department Requirements.

1.3 PERMITS AND COMPLIANCE

A. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local laws, rules, and regulations pertaining to Work practices, protection of Workers, authorized visitors to the site, persons, and property adjacent to the Work.

B. Perform asbestos related Work in accordance with New York State Industrial Code Rule 56 (herein referred to as Code Rule 56), 40 CFR 61, and 29 CFR 1926. Where more stringent requirements are specified, adhere to the more stringent requirements.

C. The Contractor must maintain current licenses, permits and certifications pursuant to New York State Department of Labor and Department of Environmental Conservation for all Work related to this Project, including the removal, handling, transport, and disposal of asbestos containing materials.

D. The Contractor must have and submit proof upon request that any persons employed by the Contractor to engage in or supervise Work on any asbestos Project have a valid NYS asbestos handling certificate pursuant to Code Rule 56.

E. The Contractor shall comply fully with any Variance secured from regulatory agencies by the Owner in the performance of the Work. Any Variance applications previously submitted are included as an appendix of this specification.

F. The Contractor shall be responsible for obtaining all Variances as may be required for the Project or as requested by the Owner. Approval of the Owner is required prior to submission of a Variance application to any regulatory agency. Failure to obtain Owner approval may result in Owner not permitting variance to be used on the project.

G. The Contractor shall be responsible for compliance with The New York State Uniform Fire Prevention and Building Code, or its successor during all Work at the site.

H. Failure to adhere to the Project Documents shall constitute a breach of the Contract and the Owner shall have the right to and may terminate the Contract provided, however, the failure of the Owner to so terminate shall not relieve the Contractor from future compliance.

1.4 SUBMITTALS

A. Pre-Work Submittals: Within 7 days prior to the pre-construction conference, the Contractor shall submit 3 copies of the documents listed below, with 1 copy going directly to the Owner for review and approval prior to the commencement of asbestos abatement activities:
   1. Contractor license issued by New York State Department of Labor.
   2. A list of Projects performed within the past two (2) years including the dollar value of all Projects. Provide Project references to include Owner, consultant, and air monitoring firm's name, contact persons, address, and phone number.
   3. Progress Schedule:
      a. Show the complete sequence of abatement activities and the sequencing of Work within each building or building section.
      b. Show the dates for the beginning and completion of each major element of Work including substantial completion dates for each Work Area, building, or phase.

4. Project Notifications: As required by Federal and State regulatory agencies together with proof of transmittal (i.e. certified mail return receipt).
5. Building Occupant Notification: As required by regulatory agencies.
6. Abatement Work Plan: Provide plans that clearly indicate the following:
   a. All Work Areas/containments numbered sequentially.
   b. Locations and types of all decontamination enclosures.
   c. Entrances and exits to the Work Areas/containments.
   d. Type of abatement activity/technique for each Work Area/containment.
   e. Number and location of negative air units and exhaust. Also provide calculations for determining number of negative air pressure units.
   f. Location of water and electrical connections to building services.
   g. Waste transport routes through the building to the waste storage container.
7. Disposal Site/Landfill Permit from applicable regulatory agency.
8. NYS Department of Environmental Conservation Waste Transporter Permit.

B. On-Site Submittals: Refer to Part 3.1.C & D for all submittals, documentation, and postings required to be maintained on-site during abatement activities.

C. Project Close-out Submittals: Within 30 days of the completion of each abatement phase, the Contractor shall submit one copy of the documents listed below to Owner and one copy to the envirionmental consultant for review and approval prior to Contractor's final payment. Once Owner approves the close-out submittal, the Contractor shall provide three sets of the approved close-out documents (double-sided and bound) to Owner Project Management, including one set to be distributed to the facility.
1. All waste disposal manifests and disposal logs
2. OSHA compliance air monitoring records conducted during the Work.
3. Daily progress log, including the entry/exit log.
4. Provide the Contractor's Acknowledgement Statement that lists all Workers used in the performance of the Project, including name and NYS DOL certification number. The Statement shall be notarized (Original notarized statement shall be sent to Owner).
5. Disposal Site/Landfill Permit from applicable regulatory agency.
6. Project notifications, amended notifications, Variances.

1.5 PRE-CONSTRUCTION CONFERENCE

A. Prior to start of preparatory Work under this Contract, the Contractor shall attend a pre-construction conference attended by Owner, Facility Personnel, and Environmental Consultant.

B. Agenda for this conference shall include but not necessarily be limited to:
1. Contractor's scope of Work, Work plan, and schedule to include number of workers and shifts.
2. Contractor's safety and health precautions including protective clothing and equipment and decontamination procedures.
3. Environmental Consultant's duties, functions, and authority.
4. Contractor's Work procedures including:
   a. Methods of job site preparation and removal methods.
   b. Respiratory protection.
   c. Disposal procedures.
   d. Cleanup procedures.
   e. Fire exits and emergency procedures.
5. Contractor's required pre-work and on-site submittals, documentation, and postings.
6. Contractor's plan for twenty-four (24) hour Project security both for prevention of theft and for barring entry of unauthorized personnel into Work Areas.
7. Temporary utilities.
8. Handling of furniture and other moveable objects.

9. Storage of removed asbestos containing materials.
10. Waste disposal requirements and procedures, including use of the Owner supplied waste manifest.

C. In conjunction with the conference the Contractor shall accompany the Owner and Environmental Consultant on a pre-construction walk-through documenting existing condition of finishes and furnishings, reviewing overall Work plan, location of fire exits, fire protection equipment, water supply and temporary electric tie-in.

1.6 APPLICABLE STANDARDS AND REGULATIONS

A. The Contractor shall comply with the following codes and standards, except where more stringent requirements are shown or specified:

B. Federal Regulations:
1. 29 CFR 1910.1001, "Asbestos" (OSHA)
2. 29 CFR 1910.1200, "Hazard Communication" (OSHA)
3. 29 CFR 1910.134, "Respiratory Protection" (OSHA)
4. 29 CFR 1910.145, "Specification for Accident Prevention Signs and Tags" (OSHA)
5. 29 CFR 1926, "Construction Industry" (OSHA)
6. 29 CFR 1926.1101, "Asbestos, Tremolite, Anthophyllite, and Actinolite" (OSHA)
7. 29 CFR 1926.500 "Guardrails, Handrails and Covers" (OSHA)
8. 40 CFR 61, Subpart A, "General Provisions" (EPA)
9. 40 CFR 61, Subpart M, "National Emission Standard for Asbestos" (EPA)
10. 49 CFR 171-172, Transportation Standards (DOT)

C. New York State Regulations:
1. 12 NYCRR, Part 56, "Asbestos", Industrial Code Rule 56 (DOL)
2. 6 NYCRR, Parts 360, 364, Disposal and Transportation (DEC)
3. 10 NYCRR, Part 73, "Asbestos Safety Program Requirements" (DOH)
4. “New York State Uniform Fire Prevention and Building Code”
5. New York State Education Department – Manual of Planning Standards

D. Standards and Guidance Documents:
1. American National Standard Institute (ANSI) Z88.2-80, Practices for Respiratory Protection
2. ANSI Z9.2-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems
3. EPA 560/585-024, Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book)
4. EPA 530-SW-85-007, Asbestos Waste Management Guidance
5. ASTM Standard E1368 “Standard Practice for Visual Inspection of Asbestos Abatement Projects”

1.7 NOTICES

A. The Contractor shall provide notification of intent to commence asbestos abatement activities as indicated below.

1. At least ten (10) Working days prior to beginning abatement activities, send written notification to:
U.S. Environmental Protection Agency
National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Coordinator
26 Federal Plaza
New York, NY 10007

2. At least ten (10) days prior to beginning abatement activities send written notification to:
New York State Department of Labor
Division of Safety and Health, Asbestos Control Program.
State Office Campus
Building 12 - Room 161B
Albany, NY 12240

B. The Contractor is required to send notifications to regulatory agencies via electronic, mail, or package delivery service that will provide proof of delivery and receipt.

C. The Contractor shall be responsible for maintaining current project filings with regulatory agencies for the duration of the project.

D. The Contractor shall post and/or provide Building Occupant Notification at least 10 days prior to beginning abatement activities as required by Code Rule 56.

1.8 PROJECT MONITORING AND AIR SAMPLING

A. The Owner shall engage the services of an Environmental Consultant (the Consultant) who shall serve as the Owner's Representative in regard to the performance of the asbestos abatement Project and provide direction as required throughout the entire abatement Project period. The consultant and all subconsultants shall not have any contractual relationship with the Contractor for the duration of the asbestos project.

B. The Contractor is required to ensure cooperation of its personnel with the Consultant for the air sampling and Project monitoring functions described in this section. The Contractor shall comply with all direction given by the Consultant during the course of the Project.

C. The Consultant shall provide the following administrative services:
1. Review and approve or disapprove all submittals, shop drawings, schedules, and samples.
2. Assure that all notifications to governmental agencies by the Contractor are submitted in a timely manner and are correct in content.

D. The Consultant shall staff the Project with a trained and certified person(s) to act on the Owner's behalf at the job site. This individual shall be designated as the Abatement Project Monitor (APM).
1. The APM shall be on-site at all times the Contractor is on-site. The Contractor shall not be permitted to conduct any Work unless the APM is on-site (except for inspection of barriers and negative air system during non-working days).
2. The APM shall have the authority to direct the actions of the Contractor verbally and in writing to ensure compliance with the Project documents and all regulations. The APM shall have the authority to Stop Work when gross Work practice deficiencies or unsafe practices are observed, or when ambient fiber concentrations outside the removal area exceed .01 f/cc or background level.
   a. Such Stop Work order shall be effective immediately and remain in effect until corrective measures have been taken and the situation has been corrected.
   b. Standby time and air sample collection and analysis required to resolve the situation shall be at the Contractor's expense.
3. The APM shall provide the following services:
   a. Inspection of the Contractor's Work, practices, and procedures, including temporary protection requirements, for compliance with all regulations and Project specifications.
   b. Provide abatement Project air sampling as required by applicable regulations (NYS, AHERA) and the Owner. Sampling will include, but not be limited to background, work area preparation, asbestos handling, final cleaning, and clearance air sampling.

c. Verify daily that all Workers used in the performance of the Project are certified by the appropriate regulatory agency.
d. Monitor the progress of the Contractor's Work, and report any deviations from the schedule to the Owner.
e. Monitor, verify, and document all waste load-out operations including placement of generator and location labels on each waste container, as required by federal regulations.
f. Verify that the Contractor is performing personal air monitoring daily, and that results are being returned and posted at the site as required.
g. The APM shall maintain a log on site that documents all project related and Consultant and Contractor actions, activities, and occurrences.
h. Verify landfill to be used for waste disposal with waste transporter(driver) and Contractor prior to waste trailer/dumpster leaving site. Confirm the waste transporter firm and landfill are listed on the regulatory notifications for the project and the waste transport vehicle license number is listed on the current NYS DEC Waste Transporter permit.

4. The following minimum inspections shall be conducted by the APM, accompanied by the Contractor's supervisor. Additional inspections shall be conducted as required by Project conditions and/or the Owner's direction. Progression from one phase of Work to the next by the Contractor is only permitted with the written approval of the APM.
   a. Pre-Construction Inspection: The purpose of this inspection is to verify the existing conditions of the Work Areas and to document these conditions.
   b. Pre-Commencement Inspection: The purpose of this inspection is to verify the integrity of each containment system prior to disturbance of any asbestos containing material. This inspection shall take place only after the Work Area is fully prepped for removal.
   c. Work Inspections: The purpose of this inspection is to monitor the Work practices and procedures employed on the Project and to monitor the continued integrity of the containment system. Inspections within the removal areas shall be conducted by the APM during all preparation, removal, and cleaning activities at least twice every Work shift. Additional inspections shall be conducted as warranted.
   d. Pre-Encapsulation Inspection: The purpose of this inspection is to ensure the complete removal of Asbestos Containing Material (ACM), from all surfaces in the Work Area prior to encapsulation.
   e. Visual Clearance Inspection: The purpose of this inspection is to verify that: all materials in the scope of work have been properly removed; no visible asbestos debris/residue remains; no pools of liquid or condensation remains; and all required cleanings are complete. This inspection shall be conducted before final air clearance testing.
   f. Post-Clearance Inspection: The purpose of this inspection is to ensure the complete removal of ACM, including debris, from the Work Area after satisfactory final clearance sampling and removal of all isolation and critical barriers and equipment from the Work Area.
   g. Punch List Inspection: The purpose of this inspection is to verify the Contractor's certification that all Work has been completed as contracted and the existing condition of the area prior to its release to the Owner.

E. The Consultant shall provide abatement Project air sampling and analysis as required by applicable regulations (New York State and/or AHERA). Sampling will include but is not limited to, background, work area preparation, asbestos handling, and final cleaning and clearance air sampling.
   1. Unless otherwise required by applicable regulations, the Consultant shall have samples analyzed by Phase Contrast Microscopy (PCM). Results shall be available within 24 hours of completion of sampling.
   2. Samples shall be collected as required by applicable regulations (New York State and/or AHERA) and these specifications. If Transmission Electron Microscopy (TEM) clearance air sampling is utilized by the owner, the clearance criteria and sampling protocols must be in compliance with AHERA. If PCM air sample analysis results exceed the satisfactory clearance criteria, then TEM analysis of the entire set of clearance air samples may be used, provided that a standard

NIOSH/ELAP accepted laboratory analysis method is utilized that shall report each air sample result in fibers per cubic centimeter.

3. If the air sampling during any phase of the abatement project reveals airborne fiber levels at or above .01 fibers/cc or the established background level, whichever is greater, outside the regulated Work Area, Work shall stop immediately and corrective measures required by Code Rule 56 shall be initiated. Notify all employers and occupants in adjacent areas. The Contractor shall bear the burden of any and all costs incurred by this delay.
4. The Environmental Consultant shall submit copies of all elevated air sampling results collected during abatement and all final air clearance results to the Commissioner of Labor, as required by regulation.
5. All final air clearances associated with this project must be run by TEM, as described in 40 CFR Part 763 Asbestos, Subpart E, 763.90 and as per New York State Education Department Requirements.

1.9 CONTRACTOR AIR SAMPLING

A. In addition to the requirements of OSHA 1926.1101, the Contractor shall be required to perform personal air monitoring every Work shift in each Work Area during which abatement activities occur in order to determine that appropriate respiratory protection is being worn and utilized.

B. The Contractor shall conduct air sampling that is representative of both the 8-hour time weighted average and 30-minute short-term exposures to indicate compliance with the permissible exposure and excursion limits.

C. The Contractor's laboratory analysis of air samples shall be conducted by an NYS DOH ELAP approved laboratory. The consultant shall not collect or analyze the Contractor's air samples.

D. Results of personnel air sample analyses shall be available, verbally, within twenty-four (24) hours of sampling and shall be posted upon receipt. Written laboratory reports shall be delivered and posted at the Work site within five (5) days. Failure to comply with these requirements may result in all work being stopped until compliance is achieved.

1.10 PROJECT SUPERVISOR

A. The Contractor shall designate a full-time Project Supervisor who shall meet the following qualifications:
   1. The Project Supervisor shall hold New York State certification as an Asbestos Supervisor.
   2. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.1101 and shall have a minimum of one year experience as a supervisor.
   3. The Project Supervisor must be able to speak, read, and write English fluently, as well as communicate in the primary language of the Workers.

B. If the Project Supervisor is not on-site at any time whatsoever, all Work shall be stopped. The Project Supervisor shall remain on-site until the Project is complete. The Contractor may not remove the Project Supervisor from the Project without the written consent of the Owner and the Environmental Consultant; however the Project Supervisor shall be removed from the Project if so requested by the Owner.

C. The Project Supervisor shall maintain the bound Daily Project Log and the entry/exit logs as required by New York State Department of Labor and section 2.3 of the specifications and the Waste Disposal Log (Appendix B) required by section 4.3 of the specifications.

D. The Project Supervisor shall be responsible for the performance of the Work and shall represent the Contractor in all respects at the Project site. The Supervisor shall be the primary point of contact for the Asbestos Project Monitor.

1.11 MEDICAL REQUIREMENTS

A. Before exposure to airborne asbestos fibers, provide Workers with a comprehensive medical examination as required by 29 CFR 1910.1001, and 29 CFR 1926.1101.
   1. This examination is not required if adequate records show the employee has been examined as required by 29 CFR 1910.1001, and 29 CFR 1926.1101 within the past year.
   2. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving potential disturbance of asbestos fibers.

1.12 TRAINING

A. As required by applicable regulations, prior to assignment to asbestos Work instruct each employee with regard to the hazards of asbestos, safety and health precautions, and the use and requirements of protective clothing and equipment.

B. Establish a respirator program as required by ANSI Z88.2 and 29 CFR 1910.134, and 29 CFR 1926.1101. Provide respirator training and fit testing.

1.13 RESPIRATORY PROTECTION

A. Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH).

B. Respirators shall be individually fit-tested to personnel under the direction of an Industrial Hygienist on a yearly basis. Fit-tested respirators shall be permanently marked to identify the individual fitted, and use shall be limited to that individual.

C. Where fiber levels permit, and in compliance with regulatory requirements, Powered Air Purifying Respirators (PAPR) are the minimum allowable respiratory protection permitted to be utilized during gross removal operations of OSHA Class I or OSHA Class II friable ACM.

D. No respirators shall be issued to personnel without such personnel participating in a respirator training program.

E. High Efficiency Particulate Air (HEPA) respirator filters shall be approved by NIOSH and shall conform to the OSHA requirements in 29 CFR 1910.134 and 29 CFR 1926.1101.

F. A storage area for respirators shall be provided by the Contractor in the clean room side of the personnel decontamination enclosure where they will be kept in a clean environment.

G. The Contractor shall provide and make available a sufficient quantity of respirator filters so that filter changes can be made as necessary during the work day.

H. Filters used with negative pressure air purifying respirators shall not be used any longer than one eight (8) hour work day. Any loose respirator filters found within the regulated area, must be disposed of as asbestos waste.

I. Any authorized visitor, Worker, or supervisor found in the Work Area not wearing the required respiratory protection shall be removed from the Project site and not be permitted to return.

J. The Contractor shall have at least two (2) Powered Air Purifying Respirators stored on site designated for authorized visitors use. Appropriate respirator filters for authorized visitors shall be made available by the Contractor.

1.14 DELIVERY AND STORAGE

A. Deliver all materials to the job site in original packages with containers bearing manufacturer's name and label.

B. Store all materials at the job site in a suitable and designated area.
   1. Store materials subject to deterioration or damage away from wet or damp surfaces and under cover.
   2. Protect materials from unintended contamination and theft.
   3. Storage areas shall be kept clean and organized.

C. Remove damaged or deteriorated materials from the job site. Materials contaminated with asbestos shall be disposed of as asbestos debris as herein specified. This includes unused Contractor supplies located in the regulated work area.

1.15 TEMPORARY UTILITIES

A. Shut down and lock out all electrical power to the asbestos Work Areas, including lighting circuits. Any electrical power passing through the Work Areas that can't be shut down due to health and safety reasons, shall be protected as per the requirements of Industrial Code Rule 56.

B. Provide temporary 120-240 volt, single phase, three wire, 100 amp electric service with Ground Fault Circuit Interrupters (GFCI) for all electric requirements within the asbestos Work Area.
   1. Where available, obtain from Owner's existing system. Otherwise provide power from other sources (i.e. generator).
   2. Provide temporary wiring and "weatherproof" receptacles in sufficient quantity and location to serve all HEPA equipment and tools.
   3. Provide wiring and receptacles as required by the Environmental Consultant for project monitoring and air sampling equipment (pumps, fans, leaf blowers, etc.).
   4. All power to the Work Area shall be brought in from outside the area through GFCI's at the source.

C. Provide temporary lighting with "weatherproof" fixtures for all Work Areas including decontamination chambers.
   1. The entire Work Area shall be kept illuminated at all times.
   2. Provide lighting as required by the Environmental Consultant for the purposes of performing required inspections.

D. All temporary devices and wiring used in the Work Area shall be capable of decontamination procedures including HEPA vacuuming and wet-wiping.

E. Utilize domestic water service, if available, from Owner's existing system. Provide hot water heaters with sufficient capacity to meet Project demands.

PART 2 PRODUCTS

2.1 PROTECTIVE CLOTHING

A. Provide personnel utilized during the Project with disposable protective whole body clothing, head coverings, gloves and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber for comfort, but shall not be used alone. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape, or provide disposable coverings with elastic wrists or tops.

B. Provide sufficient quantities of protective clothing to assure a minimum of four (4) complete disposable outfits per day for each individual performing abatement Work.

C. Eye protection and hard hats shall be provided and made available for all personnel entering any Work Area.

D. Authorized visitors shall be provided with suitable protective clothing, headgear, eye protection, and footwear whenever they enter the Work Area.

2.2 SIGNS AND LABELS

A. Provide warning signs and barrier tapes at all approaches to asbestos Work Areas. Locate signs at such distance that personnel may read the sign and take the necessary protective steps required before entering the area.
1. Provide danger signs in vertical format conforming to 29 CFR 1926.1101, minimum 20" x 14" displaying the following legend.

DANGER
ASBESTOS CANCER AND LUNG DISEASE
HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

2. Provide 3" wide yellow barrier tape printed with black lettered, "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos Work Area. Install tape 3' to 4' AFF.

B. Provide asbestos danger labels affixed to all asbestos materials, scrap, waste, debris and other products contaminated with asbestos.
1. Provide asbestos danger labels of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

2. Provide the following asbestos labels, of sufficient size to be clearly legible, for display on waste containers (bags or drums) which will be used to transport asbestos contaminated material in accordance with United States Department of Transportation 49 CFR Parts 171 and 172: (Note: Include "RQ" for friable asbestos waste only.)

RQ, NA2212, (WASTE) ASBESTOS, 9, PGIII

3. Generator identification information shall be affixed to each waste container or any packaging used to containerize asbestos waste indicating the following printed in indelible ink:
Generator Name
Facility Name
Facility Address
Date

2.3 DAILY PROJECT LOG & WORK AREA ENTRY/EXIT LOG

A. Provide a bound Daily Project Log. The log shall contain on title page the Project name; name, address and phone number of Owner; name, address and phone number of Environmental Consultant; name,

address and phone number of Abatement Contractor; emergency numbers including, but not limited to local Fire/Rescue department and all other New York State Department of Labor requirements.

B. All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted.

C. All persons entering and exiting the Work Area shall sign the entry/exit log and include name, certification number, and time.

D. The Project Supervisor shall document all Work performed daily and note all inspections required by Code Rule 56, i.e. testing and inspection of barriers and enclosures.

2.4 SCAFFOLDING AND LADDERS

A. Provide all scaffolding and/or staging as necessary to accomplish the Work of this Contract. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding and ladders shall comply with all applicable OSHA construction industry standards.

B. Provide scaffolding and ladders as required by the Environmental Consultant for the purposes of performing required inspections.

2.5 SURFACTANT (AMENDED WATER)

A. Wet all asbestos-containing materials prior to removal with surfactant mixed and applied in accordance with manufacturer's printed instructions.

2.6 ENCAPSULANT

A. Encapsulant shall be tinted or pigmented so that application when dry is readily discernible.

B. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

2.7 WASTE DISPOSAL BAGS, DRUMS, AND CONTAINERS

A. Provide 6 mil polyethylene disposal bags printed with asbestos caution labels. Bags shall also be imprinted with U.S. Department of Transportation required markings.

B. Provide 30 or 55 gallon capacity fiber, plastic, or metal drums capable of being sealed air and water tight if asbestos waste has the potential to damage or puncture disposal bags. Affix asbestos caution labels on lids and at one-third points around drum circumference to assure ready identification.

C. Containers and bags must be labeled accordance with 40 CFR Part 61 NESHAPS and Code Rule 56. When the bags/containers are moved to the holding area, lockable trailer, or lockable hardtop dumpster from the waste decontamination system washroom, each bag/container must also be appropriately labeled with the date moved in waterproof markings.

D. Labeled ACM waste containers or bags shall not be used for non-ACM waste or trash. Any material placed in labeled containers or bags, whether turned inside out or not shall be handled and disposed of as ACM waste.

2.8 HEPA VACUUM EQUIPMENT

A. All vacuuming performed under this contract shall be performed with High Efficiency Particulate Air (HEPA) filter equipped industrial vacuums conforming to ANSI Z9.2.

2.9 POWER TOOLS

A. Any power tools used to drill, cut into, or otherwise disturb asbestos material shall be manufacturer equipped with HEPA filtered local exhaust ventilation.

2.10 FIRE RETARDANT PLASTIC SHEETING

A. All polyethylene (plastic) sheeting used on the Project (including but not limited to sheeting used for critical and isolation barriers, fixed objects, walls, floors, ceilings, waste container) shall be at least 6 mil fire retardant sheeting.

B. Decontamination enclosure systems shall utilize at least 6 mil opaque fire retardant plastic sheeting. At least 2 layers of 6 mil reinforced fire retardant plastic sheeting shall be used for the flooring.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Should visible emissions or water leaks be observed outside the Work Area, immediately stop Work and institute emergency procedures per Code Rule 56. Should there be elevated fiber levels outside the Work Area, immediately stop Work, institute emergency procedures per Code Rule 56, and notify all employers and occupants in adjacent areas. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Owner.

B. Valid NYS DOL Asbestos Handler certification cards shall be on site prior to admittance of any Contractor's employees to the asbestos Work Area.

C. The following submittals, documentation, and postings shall be maintained on-site by the Contractor during abatement activities at a location approved by the Abatement Project Monitor:
1. Valid Contractor handling license issued by New York State Department of Labor.
2. NYS DOL Asbestos Handler certification cards for each person employed in the removal, handling, or disturbance of asbestos.
3. Daily OSHA personal air monitoring results.
4. NYS Department of Health ELAP certification for the laboratory that will be analyzing the OSHA personnel air samples.
5. NYS Department of Environmental Conservation Waste Transporter Permit.
6. Project documents (specifications and drawings.)
7. Notifications, Variances, Approved Work Plan. Ensure that the most up-to-date notifications and Variances are on-site.
8. Applicable regulations.
9. Material Safety Data Sheets of supplies/chemicals used on the Project.
10. Disposal Site/Landfill Permit from applicable regulatory agency.
11. List of emergency telephone numbers.
12. Magnahelic manometer semi-annual calibration certification.
13. Waste Disposal Log.
14. Daily Project Log.
15. Entry/Exit Logs.

D. The following documentation shall be maintained on-site by the Abatement Project Monitor during abatement activities:
   1. Valid Contractor handling license issued by New York State Department of Labor.
   2. Air Sample Log.
   3. Air sample results.
   4. Project Monitor Daily Log
   5. Asbestos Survey Report.
   6. A copy of ASTM Standard E1368 "Standard Practice for Visual Inspection of Asbestos Abatement Projects."
   7. Calibration chart for rotometer(s) used on-site.

E. The Work Area must be vacated by building occupants prior to decontamination enclosure construction and Work Area preparation.

F. All demolition necessary to access asbestos containing materials for removal must be conducted within negative pressure enclosures by licensed asbestos handlers. Demolition debris may be disposed of as construction and demolition debris provided the Abatement Project Monitor determines that it is not contaminated with asbestos and there has been no disturbance of ACM within the enclosure. If the demolition debris is determined to be contaminated or ACM has been disturbed, it must be disposed of as asbestos waste.

3.2 PERSONNEL DECONTAMINATION ENCLOSURE

A. Provide personnel decontamination enclosure contiguous to the Work Area or as per Variance. The decontamination enclosure shall be attached to the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public it shall be fully framed, sheathed, and lockable to prevent unauthorized entry.

B. Access to the Work Area will be from the clean room through an air-lock to the shower and through an air lock to the equipment room. Each airlock shall be a minimum of three feet from door to door. Additional air locks shall be provided as required by Code Rule 56 for remote decontamination enclosures.

C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil fire retardant plastic sheeting. Two layers of reinforced fire retardant plastic sheeting shall be used to cover the floor.

D. The entrance to the clean room shall have a lockable door with adequate small openings for Work Area make-up air. Provide suitable lockers for storage of Worker's street clothes. Storage for respirators along with replacement filters and disposable towels shall also be provided.

E. Provide a temporary shower with individual hot and cold water supplies and faucets. Provide a sufficient supply of soap and shampoo. There shall be one shower for every six Workers. The shower room shall be constructed in such a way so that travel through the shower chamber shall be through the shower. The shower shall not be able to be bypassed.

F. Shower water shall be drained, collected and filtered through a system with at least a 5.0 micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.

G. The equipment room shall be used for the storage of tools and equipment. A walk-off pan filled with water shall be located in the Work Area outside the equipment room for Workers to clean foot coverings when

leaving the Work Area. A labeled 6 mil plastic ACM waste bag for collection of contaminated clothing shall be located in this room.

H. The personal decontamination enclosure shall be cleaned and disinfected minimally at the end of each Work shift and as otherwise directed by the Asbestos Project Monitor.

3.3 WASTE DECONTAMINATION ENCLOSURE

A. Provide a waste decontamination enclosure contiguous to the Work area. The decontamination enclosure shall be attached to the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public it shall be fully framed, sheathed, and lockable to prevent unauthorized entry.

B. The waste decontamination enclosure system shall consist of a holding area, air lock and washroom. The airlock shall be a minimum of three feet from door to door. The entrance to the holding area shall have a lockable door.

C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil fire retardant plastic sheeting on walls and ceiling. Two layers of reinforced fire retardant plastic sheeting shall be used to cover the floor.

D. Where there is only one egress from the Work Area, the holding area of the waste decontamination enclosure system may branch off from the personnel decontamination enclosure equipment room, which then serves as the waste wash room.

E. The waste wash room water shall be drained, collected, and filtered through a system with at least a 5.0 micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.

F. In small asbestos Projects where only one egress from the Work Area exists, the shower room may be used as a waste washroom. In this instance, the clean room shall not be used for waste storage, but shall be used for waste transfer to carts, which shall immediately be removed from this enclosure.

3.4 WORK AREA ENTRY AND EXIT PROCEDURES

A. Access to and from the asbestos Work Area is permitted only through the personnel decontamination enclosure unless otherwise stipulated in a Site Specific Variance.

B. Workers shall sign the entry/exit log upon every entry and exit.

C. The following procedures shall be followed when entering the Work Area:
   1. Before entering the Work Area, Workers shall proceed to the clean room, remove all street clothes, and don protective clothing, equipment, and respirators.
   2. Workers shall proceed from the clean room through the shower room and the equipment room and into the Work Area.

D. The following procedures shall be followed when exiting the Work Area:
   1. Before leaving the Work Area, gross asbestos contamination will be removed by brushing, wet cleaning and/or HEPA vacuuming, followed by use of the walk-off pan.
   2. In the equipment room, Workers shall remove disposable clothing, but not respirators, and shall place clothing in plastic disposal bags for disposal as contaminated debris prior to entering the shower room. Reusable equipment shall be removed and stored in the equipment room (e,g, work boots).

3. Workers shall shower thoroughly while wearing respirators, then wash respirator with soap and water prior to removal.
4. Upon exiting the shower, Workers shall enter the clean room and don new disposable clothing if the Work shift is to continue or street clothes to exit area. Under no circumstances shall Workers enter public non-Work Areas in disposable protective clothing.

E. If remote decontamination enclosures are permitted by Code Rule 56 or a Site Specific Variance, workers shall wear two disposable suits for all phases of Work. Workers exiting the work area shall HEPA vacuum the outer suit, enter the airlock, remove the outer suit and then place it back into the Work Area. A clean second suit shall be donned before exiting the airlock and proceeding to the decontamination enclosure or another work area via the designated pathway required by Code Rule 56.

3.5 WORK AREA PREPARATION

A. Asbestos danger signs shall be posted at all approaches to the asbestos Work Area. Post all emergency exits as emergency exits only on the Work Area side, post with asbestos caution signs on the non-Work Area side. Provide all non-Work Area stairs and corridors accessible to the asbestos Work Area with warning tapes at the base of stairs and beginning of corridors. Warning tapes shall be in addition to caution signs.

B. Shut down and lock out the building heating, ventilating, and air conditioning systems. Electrical systems and circuits shall also be shut down unless permitted to remain active per Code Rule 56 and appropriately protected and labeled. Existing lighting sources shall not be utilized. Provide temporary electric power and lighting as specified herein.

C. All non-ACM surfaces and objects within the Work Area shall be pre-cleaned using HEPA vacuuming and/or wet-wiping methods. Dry sweeping and any other methods that raise dust shall be prohibited. ACM shall not be disturbed during pre-cleaning.

D. Movable objects within the Work Area shall be HEPA vacuumed and/or wet-wiped and removed from the Work Area.

E. All non-movable equipment in the Work Area shall be completely covered with 2 layers of fire retardant plastic sheeting, at least 6 mil in thickness, and secured in place with duct tape and/or spray adhesive. Active Fire Protection System components in the Work Area shall not be covered with fire retardant plastic sheeting or any other obstruction.

F. Provide enclosure of the asbestos Work Area necessary to isolate it from unsealed areas of the building in accordance with the approved asbestos Work plan and as specified herein.

G. Provide critical barriers by sealing off all openings including but not limited to operable windows and skylights, doorways, diffusers, grills, electrical outlets and boxes, doors, floor drains, and any other penetrations to surfaces in the Work Area enclosure, using 2 layers of at least 6 mil fire retardant plastic sheeting.

H. Provide isolation barriers by installing temporary framing and sheathing at openings larger than 32 square feet forming the limits of the asbestos Work Area. Sheathing thickness must be a minimum of 3/8 inch and all sheathing shall be caulked and the Work Area side sealed with two layers of 6 mil fire retardant plastic sheeting. Isolation barriers in stairwells and at work area egress locations shall not be covered with sheathing, only two layers of 6 mil fire retardant plastic sheeting.

I. Isolation barriers shall be installed at all elevator openings in the Work Area. .Elevators running through the regulated abatement work area shall be shut down or isolated as per Code Rule 56. Elevator controls shall be modified so that elevators bypass the Work Area

J. Provide two independent layers of 6 mil fire retardant plastic sheeting over all floor, wall, and ceiling surfaces. Isolation barriers shall also be covered with two independent layers (for a total of four layers). Sheeting shall be secured with duct tape. All joints in fire retardant plastic sheeting shall overlap 12" minimum. Carpeting left in place shall be covered with 3/8 inch plywood sheathing prior to plasticizing.

K. Unless otherwise specified for removal, the Contractor shall either protect all fiberglass insulation on piping, ductwork, tanks, etc. in the Work Area using two layers of six mil fire retardant plastic sheeting or remove the insulation as asbestos containing waste. If the Contractor elects to remove the fiberglass insulation as asbestos-contaminated, he/she shall be responsible for reinsulation if reinsulation of removed insulations is part of the Contract or Project.

L. Frame out emergency exits from Work Area. Provide double layer 6 mil fire retardant plastic sheeting and tape seal opening. Post as emergency exits only and tape utility knife to the Work Area side of each exit. Within the Work Area, mark the locations and directions of emergency exits throughout the Work Area using exit signs and/or duct tape.

M. Remove all items attached to or in contact with ACM only after the Work Area enclosure is in place. HEPA vacuum and wet wipe with amended water all items prior to their removal from the Work Area and before the start of asbestos removal operations.

N. Suspended ceiling tiles shall only be removed after Work Area preparation is complete. If possible, non-contaminated ceiling tiles shall be HEPA vacuumed and removed from the Work Area before asbestos removals begin. Contaminated ceiling tiles shall be disposed of as asbestos waste.

3.6 NEGATIVE AIR PRESSURE FILTRATION SYSTEM

A. Provide a portable asbestos filtration system that develops a minimum pressure differential of negative 0.02 in. of water column within all full enclosure areas relative to adjacent unsealed areas and that provides a minimum of 4 air changes per hour in the Work Area during abatement and 6 air changes for non-friable flooring and/or mastic removal.

B. Such filtration systems must be made operational after critical and isolation barriers are installed but before wall, floor, and ceilings are plasticized and shall be operated 24 hours per day during the entire Project until the final cleanup is completed and satisfactory results of the final air samples are received from the laboratory.

C. The system shall include a series of pre-filters and filters to provide High Efficiency Particulate Air (HEPA) filtration of particles down to 0.3 microns at 100% efficiency and below 0.3 microns at 99.9% efficiency. Provide sufficient replacement filters to replace pre-filters every 2 hours, secondary pre-filters every 24 hours, and primary HEPA filters every 600 hours (25 continuous days) of operation. HEPA filter sides shall be marked with installation date during all new HEPA filter installations on project.

D. A minimum of one additional filtration unit of at least the same capacity as the primary unit(s) shall be installed and fully functional to be used during primary unit (s) filter changing and in case of primary failure.

E. At no time will the unit exhaust indoors, within 15 feet of a receptor, including but not limited to windows and doors, or adversely affect the air intake of the building. Exhaust ducting shall not exceed 25' in length, except as allowed by Industrial Code Rule 56. Provide construction fencing at ground level exhaust termination locations per Code Rule 56.

F. Upon electric power failure or shut-down of any filtration unit, all abatement activities shall stop immediately and only resume after power is restored and all filtration units are fully operating. For shut-downs longer than one hour, all openings into the Work Area, including the decontamination enclosures, shall be sealed.

G. For all OSHA Class I removal Work Areas, the Contractor shall provide a manometer to verify negative air pressure. Manometers shall be read twice daily and recorded within the Daily Project Log.

H. There shall be at least a 4 hour settling period after the Work Area is fully prepared and the negative filtration units have been started to ensure integrity of the barriers.

I. Once installed and operational, the Contractor's Supervisor shall conduct daily inspections of the Work Area to insure the airtight integrity of the enclosure and operation of the negative air system. Findings shall be recorded within the Daily Project Log. Inspections shall also be conducted on days when no abatement activities are in progress per Code Rule 56 (i.e. weekends).

3.7 REMOVAL OF ASBESTOS CONTAINING MATERIALS

A. Asbestos-containing materials shall be removed in accordance with the Contract Documents and the approved Asbestos Work Plan. Only one type of ACM shall be abated at a time within a Work Area. Where there are multiple types of ACM requiring abatement, Code Rule 56 procedures for sequential abatement shall be followed.

B. Sufficiently wet asbestos materials with a low pressure, airless fine spray of surfactant to ensure full penetration prior to material removal. Re-wet material that does not display evidence of saturation.

C. One Worker shall continuously apply amended water while ACM is being removed.

D. Perform cutting, drilling, abrading, or any penetration or disturbance of asbestos containing material in a manner to minimize the dispersal of asbestos fibers into the air. Use equipment and methods specifically designed to limit generation of airborne asbestos particles. All power operated tools used shall be provided with manufacturer HEPA equipped filtered local exhaust ventilation, as required by regulation.

E. Upon removal of ACM from the substrate, the newly exposed surfaces shall be HEPA vacuumed and/or wet cleaned. Surfaces must be thoroughly cleaned using necessary methods and any required solvents to completely remove any adhesive, mastic, etc.

F. All removed material shall be placed into 6 mil plastic disposal bags or other suitable container upon detachment from the substrate. Cleanup of accumulations of loose debris or waste shall be performed whenever there is enough accumulation to fill a single bag or container and minimally at the end of each workshift.

G. Large components shall be wrapped in two layers of 6 mil fire retardant plastic sheeting. Sharp components likely to tear disposal bags shall be placed in fiber drums or boxes and then wrapped with sheeting.

H. Power or pressure washers are not permitted for asbestos removal or clean-up procedures unless approved in a Site Specific Variance and allowed by owner.

I. All open ends of pipe and duct insulation not scheduled for removal shall be encapsulated using lag cloth.

J. All construction and demolition debris determined by the Environmental Consultant to be contaminated with asbestos shall be handled and disposed of as asbestos waste.

K. The use of metal shovels, metal dust pans, etc. are not permitted inside the work area.

3.8 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION AND REMOVAL PROCEDURES

A. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the Work Area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. The persons in the Work Area shall not enter the airlock. No gross removal operations are permitted when waste transfer is in progress.

B. The containers and equipment shall be removed from the airlock by persons stationed in the washroom during waste removal operations. The external surfaces of containers and equipment shall be cleaned a second time by wet cleaning.

C. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated 6 mil plastic bags or sheeting, as the item's physical characteristics demand, and sealed airtight.

D. The clean recontainerized items shall be moved into the airlock that leads to the holding area. Workers in the washroom shall not enter this airlock.

E. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from the holding area.

F. The cleaned containers of asbestos material and equipment shall be placed in water tight carts with doors or tops that shall be closed and secured. These carts shall be held in the holding until transfer to the waste container. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

G. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.

H. Where the waste removal enclosure is part of the personnel decontamination enclosure, waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.

3.9 WORK AREA DECONTAMINATION, CLEANING, AND CLEARANCE PROCEDURES

A. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed unless modified by a Site Specific Variance.

B. First Cleaning:
1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
2. All surfaces in the Work Area shall be wet cleaned, except active fire protection system components that may be damaged by water. A wet-purpose shop vacuum may be used to pick up excess liquid, and may either be decontaminated prior to removal from the Work Area or disposed of as asbestos waste.
3. The Abatement Project Monitor (APM) shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
4. The Contractor shall then apply a thin coat of encapsulant to all surfaces in the Work Area that were not the subject of removal. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results. Encapsulants shall be pigmented or tinted to provide an indication for completeness of coverage. The APM shall determine adequacy of coverage.

5. After the encapsulant has been applied and the required waiting/settling / drying time has elapsed, the first layer of fire retardant plastic sheeting shall then be removed and bagged as asbestos waste.

C. Second Cleaning
1. All surfaces in the Work Area shall be HEPA vacuumed and then wet cleaned. Wet cleaning of active fire protection system components is not necessary if damage may occur.
2. The APM shall conduct a second visual inspection of the Work Area for cleanliness.
3. After the required waiting/settling/drying time has elapsed, the second layer of fire retardant plastic sheeting shall be removed and bagged as asbestos waste.

D. Third Cleaning
1. All surfaces in the Work Area shall be HEPA vacuumed and then wet cleaned. Wet cleaning of active fire protection system components is not necessary if damage may occur.
2. After the required waiting/settling/drying time has elapsed, the APM shall conduct a third visual inspection of the Work Area for completeness of abatement and cleanliness. The APM shall document the results of the visual inspection in the Project Monitor Log and Contractor's Daily Project Log.
3. After satisfactory APM visual inspection, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant provided no visible asbestos debris/residue; pools of liquid, or condensation remains. NOTE: TEM samples should be used vs. PCM if demolition or other dust-generating evolutions are taking place in adjacent areas, as evident from excessive loading.
4. Upon receipt of satisfactory final clearance air sampling results, the negative air pressure equipment can then be shut down, and the isolation and critical barriers removed and bagged as asbestos waste. Following this and satisfactory inspections by the project supervisor and the APM for cleanliness, the decontamination enclosures shall be removed.

E. As a result of any visual inspection by the APM or should air sampling results indicate high fiber levels, the Contractor will reclean the affected areas at no additional expense to the Owner.

3.10 TENT ENCLOSURES

A. Tent enclosures may only be used where specifically permitted by Code Rule 56 or a Site Specific Variance issued by the NYS Department of Labor.

B. The Contractor shall restrict access to the immediate area where tent removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

C. Remote personnel decontamination enclosures shall be constructed. Configuration shall be as required by Project size and a washroom with attached airlock shall be constructed contiguous to the tent enclosure for small and large size tent enclosure work areas. For tent enclosures with gross abatement of friable materials, a contiguous decontamination system shall be constructed, maintained and utilized, except for minor size tent enclosure work areas where an adjacent decontamination room or area is permitted by Code Rule 56.

D. The Work Area shall be precleaned. All objects and equipment that will remain in the restricted area during abatement shall be sealed with two layers of six mil polyethylene and tape.

E. The tent shall be a single use barrier constructed with a rigid frame and at least two layers of six mil polyethylene unless one layer of six mil polyethylene is otherwise permitted by Code Rule 56. Tents with twenty (20) square feet or less of floor space or no gross removal of friable ACM shall be constructed of one (1) layer of six mil polyethylene and shall include walls, ceilings and a floor (except portions of walls, floors and ceilings that are the removal surface) with double folded seams. All seams shall be sealed airtight using duct tape and/or spray adhesive.

F. The tent shall be constructed with at least one airlock for worker/waste egress.

G. A manometer shall be used for all OSHA Class I abatement.

H. Negative air shall be maintained at four (4) air changes per hour for non-friable and glovebag abatement tent enclosure work areas. Eight (8) air changes shall be maintained for friable gross removal tent enclosure work areas. In a Minor size abatement tent enclosure work area a HEPA vacuum may be used to maintain the required air changes.

I. OSHA compliance air monitoring is required per section 1.9.

J. ACM removal shall follow procedures defined in section 3.7.

K. Waste material shall be placed in properly labeled 6 mil plastic bags or other appropriate containers. The outside of the bags or containers shall be wet wiped and/or HEPA vacuumed in the washroom and shall then be placed in a second bag/container before being transferred to the waste storage container. All transportation of waste bags and containers outside the Work Area shall be in watertight carts. These carts shall be held in the holding area until transfer to the waste container. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

L. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed.
   1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
   2. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
   3. The Contractor shall then apply a thin coat of encapsulant to all non-removal surfaces covered with plastic in the Work Area. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results. Encapsulants shall be pigmented or tinted to provide an indication for completeness of coverage. The APM shall determine adequacy of coverage.
   3. After the waiting/settling/drying time requirements have elapsed, the Asbestos Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement. The APM shall document the results of the visual inspection in the Project Monitor Log and Contractor's Daily Project Log.
   4. After satisfactory APM visual inspection, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
   5. Upon receipt of satisfactory final clearance air sampling results, the tent shall be collapsed into itself, placed in suitable disposal bags, and tranferred through the washroom to the waste decontamination enclosure. Isolation and critical barriers shall then be removed and bagged as asbestos waste followed by satisfactory visual inspections by the project supervisor and the APM for cleanliness.

3.11 GLOVEBAG REMOVAL

A. Glovebag removals may only be used as specifically permitted by Code Rule 56 or a Site Specific Variance issued by the NYS Department of Labor. Glovebags may only be used on pipe or duct insulation.

B. In addition to conformance with applicable regulations and variances, glovebag removals are only permitted to be conducted within tent enclosures complying with these specifications.

C. The Contractor shall restrict access to the immediate area where tent/glovebag removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

D. Remote personnel decontamination enclosures shall be constructed. Configuration shall be as required by Project size and a washroom with attached airlock shall be constructed contiguous to the tent enclosure.

E. Glovebag removals shall utilize commercially available glovebags of at least six mil thickness. Use shall be in accordance with the manufacturer's instructions and the following minimum requirements:
1. The sides of the glovebag shall be cut to fit the size pipe being removed. Tools shall be inserted into the attached tool pocket.
2. The glovebag shall be placed around the pipe and the open edges shall be folded and sealed with staples and duct tape. The glovebag shall also be sealed at the pipe to form a tight seal.
3. Openings shall be made in the glovebag for the wetting tube and HEPA vacuum hose. The opening shall be sealed to form a tight seal.
4. All glovebags shall be smoke tested by the Asbestos Project Monitor under negative pressure using the HEPA vacuum before removal operations commence. Glovebags that do not pass the smoke test shall be resealed and then retested.
5. After first wetting the materials to be removed, removal may commence. ACM shall be continuously wetted. After removal of the ACM, the piping shall be scrubbed or brushed so that no visible ACM remains. Open ends of pipe insulation shall be encapsulated.
6. After the piping is cleaned, the inside of the glovebag shall be washed down and the wetting tube removed. Using the HEPA vacuum, the glovebag shall be collapsed and then twisted and sealed with tape with the ACM at the bottom of the bag.
7. A disposal bag shall be placed around the glovebag that is then detached from the pipe. The disposal bag is then sealed and transferred through the washroom to the waste storage container.

F. After glovebag removals are complete, tent decontamination procedures shall be followed.

3.12 REMOVALS OF EXTERIOR NON-FRIABLE ACM

A. Except as modified by this section, removal of exterior non-friable ACM (i.e. roof flashings, built-up roofing, siding, caulking, glazing compound, transite, tars, sealers, coatings, and other NOB ACM) shall conform to all provisions of this specification.

B. Unless Site Specific Variances have been otherwise obtained, removals shall be conducted in accordance with the provisions of Code Rule 56.

C. The Work Area shall be the area from which ACM materials are being removed and shall extend 25 feet from the perimeter of the removal area.

D. Non-certified Workers are not allowed in the Work Area until the Work Area is cleared by the Asbestos Project Monitor (APM).

E. Remote personnel decontamination enclosures shall be constructed at a location in accordance with the approved Work Plan. Unless located outside the Work Area, decontamination enclosures are not permitted to be constructed on the roof. Decontamination enclosures shall be constructed as close to the regulated abatement work area as physically possible, but no greater than 50 feet from the building. It shall be cordoned off at a distance of 25 feet to separate it from public areas.

F. All openings (including but not limited to operable windows, doors, hatches, vents, ducts, and grilles) one story above, one story below, and within 25 feet of the work area shall be sealed with two layers of six mil polyethylene. Alternately, a polyethylene drape may be used instead of sealing windows individually where permitted by Code Rule 56.

G. The removal of the ACM may require the use of scrapers, solvents, mastic removal chemicals, or other methods/procedures to ensure complete removal.

H. The Contractor is required to provide temporary protection of the building (i.e. roof, window openings, construction joints, etc.) at the end of each Work shift so as to maintain the building in a watertight condition.

I. Dumpsters used for waste storage shall be lined with two layers of six mil polyethylene and shall have a hard top. Where open-top dumpsters are permitted by ICR 56 or a Site Specific Variance, the top shall be closed with polyethylene flaps that are sealed at the end of each work shift.

J. Personal protective equipment, including respirators, shall be utilized and worn during all removal operations until the Work Area is cleared by the APM.

K. The Owner may, at his discretion, choose to conduct air sampling. If air samples collected during abatement indicate any airborne asbestos fiber concentration(s) at or above 0.01 f/cc, Work shall be stopped immediately and Work methods shall be altered to reduce the airborne asbestos fiber concentration(s).

L. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed:
1. All surfaces in the Work Area shall be HEPA vacuumed and then wet cleaned.
2. The APM shall conduct a visual inspection of the Work Area for cleanliness and completeness of abatement. The APM shall document the results of the visual inspection in the Project Monitor Log and Contractor's Daily Project Log.
3. Upon satisfactory visual inspection results, the isolation and critical barriers shall be removed and bagged as asbestos waste. Following this, the decontamination enclosures shall be removed.

3.13 NON-FRIABLE FLOORING AND/OR MASTIC REMOVALS

A. The following procedures may only be used for the removal of non-friable flooring and/or mastic materials using manual and chemical methods. These procedures shall not apply to beadblaster use or other abrasive abatement methods.

B. The Contractor shall restrict access to the immediate Work Area where non-friable ACM removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

C. Remote personnel decontamination enclosures may be utilized and shall be constructed at a location in accordance with the approved Work Plan. A washroom with attached airlock shall be constructed contiguous to each Work area enclosure.

D. The Work Area shall be prepared per section 3.5, except that ceilings, walls, and floors need not be fully plasticized However, a four-foot high single layer of 6-mil fire retardant plastic sheeting shall be installed as a splashguard at all walls adjoining mastic removal portions of the work area, to prevent damage to the existing walls.

E. Negative air shall be maintained at six (6) air changes per hour.

F. OSHA compliance air monitoring is required per section 1.9.

G. ACM removal shall follow procedures defined in section 3.7.

H. Waste material shall be placed in properly labeled 6 mil plastic bags or other appropriate containers. The outside of the bags or containers shall be wet wiped and/or HEPA vacuumed in the washroom and double-bagged before being passed into the airlock. The bags or containers shall then be transported to the waste

storage container. All transportation of waste bags and containers outside the Work Area shall be in watertight carts.

I. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed.
   1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
   2. All plastic sheeting splashguards shall be removed and containerized, followed by all surfaces in the Work Area being wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
   3. The Contractor shall then apply a thin coat of encapsulant to all non-removal surfaces in the Work Area. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results. Encapsulants shall be pigmented or tinted to provide an indication for completeness of coverage. The APM shall determine adequacy of coverage.
   4. After the waiting/settliong/drying time requirements have elapsed, the Asbestos Project Monitor (APM) shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement. The APM shall document the results of the visual inspection in the Project Monitor Log and Contractor's Daily Project Log.
   5. After satisfactory APM visual inspection, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
   6. Upon receipt of satisfactory final clearance air sampling results, the isolation and critical barriers shall be removed and bagged as asbestos waste. Following this and satisfactory inspections by the project supervisor and the APM for cleanliness the decontamination enclosures shall be removed.

3.14 RESTORATION OF UTILITIES, FIRESTOPPING, AND FINISHES

A. After final clearance, remove locks and restore electrical and HVAC systems. All temporary power shall be disconnected, power lockouts removed and power restored. All temporary plumbing shall be removed.

B. Finishes damaged by asbestos abatement activities including, but not limited to, plaster/paint damage due to duct tape, staples, and spray adhesives, and floor tile lifted due to wet or humid conditions, shall be restored prior to final payment.
   1. Finishes unable to be restored shall be replaced under this Contract at the Contractor's expense.
   2. All foam and expandable foam products and materials used to seal Work Area openings shall be completely removed upon completion of abatement activities.

C. All penetrations (including, but not limited to, pipes, ducts, etc.) through fire rated construction shall be firestopped using materials and systems tested in accordance with ASTM E814 on Projects where reinsulation is part of the required work.

PART 4 DISPOSAL OF ASBESTOS WASTE

4.1 TRANSPORTATION AND DISPOSAL SITE

A. The Contractor's Hauler and Disposal Site shall be approved by the Owner. All waste generated during the asbestos project shall be disposed of as RACM asbestos waste.

B. The Contractor shall give twenty-four (24) hour notification prior to removing any waste from the site. Waste shall be removed from the site only during normal working hours unless otherwise specified. No waste may be taken from the site unless the Contractor and Environmental Consultant are present and the Environmental Consultant authorizes the release of the waste as described herein.

C. All waste generated as part of the asbestos project shall be removed from the site within ten (10) calendar days after successful completion of all asbestos abatement work.

D. Upon arrival at the Project Site, the Hauler must possess and present to the Environmental Consultant a valid New York State Department of Environmental Conservation Part 364 Asbestos Hauler's Permit. The Environmental Consultant may verify the authenticity of the hauler's permit with the proper authority.

E. The Hauler, with the Contractor and the Environmental Consultant, shall inspect all material in the transport container prior to taking possession and signing the Asbestos Waste Manifests.

4.2 WASTE STORAGE CONTAINERS

A. All waste containers shall be fully enclosed and lockable (i.e. enclosed dumpster, trailer, etc.). No open containers will be permitted on-site (i.e. open dumpster with canvas cover, etc.) unless specifically permitted by applicable regulation or a Site Specific Variance. When asbestos contaminated waste must be kept on the work site overnight or longer, it shall be double bagged and stored in accordance with Federal, State, and local laws.

B. The Environmental Consultant shall verify that the waste storage container and/or truck tags (license plates) match that listed on the New York State Department of Environmental Conservation Part 364 permit. Any container not listed on the permit shall be removed from the site immediately.

C. The container shall be plasticized and sealed with two (2) layers of 6 mil polyethylene. Once on site, it shall be kept locked at all times, except during load out. The waste container shall not be used for storage of equipment or contractor supplies.

D. While on-site, the container shall be labeled with EPA Danger signage:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

E. The New York State Department of Environmental Conservation Asbestos Hauler's Permit number shall be stenciled on both sides and back of the container.

F. The container is not permitted to be loaded unless it is properly plasticized, has the appropriate danger signage affixed, and has the permit number appropriately stenciled on the container.

G. Waste generated off-site is not permitted to be brought onto the Project site and loaded into the waste container.

H. All asbestos waste removed from the project site shall be transported directly to the disposal site without any addtional waste being added to the container during transport.

4.3 OWNER'S AND HAULER'S ASBESTOS WASTE MANIFESTS

A. An Asbestos Waste Manifest shall be provided to the Owner and shall be utilized in conjunction with the Asbestos Hauler's Manifest.

B. The Owner's Manifest and the Hauler's Manifest shall be completed by the Contractor and verified by the Environmental Consultant that all the information and amounts are accurate and the proper signatures are in place.

C. The Manifests shall have the appropriate signatures of the Environmental Consultant, the Contractor, and the Hauler representatives prior to any waste being removed from the site.

D. Copies of the completed Owner's Manifest and the Hauler's Manifest shall be retained by the Environmental Consultant and the Contractor and shall remain on site for inspection.

E. Upon arrival at the Disposal Site, the Owner's Manifest and the Hauler's Manifest shall be signed by the Disposal Facility operator to certify receipt of ACM covered by the manifest.

F. The Disposal Facility operator shall return the original Owner's Manifest and the Hauler's Manifest to the Contractor.

G. The Contractor shall forward copies of the Owner's Manifest and the Hauler's Manifest to the Environmental Consultant within 14 days of the waste container being removed from the site. Failure to do so may result in payment being withheld from the Contractor.

H. The Contractor shall utilize the Waste Disposal Log. This log shall be maintained by the Project Supervisor and shall be kept on site at all times.

I. All waste disposal manifests and disposal logs shall be submitted by the Contractor to the Owner with the final close-out documentation.

Appendix 'A'

Renovation Survey's
for
Asbestos Containing Material,
at:

Cornwall Elementary School - 99 Lee Road Cornwall, New York 12518

Cornwall-On-Hudson Elem. School - 234 Hudson Street, Cornwall-On-Hudson, New York 12520

Cornwall Central Middle School - 122 Main Street, Cornwall, New York 12518

Adelaide
ENVIRONMENTAL HEALTH

1511 Route 22, Suite C24
Brewster, NY 10509 845.278.7710
69 State Street, 13th Floor
Albany, NY 12207 518.874.0617
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Buffalo, NY 14221 716.402.4580
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Fax: 845.278.7750

RENOVATION SURVEY
FOR
ASBESTOS-CONTAINING MATERIALS, LEAD-BASED PAINT & PCBs

PERFORMED AT:

Cornwall Middle School, Cornwall Elementary School, Cornwall on Hudson E.S.
Phase 3
Cornwall School District
Cornwall, New York 12518
Adelaide Project# CORN:24103.02-IN

PREPARED FOR:

Mr. Walter Moran
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

PREPARED BY:
Jason Fullum
June 13, 2024

REVIEWED BY:



Stephanie A. Soter
President

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1.0 Introduction

1.1 Scope of Work / Project Personnel

Adelaide Environmental Health Associates, Inc. **(Adelaide)** performed an Asbestos, Lead and PCB Survey for Building/Structure Demolition, Renovation, Remodeling and/or Repair, in conformance with ALL Federal, State and Local regulations for Cornwall Central School District:

SURVEY LOCATION(S):	Cornwall Middle School 122 Main Street, Cornwall, New York 12518 Cornwall Elementary School 99 Lee Road, Cornwall, New York 12518 Cornwall on Hudson Elementary School 234 Hudson Street, Cornwall on Hudson, New York 12520
SURVEY DATE(S):	June 7, 2024
SCOPE OF WORK:	Cornwall M.S. – 6 single toilet rooms, vestibule D101 and the back parking lot Cornwall E.S. – 2 single toilet rooms, front parking lot and bus loop Cornwall on Hudson E.S. – Bathrooms, window replacement, exterior improvements
SCOPE OF WORK BUILDING/ STRUCTURE PLANS UTILIZED:	Prepared by: Tetra Tech Dated: 9/28/2022
CERTIFIED ADELAIDE PERSONNEL:	Jason Fullum (NYS Asbestos Inspector/Cert. #24-6IUY7-SHAB and EPA Lead-based Paint Risk Assessor/Cert. #LBP-R-12098-3)
SITE CONTACT(S):	Walter Moran

The following previous inspection(s) were utilized to support inspection findings in reference to the above-mentioned scope of work (refer to Section 2.0 & Appendices for applicable data):

Project(s)	Survey Date(s)
Adelaide Project# CORN:22154.03-IN	November 4, 2022
Adelaide Project# CORN:22154.01-IN	August 6, 2023
Adelaide Project# CORN:22276.02-IN	November 3, 2022
Adelaide Project# CORN:22278.00-IN	April 25, 2023

1.2 Executive Summary

On June 7, 2024, **Adelaide** inspected the parking lots at the Cornwall Middle School and the Cornwall Elementary School that will be affected by the proposed scope of work for suspect ACM, LBP and PCBs.

SUSPECT HAZARDOUS MATERIAL	SAMPLE(S)/LAYER(S)/ READING(S) COLLECTED	SAMPLE(S) / HOMOGENEOUS AREA(S) IDENTIFIED POSITIVE
Asbestos-containing Materials (ACM):	8	0
Lead-based Paint (LBP):	6 (plus calibrations)	0
PolyChlorinated Biphenyls (PCB):	0	N/A

There are **asbestos materials that will be impacted** by this scope of work as described in section 1.1. These materials are listed in section 2.1.

1.3 Conclusions and Recommendations

The following conclusions and recommendations are prepared by **Adelaide** as per the provided scope of work for Building/Structure Demolition, Renovation, Remodeling and/or Repair. Should the scope of work change, it is recommended that the findings be revisited to determine if additional sampling will be required to satisfy ALL Federal, State and Local regulations.

The materials sampled, as part of this survey, were limited to building materials potential affected by the provided scope of work only. All building materials outside the scope of work that have the potential to be disturbed, impacted, or if the scope of work is to change, are to be presumed asbestos-containing materials (PACM). Identified PACM **must** either be sampled by a licensed NYS Asbestos Inspector and/or abated/removed and disposed of by a licensed NYS Asbestos Abatement Contractor.

1.4 Asbestos-containing Materials (ACM)

- This survey concluded that the materials listed in Section 2.1 tested ***positive for asbestos***.

- There are asbestos materials that will be impacted by this scope of work. These materials are listed in section 2.1. Refer to Appendix A for the approximate location of the above materials in the affected scope of work.

- Subpart 56-5(h) of 12 NYCRR Part 56 requires that no demolition, renovation, remodeling, or repair work be commenced by any owner or the owner's agent prior to the completion of asbestos abatement. Asbestos abatement must be performed by an asbestos abatement contractor that maintains a current asbestos handling license and employs NYSDOL/NYCDEP certified asbestos handlers and supervisors. It is recommended that a 12 NYCRR 56 certified Project Monitor oversee abatement activities.

- Subpart 56-5(g) of 12 NYCRR Part 56 specifies requirements for transmittal of asbestos survey information by the owner or owner's agent. (1) One copy of the asbestos survey report shall be sent to the local government entity charged with issuing a permit for such demolition, renovation, remodeling, or repair work under applicable State or local laws. (2) If controlled demolition or pre-demolition activities will be performed, one copy of the asbestos survey report shall be submitted to the appropriate Asbestos Control Bureau district office. (3) One copy of the asbestos survey report must be kept on the construction site throughout the duration of the asbestos project and any associated demolition, renovation, remodeling, or repair project.

1.5 Lead-based Paint (LBP)

- This survey concluded that the readings summarized in Section 2.3 and Appendix E tested ***positive for lead-based paint.***

- These areas must be either abated or Lead safe work practices must be implemented during the demolition, renovation, remodeling, or repair activities if these areas are to be disturbed.

1.6 PolyChlorinated Biphenyls (PCB)

- This survey concluded that the materials listed in Section 2.4 and Appendix F tested ***negative for PCBs.***

2.0 Summary of Hazardous Materials

2.1 Summary of Identified ACM/PACM

KEY: **ACM** = Materials containing greater than 1% of asbestos; **HA** = Homogeneous Area; **LF** = Linear Feet; **SF** = Square Feet; **PACM** = Presumed Asbestos-containing Materials; **Friable** = ACM capable of being released into air, and which can be crumbled, pulverized, powdered, crushed or exposed by hand-pressure; [A] = Material is considered non-friable solely in an intact and undisturbed state, however, may be rendered friable if pulverized or crumbled while in dry state.

Samples collected by **Adelaide** June 7, 2024 for Cornwall MS and ES

HA	Identified ACM	ACM Location(s)	Approx. Qty.	Condition	Friable? (Yes or No)
NO Asbestos-containing Materials (ACM) identified upon PLM, PLM-NOB, QTEM and/or PLM-SM-V analysis, by a laboratory approved under the NYSDOH ELAP, of samples collected/analyzed in reference to the above-mentioned scope of work.					

Cornwall Middle School

Samples collected by **Adelaide** September 12, 2022 and March 7, 2023

HA	Identified ACM	ACM Location(s)	Approx. Qty.	Condition	Friable? (Yes or No)
008	9x9 Floor Tile under 12x12 Floor Tile	Second Floor – B Wing Women's Bathroom B103	80 SF	Good	No
037	1x1 Ceiling Tile Glue Daubs	Second Floor – B Wing Women's Bathroom B103	40 SF	Good	No
PACM	Pipe Insulation and Mudded Fittings	All Bathrooms	Undetermined	Unknown	Yes

Cornwall Elementary School

Samples collected by **Adelaide** September 09, 2022, and September 12, 2022

10	Mudded Fittings (Assumed)	Second Floor – Bathrooms	Unidentified	Unknown	Yes

Cornwall On Hudson Elementary School

Samples collected by **Adelaide** September 09, 2022, September 12, 2022, November 30, 2022

HA	Identified ACM	ACM Location(s)	Approx. Qty.	Condition	Friable? (Yes or No)
016	Textured Coating on Plaster Wall	Third Floor – Boys Bathroom	700 SF	Good	Yes
		Third Floor – Girls Bathroom	700 SF	Good	Yes
029	Window Caulking – 2nd Layer (Older Caulk)	First Floor - All Exterior Windows	9 Windows – 320 LF	Damaged	No
		Second Floor - All Exterior Windows	9 Windows – 340 LF	Damaged	No
		Third Floor - All Exterior Windows	10 Windows – 370 LF	Damaged	No
PACM	Pipe Insulation and Mudded Fittings behind Wall Chases	First Floor – Boys and Girls Bathrooms behind Walls and Buildouts	Undetermined	Unknown	Yes
		Second Floor – Teachers Bathroom	Undetermined	Unknown	Yes
		Third Floor - Boys and Girls Bathrooms behind Walls and Buildouts	Undetermined	Unknown	Yes
PACM	All electrical components and associated wiring/insulation materials, electrical boxes/cabinets, lighting, etc.	First Floor – Boys and Girls Bathrooms	Undetermined	Unknown	No
		Second Floor – Teachers Bathroom	Undetermined	Unknown	No
		Third Floor - Boys and Girls Bathrooms	Undetermined	Unknown	No
		Classrooms, Cafeteria and Nurses Office	Undetermined	Unknown	No
34	Transite in Spandrel Space Above Windows	All Windows	1,500 SF	Good	No

2.2 Summary of Identified Non-ACM

Samples collected by **Adelaide** June 7, 2024 for Cornwall MS and ES

Identified Non-ACM	Sample Location(s)
Asphalt	Cornwall M.S. Back Parking Lot Cornwall E.S. Bus Loop and Parking Lot
Asphalt Patch	

Cornwall Middle School

Samples collected by **Adelaide** September 12, 2022, March 7, 2023 and June 23, 2023

Identified Non-ACM	**Sample Location(s) & HA's**
Caulking at Fixtures (Older)	B Wing – Bathroom B102
Interior/Exterior Door Caulking (Newer Gray)	Exterior Doors A7 and B4
Exterior Door Caulking (Brown)	Exterior Door A7
Exterior Door Caulking (Older Gray)	Exterior Door A6
Caulking at Fixtures (White)	A Wing – Custodial Room, Bathroom A101
	B Wing – Bathrooms B102 and B102
	C Wing – Bathrooms C106 and C107
	D Wings – Bathrooms 017, 019, D102 and D104
12x12 Beige with White Floor Tile	B Wing Second Floor – Bathroom B103
Mastic for 12x12 Floor Tile (Brown)	B Wing Second Floor – Bathroom B103
Mastic of 9x9 Floor Tile (Black)	B Wing Second Floor – Bathroom B103
Older Fiberglass Pipe Wrap Above Ceiling	A Wing – Custodial Room, Bathroom A101
	B Wing – Bathrooms B102 and B103
	C Wing – Bathrooms C106 and C107
Older Fiberglass Pipe Wrap Above Ceiling	D Wings – Bathrooms 017, 019, D102 and D104
Fire Door Insulation	D Wings – Bathrooms 017, 019, D102 and D104
Ceramic Wall Tile Grout, Adhesive (1st Layer)	D Wings – Bathrooms 017, 019, D102, D104, Faculty Mens and Women's
Ceramic Wall Tile Grout (2nd Layer)	D Wings – Bathrooms 017, 019, D102, D104, Faculty Mens and Women's
Ceramic Floor Tile Grout, Mudset	D Wings – Bathrooms 017, 019, D102, D104, Faculty Mens and Women's
Ceramic Wall Tile Grout, Adhesive (1st Layer)	C Wing – Bathrooms C106 and C107
Ceramic Wall Tile Grout, Mudset (2nd Layer)	C Wing – Bathrooms C106 and C107
Ceramic Wall Tile Grout, Adhesive	A Wing – Custodial Room, Bathroom A101
	B Wing – Bathrooms B102 and B103
	D Wings – Bathrooms Faculty Mens and Women's
Ceramic Floor Tile Grout, Mudset	A Wing – Custodial Room, Bathroom A101
	B Wing – Bathrooms B102 and B103
	C Wing – Bathrooms C106 and C107
	D Wings – Bathrooms Faculty Mens and Women's
Joint Compound and Sheetrock (1970's)	A Wing – Custodial Room, Bathroom A101
	B Wing – Bathrooms B102 and B102
	C Wing – Bathrooms C106 and C107
Joint Compound and Sheetrock (1950's)	D Wings – Bathrooms 017, 019, D102 and D104
Ceiling Plaster – Top and Base Coats (1950's)	A Wing – Custodial Room, Bathroom A101
	B Wing – Bathrooms B102 and B102
	C Wing – Bathrooms C106 and C107

Identified Non-ACM	Sample Location(s) & HA's
Ceiling Plaster – Top and Base Coats (1970's)	D Wings – Bathrooms 017, 019, D102, D104, Faculty Mens and Women's
Plaster Wall – Top and Base Coats (1950's)	A Wing – Custodial Room, Bathroom A101
	B Wing – Bathrooms B102 and B102
	C Wing – Bathrooms C106 and C107
1x1 Ceiling Tile	Second Floor – B Wing Bathroom B103
CMU and Mortar	Throughout Exterior Perimeter and Interior Walls
Covebase with Adhesive	Second Floor – B Wing Bathroom B103
Drywall above Ceiling Tile	Second Floor – B Wing Bathroom B103
Brick Mortar	Throughout Exterior Perimeter Walls
Canopy Plaster Top Layer	D Wing – Door A7
Terrazzo Floor (1970's)	D Wing – First and Second Floor Hallways
Terrazzo Floor (1950's)	A, B and C Wings – Second Floor Hallways
Textured Coating on Plaster Wall (Top Layer)	D Wing – First and Second Floor Hallways
Skim Coat on Plaster Wall (2nd Layer)	D Wing – First and Second Floor Hallways
Ceramic Wall Tile Mudset – 2nd Layer	First Floor – D Wing Boys Bathroom (017)
	First Floor – D Wing Girls Bathroom (019)
	Second Floor – D Wing Boys Bathroom(D104)
	Second Floor – D Wing Girls Bathroom(D102)
Canopy Ceiling Plaster Base Coat	Exterior – A7 Door
Plaster Wall Skim Coat and Base Coat	First Floor – D Wing Hallway Bathrooms 017 & 019 Entrances
	Second Floor – D Wing Hallway Bathrooms D102 & D104 Entrances, Faculty Mens and Women's
Plaster Wall Skim Coat and Base Coat	Second Floor – D Wing Door A7
	Second Floor – D Wing Door A6
	Second Floor – D Wing Door B4
Black Material on Back side of Radiator Cover	Second Floor – D Wing Faculty Mens and Women's
Electrical Wire Insulation	E Wing and C Wing Bathrooms

Samples collected by **Adelaide** October 17th & 18th 2022

Entry Window System Caulk	2nd Floor Entry C-9 Interior/Exterior HA 28
EPDM Top Layer	Entry C-9 Exterior Roof HA 29
Fiberboard Bottom Layer	Entry C-9 Exterior Roof HA 30

Cornwall Elementary School

Samples collected by **Adelaide** September 09, 2022, and September 12, 2022

Identified Non-ACM	Sample Location(s) & HA's
CMU and Mortar	Exterior and Interior Perimeter Walls
Parge Coating at Bathroom Chases	First Floor Bathrooms A33A, A33B, 107A, 107B
	Second Floor Bathrooms 207A and 207B
Urinal Grout	First Floor Bathrooms A33A, 107B

Identified Non-ACM	Sample Location(s) & HA's
	Second Floor Bathroom 207B
Caulking at Fixtures	First Floor Bathrooms A33A, A33B, 107A, 107B
	Second Floor Bathrooms 207A and 207B
Older Fiberglass Pipe Wrap	First Floor Hallway outside Bathrooms
	Second Floor Hallway outside Bathrooms
1x1 Ceiling Tile and Glue Daubs	Second Floor Bathroom 207B
Ceiling Tile Creators	Throughout all Classrooms and Bathrooms A33A, A33B, 107A, 107B, 207A, 207B
Ceiling Tile Large Holes	Throughout all Classrooms and Bathrooms A33A, A33B, 107A, 107B, 207A, 207B
Ceiling Tile Small Squiggles with Holes	Throughout all Classrooms and Bathrooms A33A, A33B, 107A, 107B, 207A, 207B
Ceiling Tile Large Squiggles with Holes	Throughout all Classrooms and Bathrooms A33A, A33B, 107A, 107B, 207A, 207B
Ceramic Floor Tile – Grout, Mudset	First Floor Bathrooms A33A, A33B, 107A, 107B
	Second Floor Bathrooms 207A and 207B
Plaster Ceiling – Top and Base Coats	First Floor Bathrooms A33A, A33B, 107A, 107B
	Second Floor Bathrooms 207A and 207B
Plaster Wall – Top and Base Coats	Throughout all Classrooms Casework
Countertop Backspace Adhesive	Throughout all Classrooms
12x12 Floor Tile – Brown with White Mottled	Classrooms 204
12x12 Floor Tile – Tan with White Mottled	Classrooms 110, 201
12x12 Floor Tile Mastic – Brown	Classrooms 101, 102, 104, 105, 106, 108, 109, 110, 111, 113, 114, 115, 116, 201, 204, 205, 209, 210, 211, 213, 215
12x12 Floor Tile – Blue with Black and White	Classrooms 106, 108, 109, 115, 205, 209, 213, 215
12x12 Floor Tile – Blue with Gray Mottled	Classrooms 104, 209
9x9 Floor Tile Mastic – Black	Throughout all Classrooms
Leveling Compound	Throughout all Classrooms
12x12 Floor Tile – Tan with Brown and White Streaks	Classrooms 105, 113, 114
12x12 Floor Tile – Beige with White, Bule and Rust	Classrooms 101, 102, 111, 116, 210, 211
Covebase and Adhesive	Throughout all Classrooms

Cornwall on Hudson Elementary School

Samples collected by **Adelaide** September 09, 2022, and September 12, 2022

Identified Non-ACM	Sample Location(s) & HA's
Ceramic Floor Tile – Grout an Mudset	First Floor – Bathrooms A103 and A106
Concrete	Throughout all Floor Levels
Ceramic Wall Tile Grout, Mudset and Adhesive	First Floor – Bathrooms A103 and A106
12x12 Off White with Gray Floor Tile	Second Floor – Teachers Bathroom

Identified Non-ACM	Sample Location(s) & HA's
12x12 Beige with Brown Floor Tile	Second Floor – Teachers Bathroom
Floor Tile Mastic – Brown	Second Floor – Teachers Bathroom
Ceiling Tile – Deep Crators	Hallway
Ceiling Tile – Sheetrock Type	First Floor – Second Floor – Teachers Bathroom Third Floor –
Covebase with Adhesive	First Floor – Second Floor – Teachers Bathroom Third Floor –
Clay Block and Mortar	Throughout all Interior Walls
Old Wall Adhesive (behind bump out chase)	First Floor – Second Floor – Third Floor – Bathrooms A301 and A302
Textured Coating on Plaster Wall (type 1)	First Floor – Bathrooms A103 and A106 Second Floor – Third Floor –
Sheetrock and Joint Compound	First Floor – Bathrooms A103 and A106 Second Floor – Teachers Bathroom Third Floor –
Epoxy Coating on Concrete Floor	Third Floor – Bathrooms A301 and A302
Leveling Compound (type 1)	Third Floor – Bathrooms A301 and A302
Leveling Compound (type 2)	Second Floor – Teachers Bathroom
Plaster Wall – Top and Base Coats	First Floor – Bathrooms A103 and A106, Cafeteria, Nurses Office, and Classrooms Second Floor – Teachers Bathroom, and Classrooms Third Floor – Bathrooms A301 and A302, and Classrooms
Plaster Ceiling – Top and Base Coats	First Floor – Bathrooms A103 and A106, Cafeteria, Nurses Office, and Classrooms Second Floor – Teachers Bathroom, and Classrooms Third Floor – Bathrooms A301 and A302, and Classrooms
Dura Rock Wall Board	First Floor – Bathrooms A103 and A106 Third Floor – Bathrooms A301 and A302
Window Caulking – At Windowsill	North, South, East and West Elevations
Window Caulking – At Window Side Top Layer	North, South, East and West Elevations
Caulking at Fixtures	First Floor – Bathrooms A103 and A106 Second Floor – Teachers Bathroom Third Floor – Bathrooms A301 and A302

Identified Non-ACM	Sample Location(s) & HA's
Duct Insulation Cover	First Floor – Bathrooms A103 and A106, Cafeteria, Nurses Office, and Classrooms Second Floor – Teachers Bathroom, and Classrooms Third Floor – Bathrooms A301 and A302, and Classrooms Second Floor – Third Floor –
Brick Mortar	Exterior and Interior Perimeter Walls

Samples collected by **Adelaide** April 13, 2023

Identified Non-ACM	Sample Location(s) & HA's
Brick & Mortar Facade	Exterior Front Façade – HA 01 & 02
Concrete Base	Exterior Column Base – HA 03
Stone & Mortar	Exterior Column – HA 04 & 05

2.3 Summary of Identified LBP

Based on review of the data generated by the Viken Pb200e X-Ray Fluorescence (XRF) Analyzer(s), the following surfaces tested were identified as lead-based, as defined by HUD/EPA (equal to or in excess of 1.0 milligram per square centimeter):

Readings collected by **Adelaide** June 7, 2024 for Cornwall MS and ES

Location of LBP	LBP Component	Substrate	Color	Condition	Readings (mg/cm2)
NO Lead-based Paints identified above HUD/EPA standards of readings collected in reference to the above-mentioned scope of work.					

<u>Cornwall Middle School</u>

Readings collected by **Adelaide** September 12, 2022

Location of LBP	LBP Component	Substrate	Color	Condition	Readings (mg/cm2)
NO Lead-based Paints identified above HUD/EPA standards of readings collected in reference to the above-mentioned scope of work.					

Readings collected by **Adelaide** March 1, 2023

Location of LBP	LBP Component	Substrate	Color	Condition	Readings (mg/cm2)
NO Lead-based Paints identified above HUD/EPA standards of readings collected in reference to the above-mentioned scope of work.					

Cornwall Elementary School

Readings collected by **Adelaide** September 09, 2022, and September 12, 2022

Location of LBP	LBP Component	Substrate	Color	Condition	Readings (mg/cm2)
NO Lead-based Paints identified above HUD/EPA standards of readings collected in reference to the above-mentioned scope of work.					

Cornwall On Hudson Elementary School

Readings collected by **Adelaide** September 09, 2022, and September 12, 2022

Location of LBP	LBP Component	Substrate	Color	Condition	Readings (mg/cm2)
1st Floor – Boys Bathroom	Window Case	Wood	Off White	Intact	*1.60*
1st Floor – Boys Bathroom	Windowsill	Metal	Off White	Intact	*4.80*
1st Floor – Girls Bathroom	Windowsill	Wood	Off White	Intact	*2.80*
1st Floor – Girls Bathroom	Window Case	Wood	Off White	Intact	*2.00*
2nd Floor – Teachers Bathroom	Door Case	Wood	Light Green	Intact	*1.10*
2nd Floor – Teachers Bathroom	Baseboard	Wood	Light Green	Intact	*2.40*
2nd Floor – Teachers Bathroom	Casework	Wood	Light Green	Intact	*3.60*
3rd Floor – Boys Bathroom	Floor	Concrete	Gray	Fair	*1.00*
3rd Floor – Boys Bathroom	Floor	Concrete	Gray	Fair	*1.50*
3rd Floor – Boys Bathroom	Window Case	Wood	Blue	Intact	*7.80*
3rd Floor – Boys Bathroom	Windowsill	Metal	Blue	Intact	*4.50*
3rd Floor – Boys Bathroom	Door Case	Wood	Blue	Intact	*4.20*
3rd Floor – Girls Bathroom	Door Case	Wood	White	Intact	*7.10*
3rd Floor – Girls Bathroom	Window Case	Wood	White	Intact	*5.10*
3rd Floor – Girls Bathroom	Floor	Concrete	Gray	Intact	*1.30*

Readings collected by **Adelaide** April 13, 2023

Location of LBP	LBP Component	Substrate	Color	Condition	Readings (mg/cm2)
NO Lead-based Paints identified above HUD/EPA standards of readings collected in reference to the above-mentioned scope of work.					

2.4 Summary of Identified PCB-containing Materials

Samples collected by **Adelaide** June 7, 2024 for Cornwall MS and ES

Sample #	Location / Description	Material Matrix	Substrate	Approx. Qty.	Analytical Result
NO suspect PCB-containing materials were observed to be impacted by the above-mentioned scope of work.					

Cornwall Middle School

Samples collected by **Adelaide** September 12, 2022

Sample #	Location / Description	Material Matrix	Color	Substrate	Analytical Result
NO PCB-containing materials were identified above the USEPA 40 CFR 761 threshold of 50 ppm(mg/kg) of samples collected/analyzed in reference to the above-mentioned scope of work.					

Samples collected by **Adelaide** March 7, 2023

Sample #	Location / Description	Material Matrix	Color	Substrate	Analytical Result
NO suspect PCB-containing materials were observed to be impacted by the above-mentioned scope of work.					

Samples collected by **Adelaide** November 7, 2022

Sample #	Location / Description	Material Matrix	Color	Substrate	Analytical Result
NO PCB-containing materials were identified above the USEPA 40 CFR 761 threshold of 50 ppm(mg/kg) of samples collected/analyzed in reference to the above-mentioned scope of work.					

Cornwall Elementary School

Samples collected by **Adelaide** September 09, 2022, and September 12, 2022

Sample #	Location / Description	Material Matrix	Color	Substrate	Analytical Result
NO PCB-containing materials were identified above the USEPA 40 CFR 761 threshold of 50 ppm(mg/kg) of samples collected/analyzed in reference to the above-mentioned scope of work.					

Cornwall On Hudson Elementary School

Samples collected by **Adelaide** September 09, 2022, and September 12, 2022

Sample #	Location / Description	Material Matrix	Color	Substrate	Analytical Result
NO PCB-containing materials were identified above the USEPA 40 CFR 761 threshold of 50 ppm(mg/kg) of samples collected/analyzed in reference to the above-mentioned scope of work.					

2.5 Observations

SUSPECT ASBESTOS-CONTAINING MATERIALS (ACM)

A visual inspection was performed, and homogeneous material types were established based on appearance, color and texture. The findings presented in this report are based upon reasonably available information and observed site conditions at the time the assessment was performed. The findings and conclusions of this report are not meant to be indicative of future conditions at the site and does not warrant against conditions that were not evident from visual observations or historical information obtained from others.

On June 7, 2024, representative bulk sampling was performed on suspect building materials for laboratory analysis and the following is a summary of installed building materials sampled as per the scope of work provided:

- Miscellaneous Materials – Asphalt and Asphalt Patch

3.0 Asbestos-containing Materials (ACM)

3.1 Field Procedures and Analysis Methodology

Guidelines used for the inspection were established by the U.S. Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, DOC# 560/5-85-024 and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA) and Title 12 NYCRR Part 56-5.1. Field information was organized as per the AHERA concept of a homogeneous area (HA); that is, suspect Asbestos-containing Materials (ACM) with similar age, appearance, and texture were grouped together, sampled and assessed for condition.

For the purposes of this inspection, suspect ACM has been placed in three material categories: thermal, surfacing, and miscellaneous. 1) Surfacing materials are those that are sprayed on, troweled on or otherwise applied to surfaces for fireproofing, acoustical, or decorative purposes (e.g., wall and ceiling plaster). 2) Thermal materials are those applied to heat pipes or other structural components to prevent heat loss or gain or prevent water condensation (e.g., pipe and fitting insulation, duct insulation, boiler flue). 3) Miscellaneous materials are interior building materials on structural components, structural members or fixtures, such as floor and ceiling tiles, etc. and do not include surfacing material or thermal system insulation.

SURFACING MATERIALS

Surfacing materials were grouped into homogeneous sampling areas. A homogeneous area contains material that is uniform in color and texture and appears identical in every other respect. Materials installed at different times belong to different sampling areas. Homogeneous areas were determined on per floor basis.

The following protocol was used for determining the number of samples to be collected:

- At least three bulk samples were collected from each homogeneous area that is 1,000 square feet or less.
- At least five bulk samples were collected from each homogeneous area that is greater than 1,000 square feet but less than or equal to 5,000 square feet.
- At least seven bulk samples were collected from each homogeneous area that is greater than 5,000 square feet.

THERMAL SYSTEM INSULATION (TSI)

The concept of homogeneous sampling areas applies equally well to thermal insulation as to surfacing material. A "typical" building may contain multiple insulated pipe runs from any combination of the following categories:

- Hot water supply and/or return
- Cold water supply
- Chilled water supply

- Steam supply and/or return
- Roof or system drain

The following protocol was used for determining the number of samples to be collected.

- Collect at least three bulk samples from each homogeneous area of thermal system insulation.
- Collect at least one bulk sample from each homogeneous area of patched thermal system insulation if the patched section is less than 6 linear or square feet.
- In a manner sufficient to determine whether the material is ACM or not ACM, collect a minimum of three bulk samples from each homogeneous insulated mechanical system tee, elbow, and valve.

Bulk samples are not collected from any homogeneous area where the certified inspector has determined that the thermal system insulation is fiberglass, foam glass, or rubber.

MISCELLANEOUS MATERIALS

Miscellaneous materials are grouped into different homogeneous areas and at least two bulk samples are collected from each homogeneous area as per the clarification letter from the EPA and the Professional Abatement Contractors of New York, Inc in November of 2007.

Samples collected were analyzed by a laboratory approved under the New York State Department of Health Environmental Laboratory Approval Program (NYSDOH ELAP). Samples were analyzed in the laboratory by Polarized Light Microscopy (PLM), Polarized Light Microscopy-NOB (PLM-NOB) and/or Quantitative Transmission Electron Microscopy (QTEM), as required. Sample collection and laboratory analysis were conducted in compliance with the requirements of Title 12 NYCRR Part 56-5.1, 29 CFR 1926.1101 and standard EPA & OSHA accepted methods. Samples consisting of multiple layers were separated and analyzed independently in the laboratory.

3.2 Regulatory Guidelines and Requirements for ACM

FEDERAL

In accordance with the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) established National Emission Standards for hazardous Air Pollutants (NESHAP) to protect the public from exposure to airborne pollutants. Asbestos was one of the air pollutants, which was addressed under the NESHAP 40 CFR Part 61. The purpose of asbestos NESHAP regulations is to protect the public health by minimizing the release of asbestos when facilities, which contain ACM, are being renovated or demolished. EPA is responsible for enforcing regulations related to asbestos during renovations and demolition, however, the CAA allows the EPA to delegate this authority to State and Local Agencies. Even after EPA delegate's responsibility to a state or Local agency, EPA retains the authority to oversee agency performance and to enforce NESHAP regulations as appropriate.

NEW YORK STATE

Asbestos in New York State is regulated under the Labor Law Section 906, Part 56 of Title 12 of the Official Compilation of Codes, Rules, and Regulations. Within the department and for the purpose of the Department of Labor, this part (rule) is known as Industrial Code Rule No. 56 (ICR 56) relating to hazards to the public safety and health, during the removal, encapsulation, or disturbance of friable asbestos, or any handling of ACM that may result in the release of asbestos fiber.

As specified in Title 12 NYCRR Part 56-5.1 (h) and (i), "If the building/structure asbestos survey finds that the portion of the building/structure to be demolished, renovated, remodeled, or have repair work contains ACM, PACM, suspect miscellaneous ACM assumed to be ACM, or asbestos material, which is impacted by the work, the owner or the owner's agent shall conduct, or cause to have conducted, asbestos removal performed by a licensed asbestos abatement contractor in conformance with all standards set forth in this Part. All ACM, PACM, suspect miscellaneous ACM assumed to be ACM, or asbestos material impacted by the demolition, renovation, remodeling or repair project shall be removed as per this Part, prior to access or disturbance by other uncertified trades or personnel. No demolition, renovation, remodeling or repair work shall be commenced by any owner or the owner's agent prior to the completion of the asbestos abatement in accordance with the notification requirements of this Part…All building/structure owners and asbestos abatement contractors on a demolition, renovation, remodeling, or repair project, which includes work covered by this part, shall inform all trades on the work site about PACM, ACM, asbestos material and suspect miscellaneous ACM…Bids may be advertised and contracts awarded for demolition, remodeling, renovation, or repair work, but no work on the current intermediate portion of the project shall commence on the demolition, renovation, remodeling or repair work by any owner or agent prior to completion of all necessary asbestos abatement work for the current intermediate portion of the entire project, in conformance with all standards set forth in this Part." All work conducted should be in accordance with all legal requirements, including but not limited to U.S. Environmental Protection Agency (EPA) National Emissions Standards for Hazardous Air Pollutants (NESHAP) [40 CFR Part 61], New York State Industrial Code Rule 56 Asbestos Regulations (ICR 56) and Chapter 1 of Title 15 of the Rules of the City of New York Regulations, as applicable. Advance notification of the asbestos project to the USEPA, NYSDOL, and NYCDEP may be required.

CONCEALED ACM

In addition to the ACMs identified at the site, there is a possibility that concealed suspect ACM may exist at the building/structure. As such, if any concealed suspect ACM is encountered during future construction related activities, the work should immediately stop. Prior to resuming the work, the suspect ACM should either be 1) Sampled by an appropriately-certified asbestos professional and submitted to an Approved NYSDOH ELAP laboratory for asbestos analysis or 2) Presumed to be ACM (PACM) and removed by a licensed asbestos abatement contractor for disposal in accordance with all applicable regulations.

4.0 Lead-based Paint (LBP)

4.1 Applicable Standards/Guidelines for LBP

The U.S Department of Housing and Urban Development (HUD) defines the action level for lead-based paint as a lead content equal to or greater than 1.0 milligrams of lead per square centimeter of painted surface (≥1.0 mg Pb/cm^2) when measured with an XRF analyzer or 0.5 percent by weight when chemically tested. This definition is described in the HUD "Lead-Based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing, September 1990". The state of New York's definition of the action level for lead-based paint is consistent with the level established by HUD.

Please note that although the HUD defines lead-based paint as paint having lead concentrations equal or greater than 1.0 mg/cm2, the Occupational Safety and Health Administration (OSHA) considers any concentration of lead in paint to be lead-containing paint. Regardless of the lead concentrations in paint, the contractor shall comply with 29 CFR 1926.62, OSHA regulations, and take precautionary measures for dust control and limit employee exposure to lead dust during the renovations.

Painted surfaces that would be impacted by planned activities such as drilling, cutting, scrapping, etc. and create dust should be properly addressed by following safe work practices, good housekeeping procedures and/or following proper abatement procedures. Grinding and sanding of paint without HEPA filter exhaust, open flame gas fired torch, unconfined abrasive blasting, and chemical strippers containing methylene chloride or other human carcinogenic chemicals are not recommended.

The Federal Resource Conservation and Recovery Act (RCRA) regulation governs the handling, transportation, and disposal of hazardous materials. Every demolition/renovation debris generator has the responsibility to determine whether the debris exhibits one or more of the characteristic wastes listed in subpart C of 40 CFR Part 261. In the case of demolition debris, lead in LBP is a characteristic waste, and therefore, it is the responsibility of the renovation/demolition debris generator to characterize the waste prior to its disposal and, if found to be hazardous waste as defined by Federal Statutes, to be properly handled and disposed.

Metal objects painted with LBP are exempt from disposal regulations applicable to lead, provided they are properly recycled. All metal objects that are painted with LBP should be sent to a certified recycling facility.

This report is not Lead-based Paint abatement specification and should not be used for specifying removal methods or techniques.

4.2 XRF Information

Viken Pb200e X-Ray Fluorescence (XRF) Analyzer(s) were used to survey the building/structure or portion thereof identified to be demolished, renovated, remodeled or repaired for the presence of LBP. The Viken Pb200e XRF Analyzer(s) are using a sealed source of Co-57 with 6mCi sources, meeting HUD requirements for the analysis of paint films. During the analysis, the intensity of the x-rays is converted by the instrument's internal software into an estimate of the concentration of lead in the substance being analyzed. The results are interpreted as concentrations of lead in milligrams per square centimeter. This device is a field-screening tool, used to collect multiple readings in a short period of time. The method of measurement is based on spectrometric analysis of lead x-ray fluorescence within a controlled depth of interrogation. The reading is an estimate of lead content in all layers of paint. The results are displayed in milligrams per square centimeter (mg/cm2). The device(s) used for this inspection were the Viken Pb200e X-Ray Fluorescence (XRF) Analyzer(s) Serial Number 2104, Source date 4/1/23, Serial number 2231, Source date 5/15/22, Serial number 2595, Source date 2/15/23 and/or Serial number 2901, Source date 2/15/23.

5.0 PolyChlorinated Biphenyls (PCB)

5.1 Background and Protocol for PCBs

PolyChlorinated Biphenyls (PCB) are a group of manmade chemicals. PCBs were widely used in building materials and electrical products in the past. The U.S. Environmental Protection Agency banned the manufacturing and certain uses of PCBs in 1978, but buildings constructed or renovated between 1950 and 1978 may still have building materials and electrical products that contain PCBs. Examples of products that may contain PCBs include caulk, paint, glues, plastics, fluorescent lighting ballasts, transformers and capacitors.

PCBs are currently prohibited from being used in caulk and other commodities (U.S. EPA, 40 CFR 761). However, prior to 1977, PCBs were present in some caulking materials used in the construction of schools and other buildings. Studies have shown that concentrations of PCB can exceed 1% (10,000 ppm) by weight in some caulk materials. An investigation of 24 buildings in the Greater Boston Area revealed that one-third of the buildings tested (8 of 24) contained caulking materials with polychlorinated biphenyl (PCB) content exceeding 50 ppm by weight with an average concentration of 15,600 ppm or 1.5% (Herrick et al., 2004). These buildings included schools and other public buildings.

The U.S. EPA regulates the disposal of caulk, as well as soil and other materials contaminated with PCBs from caulk, if the concentration of PCBs exceeds 50 ppm. Such materials must be disposed at an appropriate approved or permitted facility.

U.S. EPA regulation 40 CFR 761 defines "PCB remediation waste" to include contaminated soil, and specifies a clean-up level of <1ppm without further conditions for unrestricted use in "high occupancy areas" (i.e., areas where individuals may be present for 335 hours or more per year). PCB caulk is defined as a PCB bulk product waste, and its disposal is subject to U.S. EPA regulations under the Toxic Substances Control Act (40 CFR761.62).

This protocol has been developed in consultation with the New York State Department of Health, Division of Environmental Health Assessment, Bureau of Toxic Substance Assessment to address concerns about properly managing caulk containing PCBs that will be disturbed during building renovation and maintenance.

CAULK SAMPLE COLLECTION

Buildings constructed or renovated between 1950 and 1977 have a potential to contain PCBs in existing caulk. Representative samples of caulking materials from these buildings prior to renovation or demolition work should be tested to determine whether the caulk is contaminated with PCBs. Professional judgement should be used to design the sampling plan for characterizing caulk throughout the building. The consultant should pay particular attention to construction and maintenance records and to the appearance of caulking materials (likenesses and differences). Samples should be taken from window frames or expansion joints that have not been repaired or replaced since 1977. Depending on specific information provided in the workplan developed by the project manager, such as window placement, compositing of some caulk samples might be appropriate. Caulk from different time periods or that have a different appearance should not be composited together.

It is important to note that caulk used during the time period of interest may also contain asbestos or lead. Therefore, the work plan should include testing, handling and disposal requirements appropriate for such regulated materials.

SOIL SAMPLE COLLECTION

Buildings constructed or renovated between 1950 and 1977, which have undergone further renovation after 1977, may have residual PCB contamination in adjacent soils. An adequate representation of surface soils should be tested to assess the potential for residual PCB contamination.

When designing a representative soil sampling plan, the likelihood of soil contamination from deteriorated or deteriorating caulk should be considered. Caulk that has in the past dried out and fallen to the ground is the most important source of soil contamination. Thus, sampling should include soil beneath windows

where caulk has obviously deteriorated or been replaced because of previous deterioration. Areas subject to the stress of sun and prevailing weather (typically the southern and western side of each structure) should be included for sampling. These samples would provide a conservative evaluation of soil conditions due to an increased potential for material failure, possibly resulting in contamination of soil. Also, if earlier renovation or demolition work may have stockpiled potentially contaminated caulk in other school areas, the school should consider having soils in those areas tested as well.

Soil sampling should focus on areas of the building where "banks" or "gangs" of windows exist/were replaced and areas of the structure where large expansion joints are located. This would provide a conservative evaluation of potential soil contamination and permit efficient sampling.

Any obvious pieces of caulk encountered during the collection of soil samples should be removed from the soil, categorized (with respect to location and depth) and treated as a separate potential sample.

Depth – At each soil sample location, soil should be collected in depth intervals of 0-2 inches, 2-6 inches and 6-12 inches. The surface soil sample (0-2 inches) should be collected from below the vegetative surface layer, if present.

Distance from Structure – Samples should be collected within 1 foot of the building and 5 feet from the building.

Samples should be collected in a manner that prevents cross-contamination. Augers or driven core samplers should be avoided, as any caulk caught on the edge of this type of tool could be driven to lower intervals. Using a designated trowel for each sample location and each interval of depth is encouraged. If the sampling tool is field cleaned between samples, do so in a manner that does not add solvent contamination to the environment.

NOTE
Sampling was performed by **Adelaide** in compliance with protocols outlined by New York State Education Department (NYSED) and USEPA 40 CFR 761, as described above. Only one sample per homogeneous area was required for analysis of suspect PCB-containing materials. Bulk sample(s) were properly packaged and forwarded, with associated Chain of Custody (COC), to a laboratory approved under the New York State Department of Health Environmental Laboratory Approval Program (NYSDOH ELAP), for analysis using method SW846-3550B/8082. The analysis will determine if the suspect material will be classified as PCB-containing at or above 50 ppm or mg/kg as per the EPA regulations. Copies of the analytical results are contained within attached appendices for review.

6.0 General Discussion

All construction personnel as well as individuals who have access to locations where asbestos-containing materials (ACM), lead-based paints (LBP) and/or polychlorinated biphenyls (PCB) exists should be informed of its presence and the proper work practices in these areas. Conspicuous labeling of all ACM is suggested to ensure personnel is adequately informed. Personnel should be informed not to rest, lean or store material or equipment on or near these surfaces and not to cut, saw, drill, sand or disturb ACM. All removal, disturbance, and repair of ACM should be performed in compliance with Title 12 NYCRR Part 56 by persons properly trained to handle ACM. Facility custodial and maintenance personnel should receive training commensurate with their work activities; as defined in 29 CFR 1910.1001.

7.0 Disclaimers

Adelaide certifies that the information contained within this report is based solely upon site observations and the results of laboratory analysis for samples collected during this survey/assessment. These observations and results are time dependent, subject to changing site conditions and revisions to Federal, State and Local regulations. **Adelaide** warrants that these findings have been promulgated after being prepared in general accordance with generally accepted practices in the abatement industries. **Adelaide** also recognizes that inspection laboratory data is not usually sufficient to make all abatement and management decisions. No other warranties are expressed or implied.

The materials sampled, as part of this survey, were limited to building materials potential affected by the provided scope of work only. All building materials outside the scope of work that have the potential to be disturbed, impacted, or if the scope of work is to change, are to be presumed asbestos-containing materials (PACM). Identified PACM **must** either be sampled by a licensed NYS Asbestos Inspector and/or abated/removed and disposed of by a licensed NYS Asbestos Abatement Contractor.

Due to the potential for concealed Asbestos-containing Materials (ACM) and/or other regulated materials, this report should not be construed to represent all ACM and/or regulated materials within the site(s). All quantities of ACM and/or other regulated materials identified, and all dimensions listed within this report are approximate and should be verified On-site.

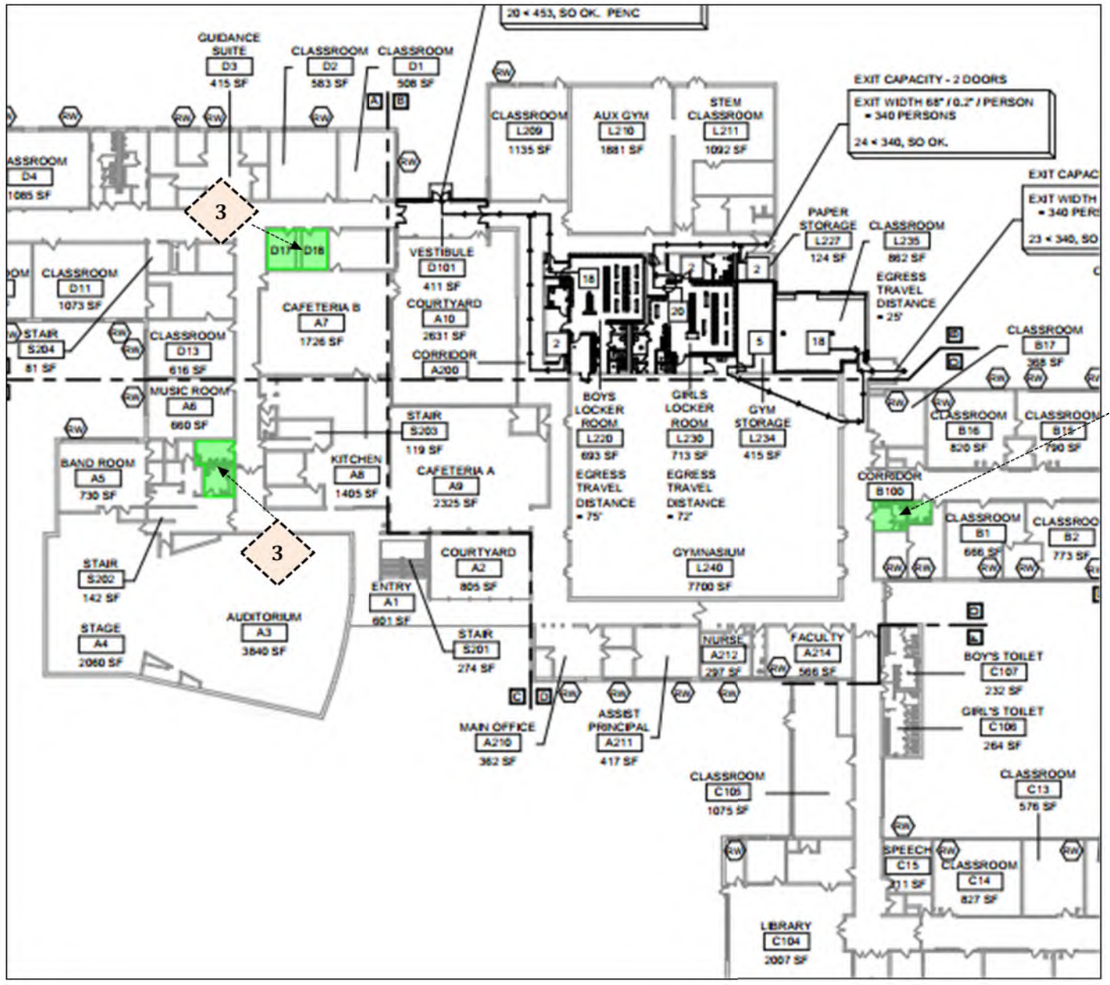
This report is generated for the exclusive use of the client and is not designed to serve as a specification for abatement. The owner is strongly encouraged to contract with a consultant having a current Asbestos Project Designer Certificate as issued by New York State Department of Labor for the preparation of contract specifications, work plans, and/or drawings prior to requesting bids for the abatement or removal of the materials identified in this report.

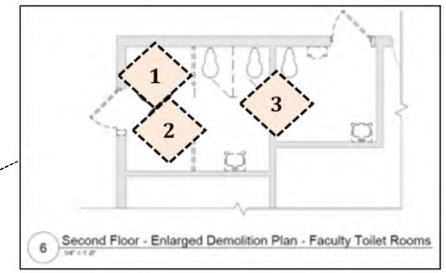
NYSDOH issued an Interim Guidance Letter, on July 9, 2013, which outlined the approved testing alternative for materials containing vermiculite. Specifically, "...Where TSI, surfacing materials, or other PACM or miscellaneous suspect ACM contain greater than 10% vermiculite, Item 198.6 may be used to evaluate the asbestos content of the material; provided, however, that any test results using this method must be reported with the following conspicuous disclaimer: *"This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite."* On July 22, 2014, NYSDOH issued a Regulatory Guidance Letter outlining the new approved analytical methods for testing sprayed-on fireproofing (SOFP) that contains vermiculite. NYSDOH authorized the use of ***two*** analytical methods to evaluate the asbestos content of SOFP that contains vermiculite. As per NYSDOH Guidelines, *"After October 31, 2014, one of the new methods **must** be used to test SOF-V, regardless of the percent of vermiculite."* On May 6, 2016, NYSDOH issued a Regulatory Guidance Letter outlining the new protocol for analytical procedure for surfacing materials (ie. plaster, stucco, etc.) that contain vermiculite. As per NYSDOH Guidelines, "*The original July 2013 and July 2014 letters addressed SOF-V only. Both NYS DOH's Item 198.8 and RJ Lee Group Method 055 shall now be applied to test for vermiculite in other Surfacing Material (SM) as defined in 12 NYCRR Part 56 (NYS Industrial Code Rule 56).*"

APPENDIX A

ACM LOCATION MAP(S)

CORNWALL MIDDLE SCHOOL





ACM LEGEND: (see report for details)	
1	9x9 Floor Tile Under 12x12 Floor Tile
2	1x1 Ceiling Tile Glue Daubs
3	Assumed Pipe Insulation and Fittings Within Chases

Second Floor Plan - Asbestos Locations

Drawing Not to Scale

Adelaide ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Mr. Walter Moran
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

Phase 3

SURVEY LOCATION:
Cornwall M.S.
122 Main Street
Cornwall, New York 12518

DATE: 6/13/2024

DRAWING VERSION: No. 1

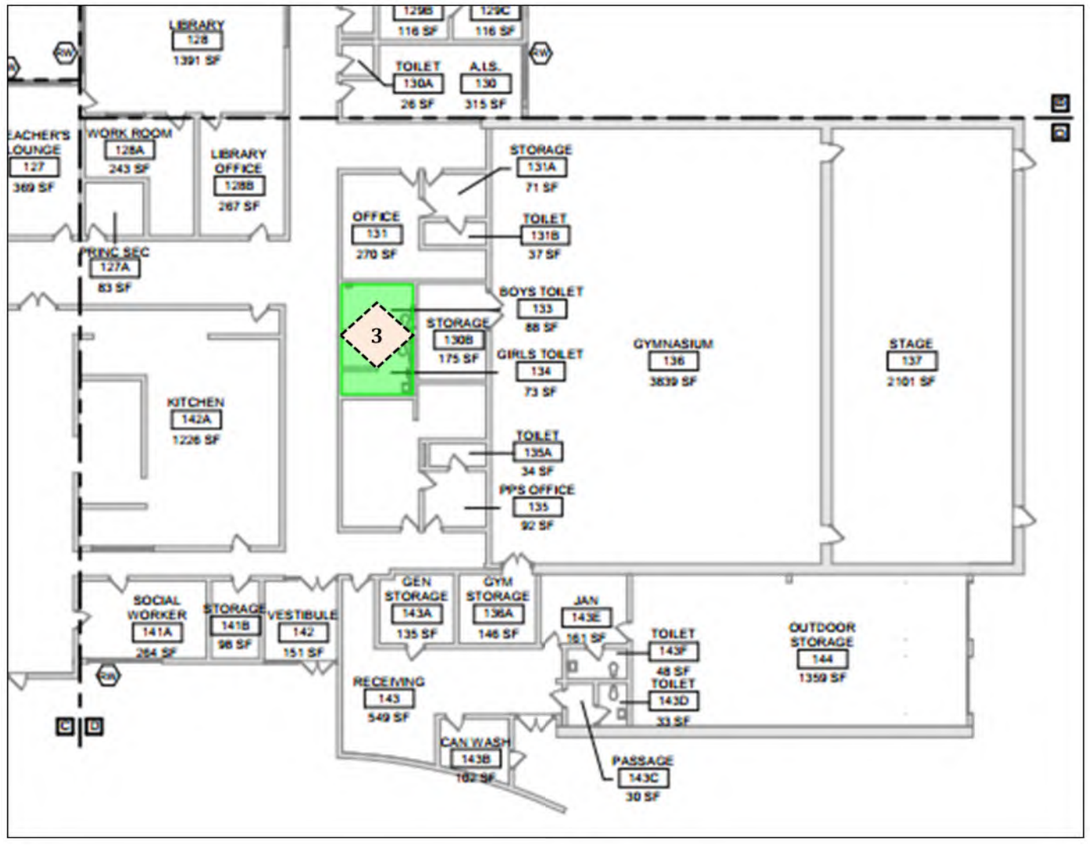
ISSUED FOR:
Asbestos Lead PCB Inspection

ADELAIDE PROJECT NO.:
CORN:24103.02-IN

DRAWING PREPARED BY:
JPF

ASB-01

CORNWALL ELEMENTARY SCHOOL



ACM LEGEND: (see report for details)	
3	Assumed Pipe Insulation and Fittings Within Chases

Second Floor Plan - Asbestos Locations

Drawing Not to Scale

Adelaide ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Mr. Walter Moran
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

Phase 3

SURVEY LOCATION:
Cornwall E.S.
99 Lee Road
Cornwall, New York 12518

DATE: 6/13/2024

DRAWING VERSION: No. 1

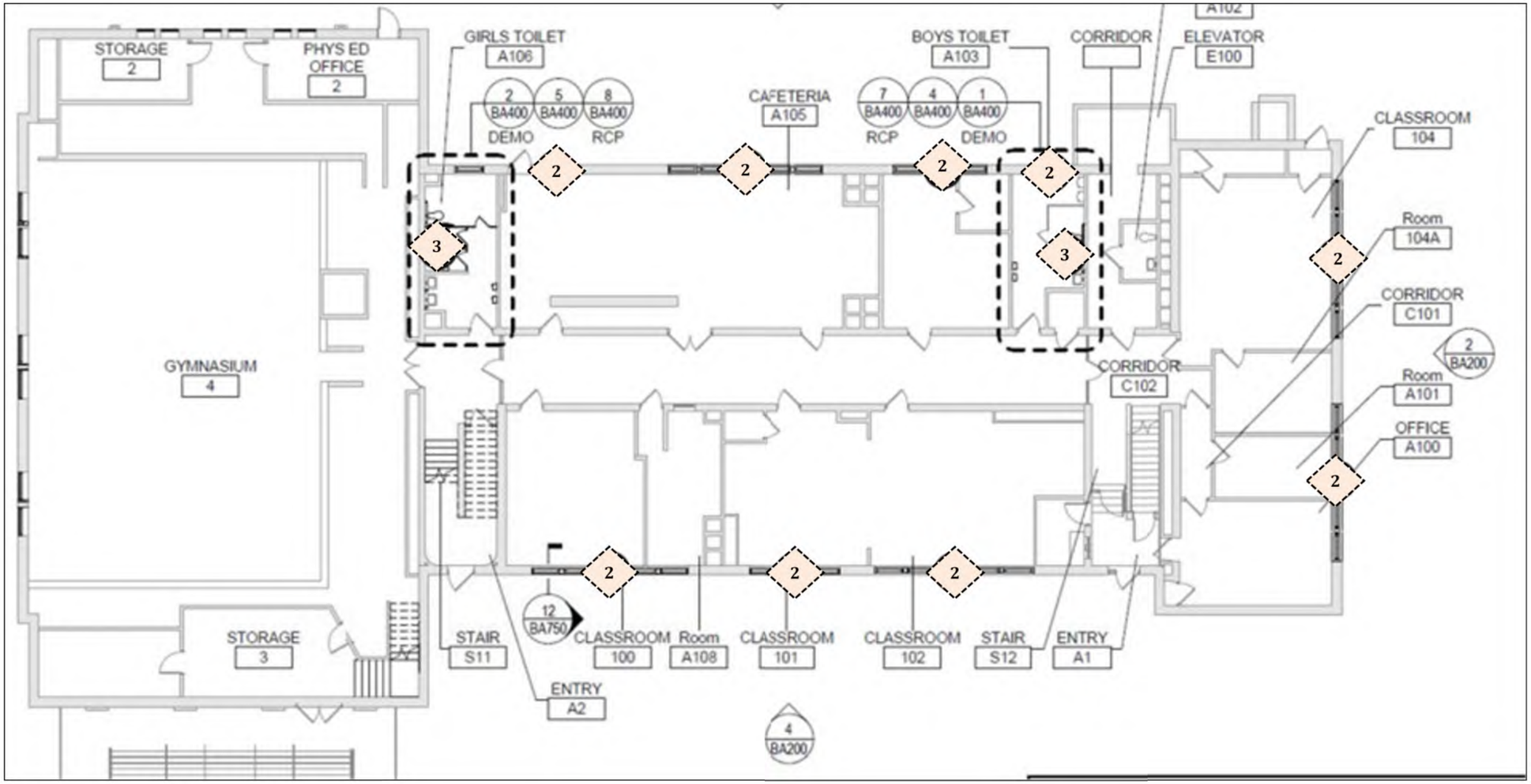
ISSUED FOR:
Asbestos Lead PCB Inspection

ADELAIDE PROJECT NO.:
CORN:24103.02-IN

DRAWING PREPARED BY:
JPF

ASB-02

CORNWALL-ON-HUDSON SCHOOL



First Floor Plan - Asbestos Locations

Drawing Not to Scale

ACM LEGEND: (see report for details)	
1	Textured Coating on Plaster Wall
2	Window Caulking - 2nd Layer and Transite in Sprandrel Space Above Window
3	Assumed Pipe Insulation and Fittings behind walls and buildouts throughout bathrooms
PACM	Electrical (Main fee wire, lighting wire) throughout all bathrooms and HVAC

Adelaide ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Mr. Walter Moran
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

Phase 3

SURVEY LOCATION:
Cornwall On Hudson ES
234 Hudson Street
Cornwall On Hudson,
New York 12518

DATE: 6/13/2024

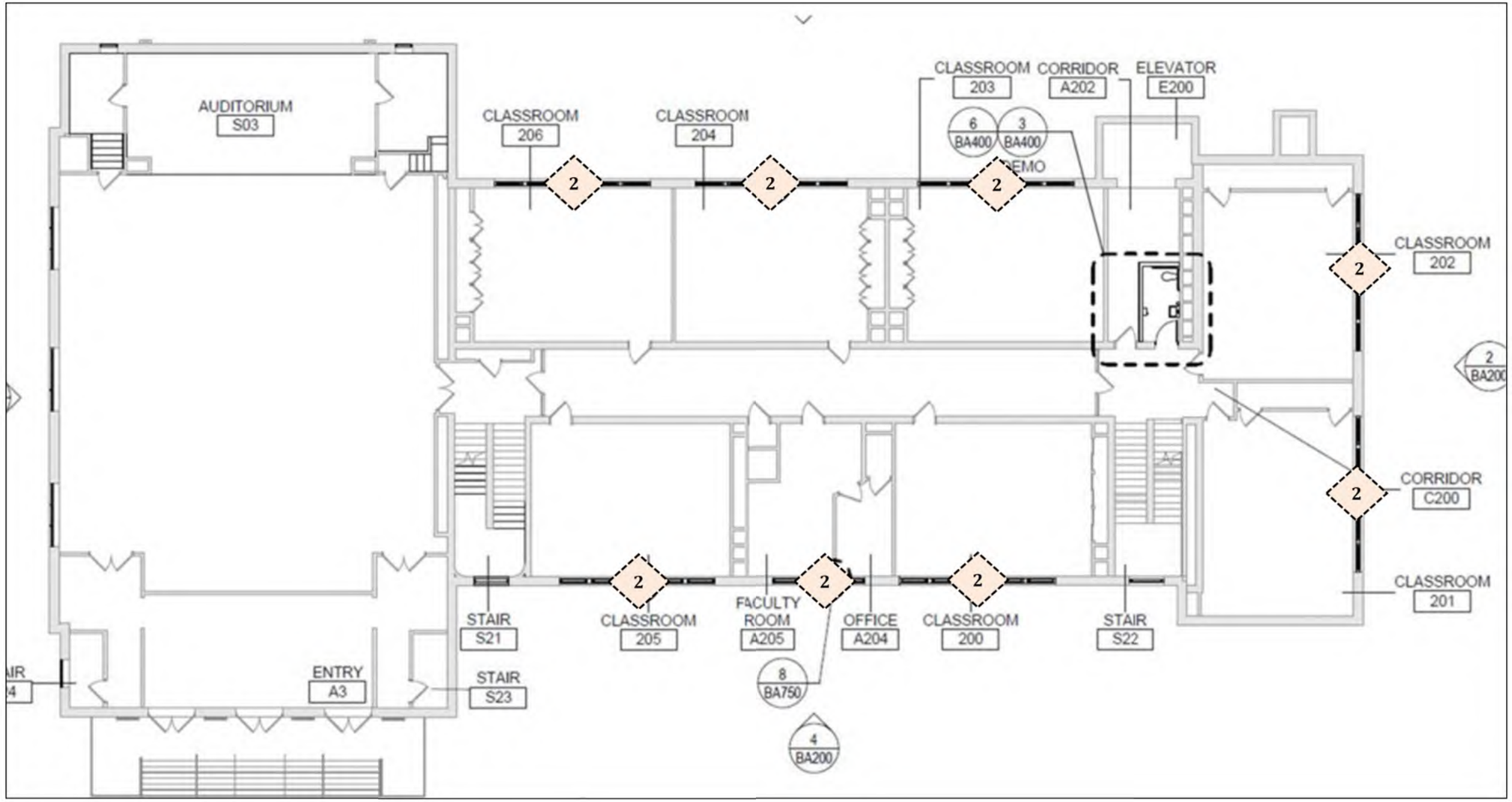
DRAWING VERSION: No. 1

ISSUED FOR:
Asbestos Lead PCB Inspection

ADELAIDE PROJECT NO.:
CORN:24103.02-IN

DRAWING PREPARED BY:
JPF

ASB-03



Second Floor Plan - Asbestos Locations

Drawing Not to Scale

ACM LEGEND: (see report for details)	
1	Textured Coating on Plaster Wall
2	Window Caulking - 2nd Layer and Transite in Sprandrel Space Above Window
3	Assumed Pipe Insulation and Fittings behind walls and buildouts throughout bathrooms
PACM	Electrical (Main fee wire, lighting wire) throughout all bathrooms and HVAC

Adelaide ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Mr. Walter Moran
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

Phase 3

SURVEY LOCATION:
Cornwall On Hudson ES
234 Hudson Street
Cornwall On Hudson,
New York 12518

DATE: 6/13/2024

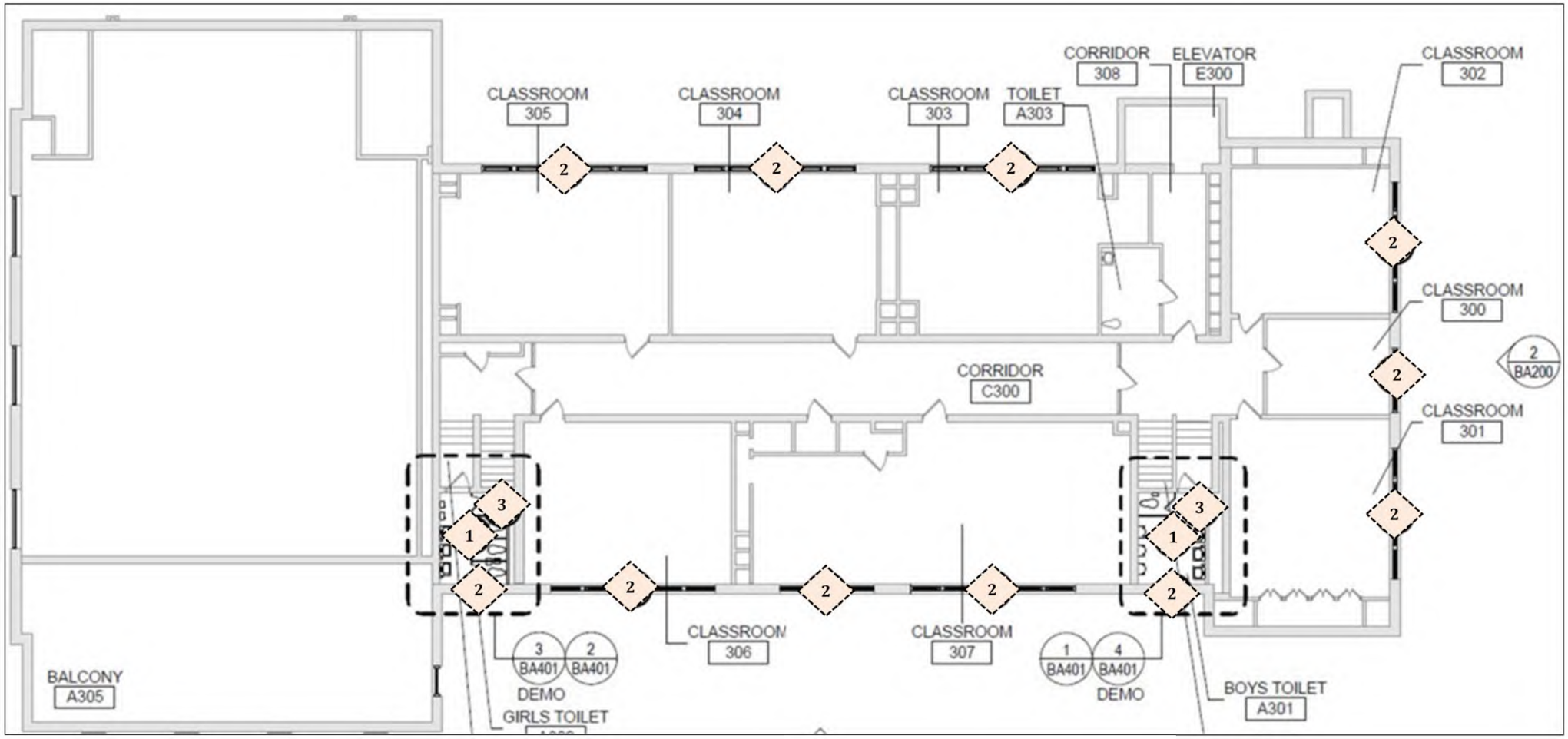
DRAWING VERSION: No. 1

ISSUED FOR:
Asbestos Lead PCB Inspection

ADELAIDE PROJECT NO.:
CORN:24103.02-IN

DRAWING PREPARED BY:
JPF

ASB-04



Third Floor Plan - Asbestos Locations

Drawing Not to Scale

ACM LEGEND: (see report for details)	
1	Textured Coating on Plaster Wall
2	Window Caulking - 2nd Layer and Transite in Sprandrel Space Above Window
3	Assumed Pipe Insulation and Fittings behind walls and buildouts throughout bathrooms
PACM	Electrical (Main fee wire, lighting wire) throughout all bathrooms and HVAC

Adelaide ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Mr. Walter Moran
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

Phase 3

SURVEY LOCATION:
Cornwall On Hudson ES
234 Hudson Street
Cornwall On Hudson,
New York 12518

DATE: 6/13/2024

DRAWING VERSION: No. 1

ISSUED FOR:
Asbestos Lead PCB Inspection

ADELAIDE PROJECT NO.:
CORN:24103.02-IN

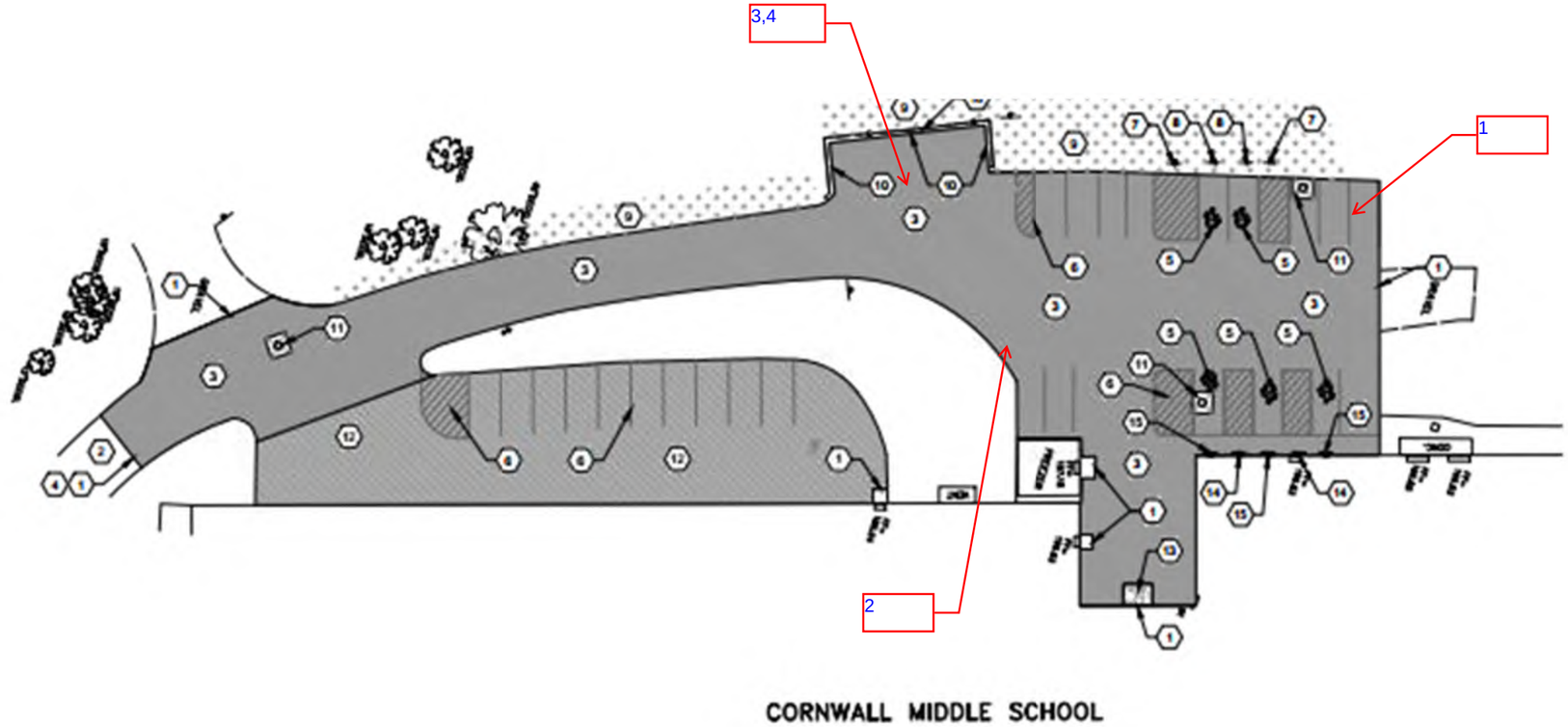
DRAWING PREPARED BY:
JPF

ASB-05

APPENDIX B

SAMPLE LOCATION MAP(S)

CORNWALL MIDDLE SCHOOL



Parking Lot Plan - Sample Locations

Drawing Not to Scale

Adelaide
ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Mr. Walter Moran
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

Phase 3

SURVEY LOCATION:
Cornwall M.S.
122 Main Street
Cornwall, New York 12518

DATE: 6/13/2024

DRAWING VERSION: No. 1

ISSUED FOR:

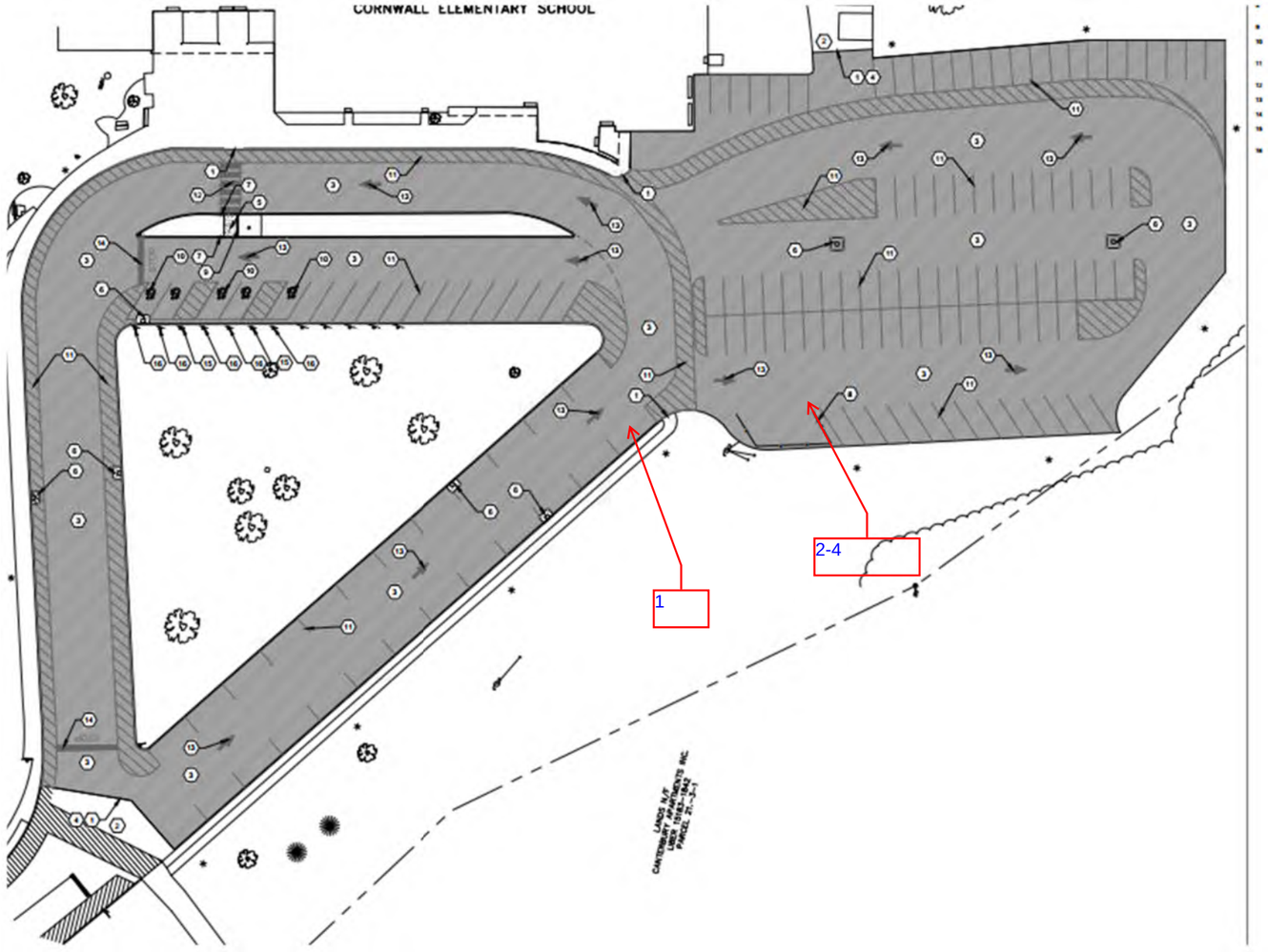
Asbestos Lead PCB Inspection

ADELAIDE PROJECT NO.:
CORN:24103.02-IN

DRAWING PREPARED BY:
JPF

SL-01

CORNWALL ELEMENTARY SCHOOL



Parking Lot Plan - Sample Locations

Drawing Not to Scale

Adelaide
ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Mr. Walter Moran
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

Phase 3

SURVEY LOCATION:
Cornwall E.S.
99 Lee Road
Cornwall, New York 12518

DATE: 6/13/2024

DRAWING VERSION: No. 1

ISSUED FOR:

Asbestos Lead PCB Inspection

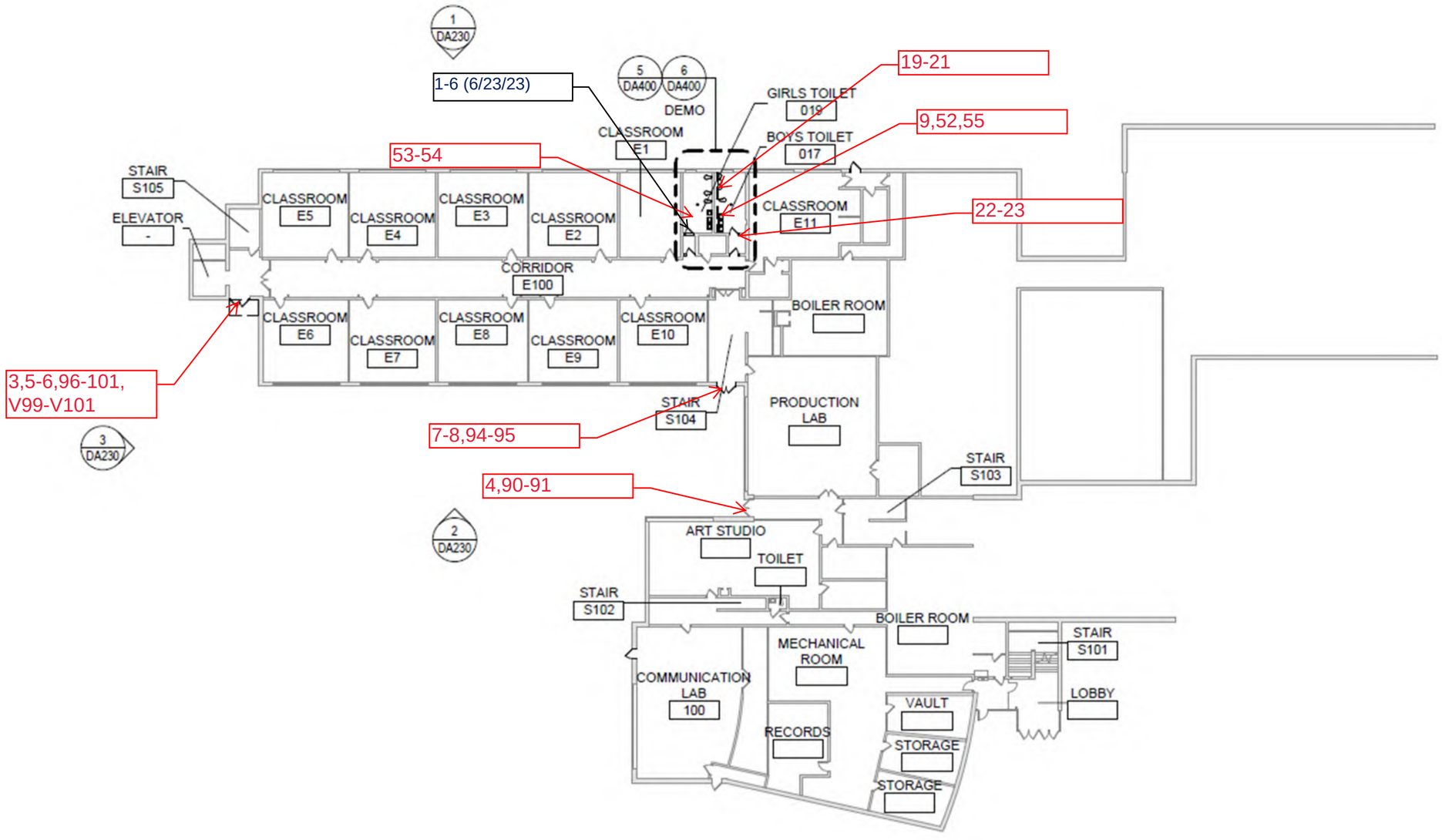
ADELAIDE PROJECT NO.:
CORN:24103.02-IN

DRAWING PREPARED BY:
JPF

SL-02

PREVIOUS SAMPLE LOCATION MAPS

CORNWALL MIDDLE SCHOOL



2 FIRST FLOOR - KEY DEMOLITION PLAN

1/32" = 1'-0"

First Floor Key Plan - Sample Locations

Drawing Not to Scale

Adelaide ENVIRONMENTAL HEALTH

1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Cornwall Central
School District
130 Main Street
Cornwall, New York 12518

(Client) Project #
xxx

SURVEY LOCATION:
Cornwall Middle School
122 Main Street
Cornwall, New York 12518

DATE: 07/3/2023

DRAWING VERSION: No. 2

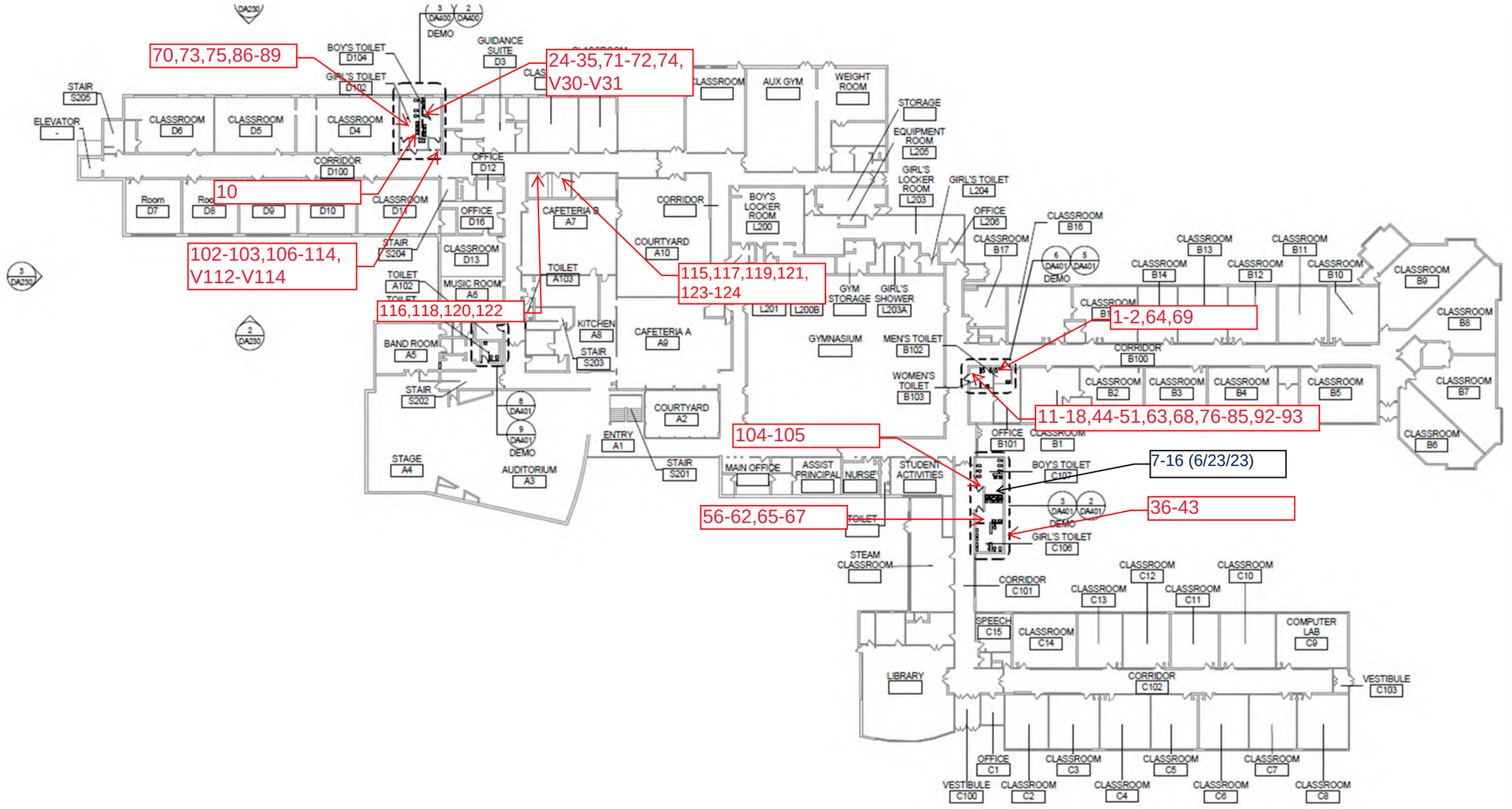
ISSUED FOR:

Limited HazMat Survey

ADELAIDE PROJECT NO.:
CORN: 22154.01-IN

DRAWING PREPARED BY:
JPF

SL-01



Second Floor Key Plan - Sample Locations

Drawing Not to Scale

Adelaide ENVIRONMENTAL HEALTH

1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Cornwall Central
School District
130 Main Street
Cornwall, New York 12518

(Client) Project #
xxx

SURVEY LOCATION:
Cornwall Middle School
122 Main Street
Cornwall, New York 12518

DATE: 07/3/2023

DRAWING VERSION: No. 3

ISSUED FOR:

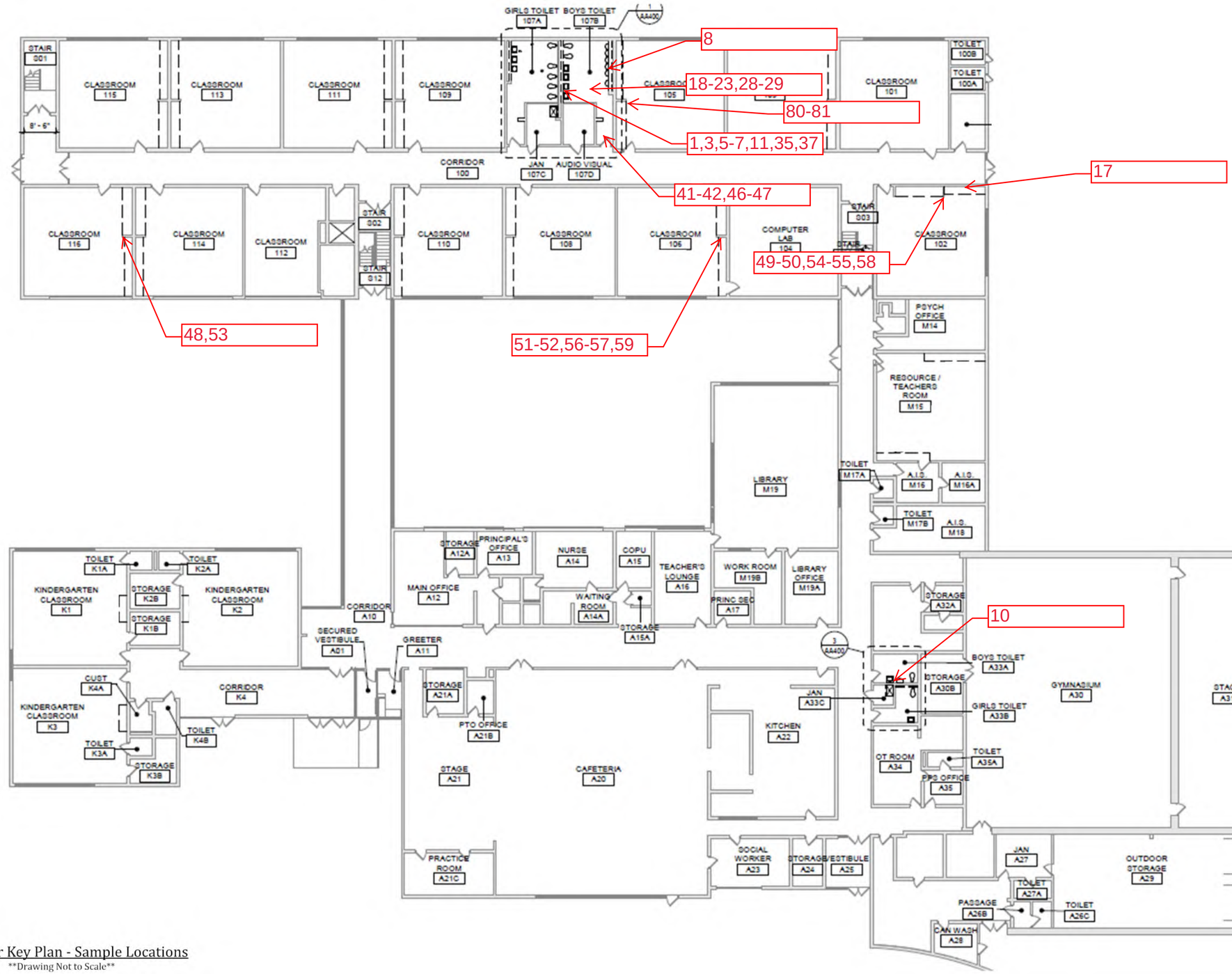
Limited HazMat Survey

ADELAIDE PROJECT NO.:
CORN: 22154.01-IN

DRAWING PREPARED BY:
JPF

SL-02

CORNWALL ELEMENTARY SCHOOL



First Floor Key Plan - Sample Locations

Drawing Not to Scale

Adelaide ENVIRONMENTAL HEALTH

1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

(Client) Project #
XXX

SURVEY LOCATION:
Cornwall Elementary School
99 Lee Road
Cornwall, New York 12518

DATE: 09/18/2022

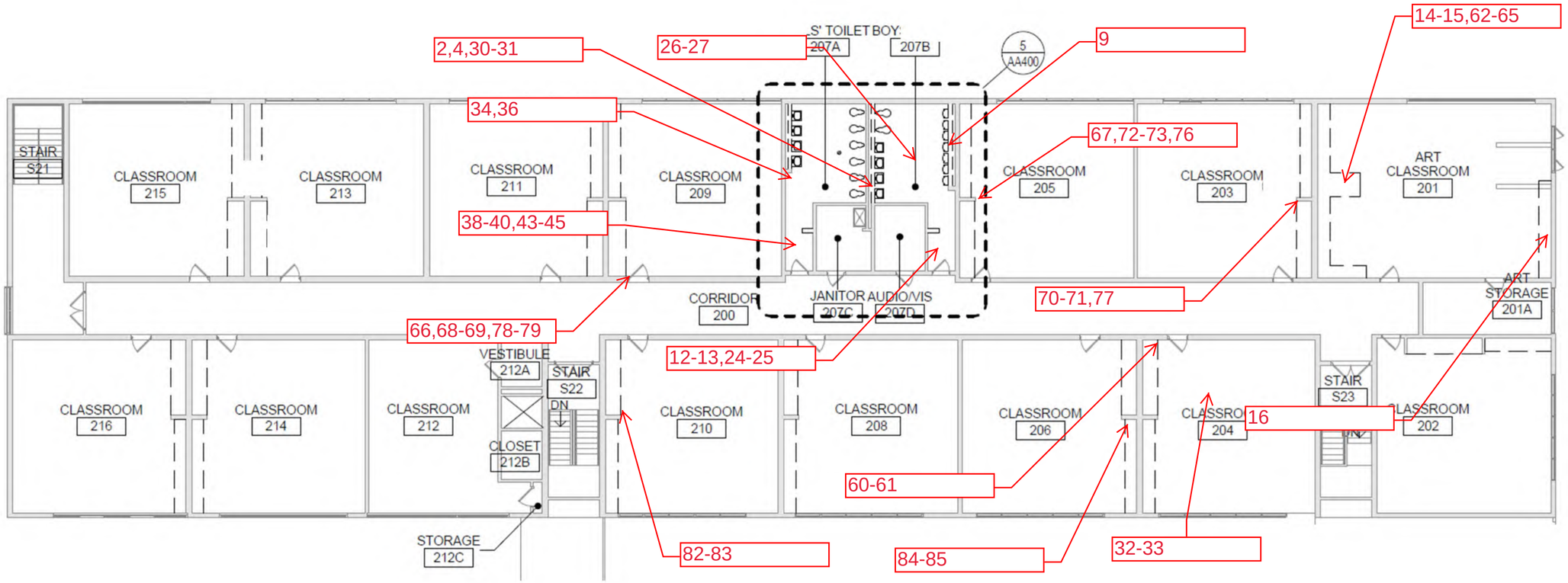
DRAWING VERSION: No. 1

ISSUED FOR:
Limited HazMat Survey

ADELAIDE PROJECT NO.:
CORN: 22276.00-IN

DRAWING PREPARED BY:
DWS

SL-01



Second Floor Key Plan - Sample Locations

Drawing Not to Scale

Adelaide ENVIRONMENTAL HEALTH

1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

(Client) Project #
xxx

SURVEY LOCATION:
Cornwall Elementary School
99 Lee Road
Cornwall, New York 12518

DATE: 09/18/2022

DRAWING VERSION: No. 1

ISSUED FOR:

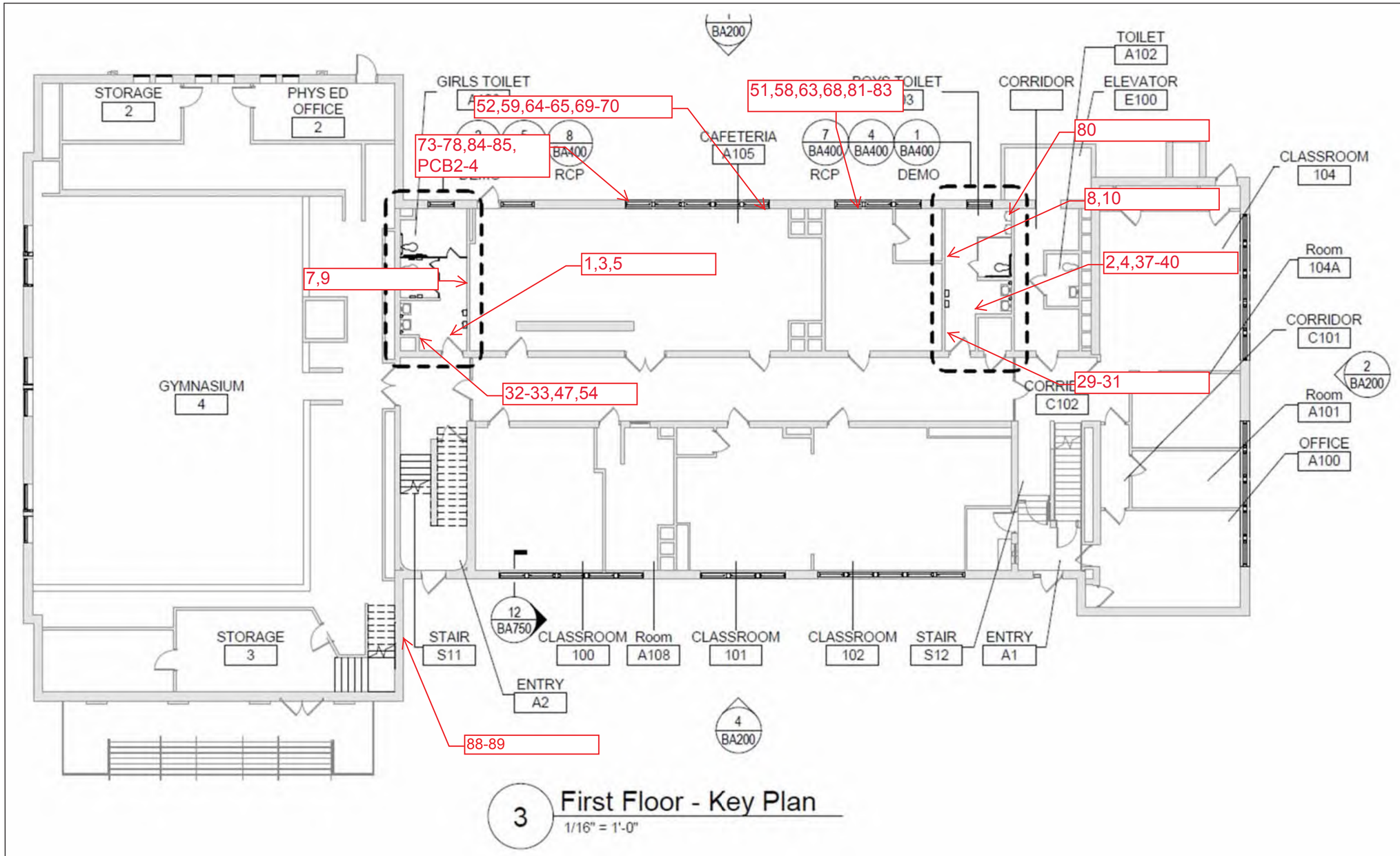
Limited HazMat Survey

ADELAIDE PROJECT NO.:
CORN: 22276.00-IN

DRAWING PREPARED BY:
DWS

SL-02

CORNWALL-ON-HUDSON SCHOOL



First Floor Key Plan - Sample Locations

Drawing Not to Scale

Adelaide ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

(Client) Project #
xxx

SURVEY LOCATION:
Cornwall on Hudson
Elementary School
234 Hudson Street
Cornwall-On-Hudson,
New York 12520

DATE: 12/2/2022

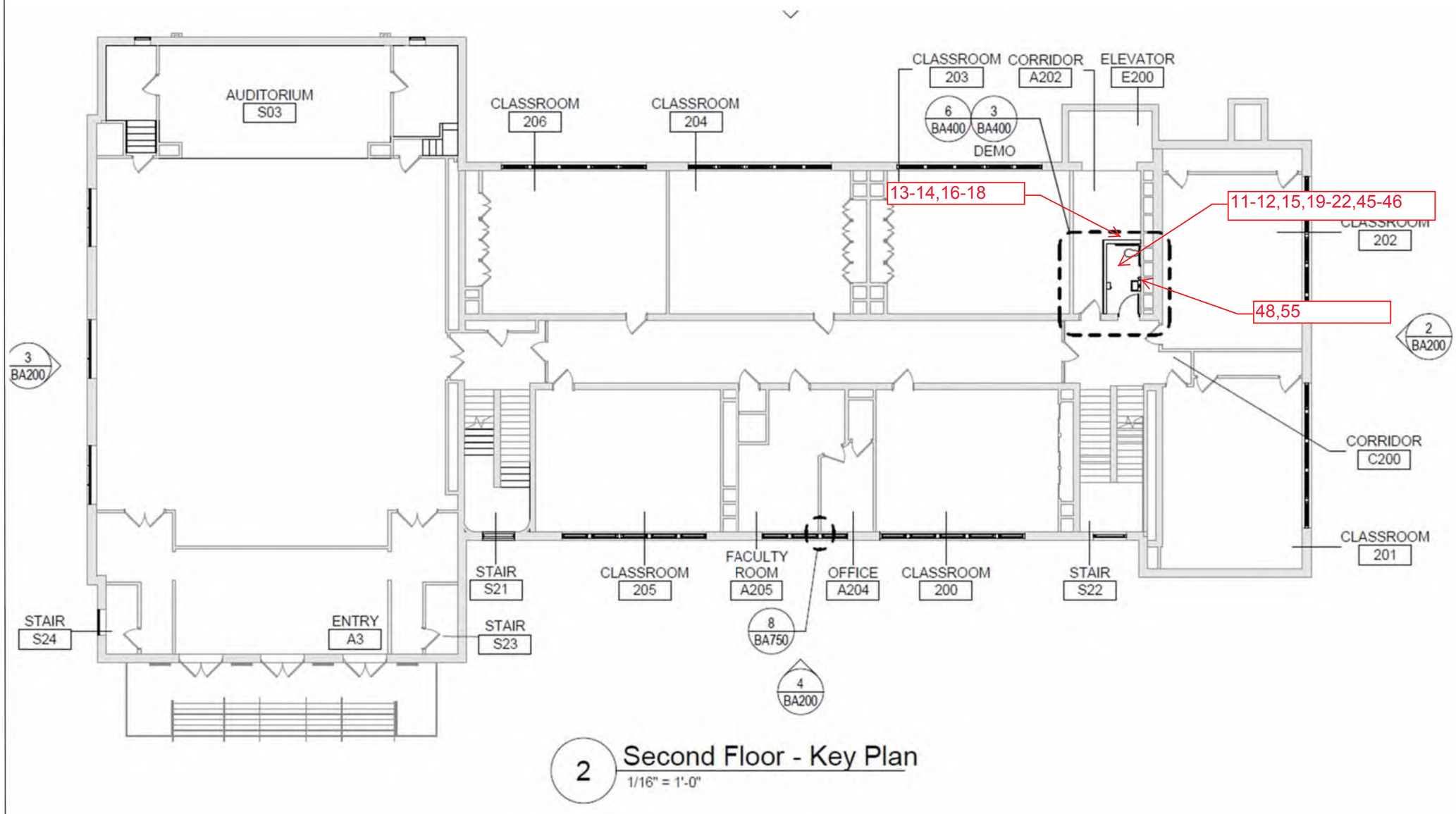
DRAWING VERSION: No. 2

ISSUED FOR:
Limited HazMat Survey

ADELAIDE PROJECT NO.:
CORN: 22278.00-IN

DRAWING PREPARED BY:
JPF

SL-01



2 Second Floor - Key Plan

1/16" = 1'-0"

Second Floor Key Plan - Sample Locations

Drawing Not to Scale

Adelaide ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

(Client) Project #
xxx

SURVEY LOCATION:
Cornwall on Hudson
Elementary School
234 Hudson Street
Cornwall-On-Hudson,
New York 12520

DATE: 09/16/2022

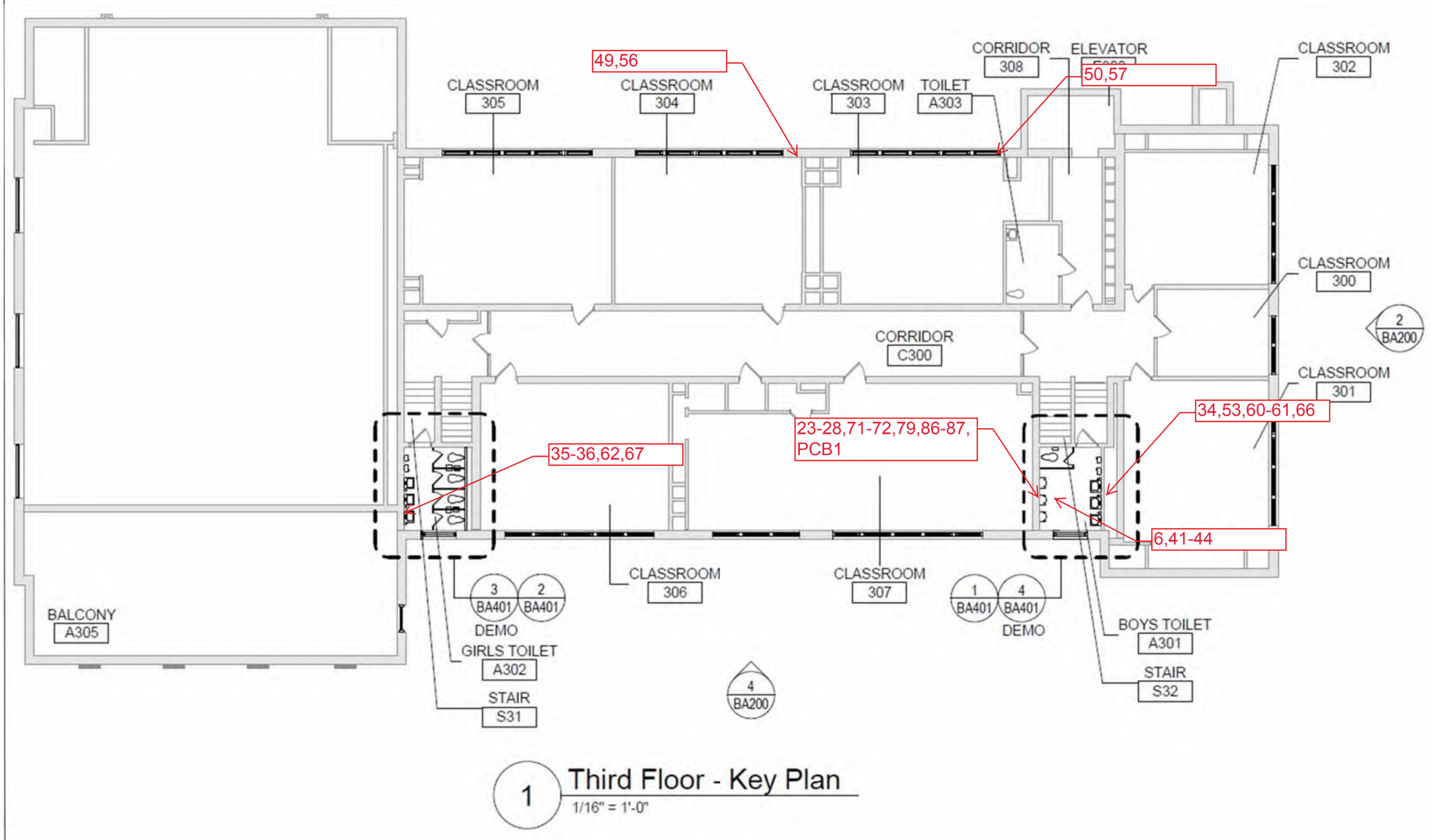
DRAWING VERSION: No. 1

ISSUED FOR:
Limited HazMat Survey

ADELAIDE PROJECT NO.:
CORN: 22278.00-IN

DRAWING PREPARED BY:
DWS

SL-02



1 Third Floor - Key Plan

1/16" = 1'-0"

Third Floor Key Plan - Sample Locations

Drawing Not to Scale

Adelaide ENVIRONMENTAL HEALTH
1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Cornwall Central School District
130 Main Street
Cornwall, New York 12518

(Client) Project #
xxx

SURVEY LOCATION:
Cornwall on Hudson Elementary School
234 Hudson Street
Cornwall-On-Hudson, New York 12520

DATE: 09/16/2022

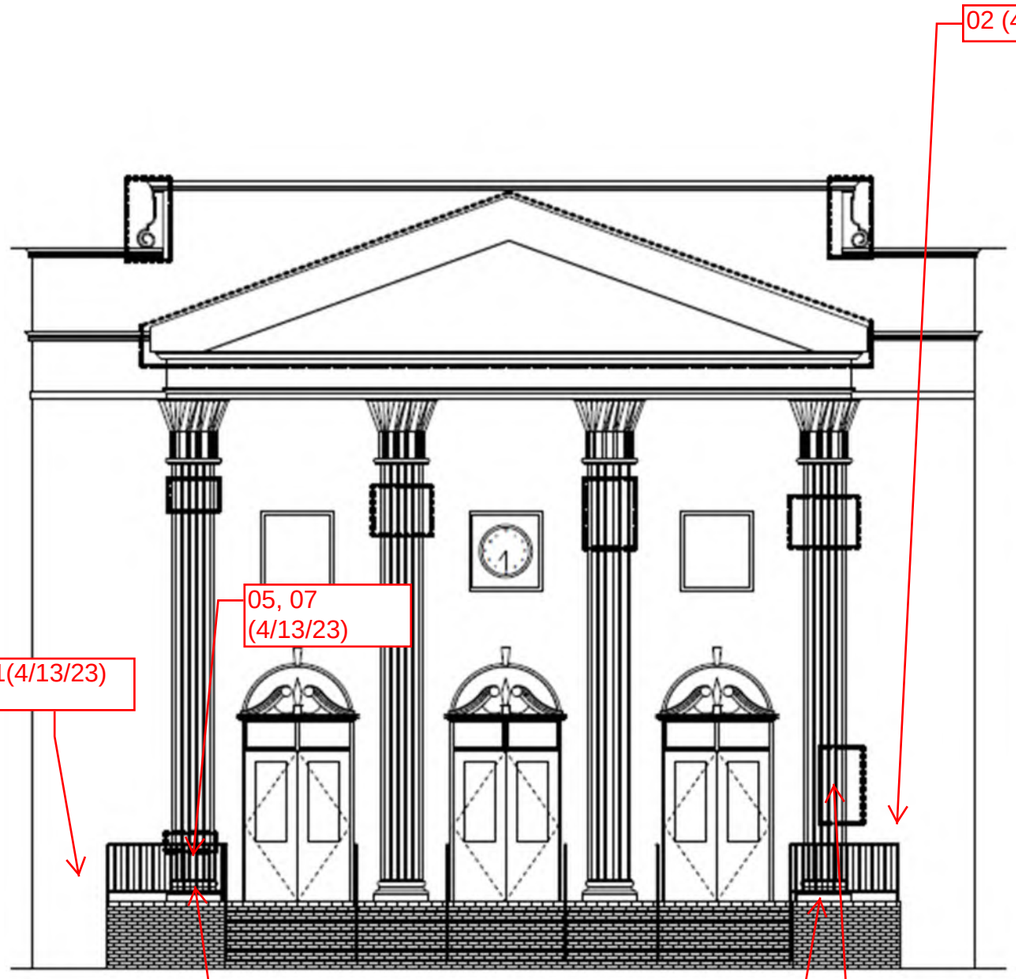
DRAWING VERSION: No. 1

ISSUED FOR:
Limited HazMat Survey

ADELAIDE PROJECT NO.:
CORN: 22278.00-IN

DRAWING PREPARED BY:
DWS

SL-03





Exterior - Limited Sample Locations

Drawing Not to Scale

Adelaide
ENVIRONMENTAL HEALTH

1511 Route 22
Brewster, NY 10509
Phone: (845) 278-7710
Fax: (845) 278-7750

CLIENT:
Mr. Walter Moran
Cornwall Central
School District
130 Main Street
Cornwall, New York 12518

Client Project #

SURVEY LOCATION:
Cornwall-on-Hudson
Elementary School
234 Hudson Street
Cornwall,-on-Hudson
New York 12520

DATE : 04/25/2023

DRAWING VERSION: No. 1

ISSUED FOR:

Limited HazMat Survey

ADELAIDE PROJECT NO.:
CORN:22278.00-IN

DRAWING PREPARED BY:
LNJ3

SL-04

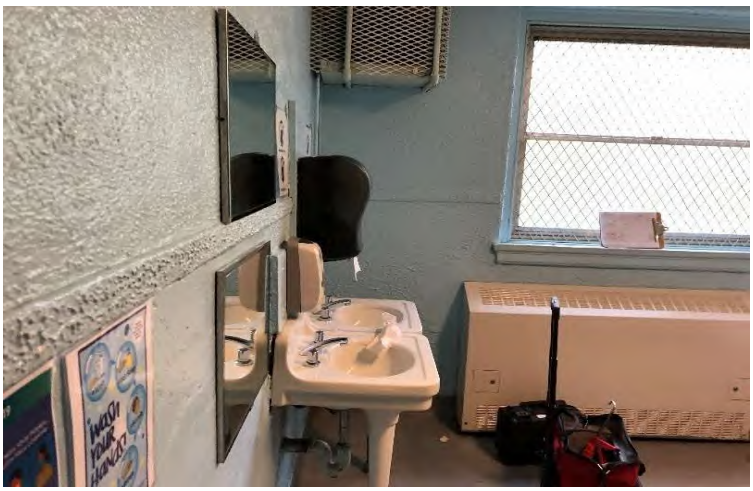
APPENDIX C

ACM PHOTO(S)

CORNWALL MIDDLE SCHOOL

Cornwall MS HA 008 9x9 Floor Tile under 12x12 Floor Tile 7.50% Chrysotile	
Cornwall MS HA 037 1x1 Ceiling Tile Glue Daubs 1.90% Anthophyllite	
Cornwall MS PACM Pipe Insulation and Mudded Fittings	

CORNWALL-ON-HUDSON SCHOOL

Cornwall ES HA 010 Mudded Fittings for Fiberglass Pipe Insulation 10.80% Chrysotile	
Cornwall On Hudson ES HA 016 Textured Wall Coating on Plaster 3.30% Chrysotile	
Cornwall On Hudson ES HA 029 Window Caulking – 2nd Layer (Older Caulk) 3.90% Chrysotile	

Cornwall On Hudson ES PACM All electrical components and associated wiring/insulation materials, electrical boxes/cabinets, lighting, etc.	
Cornwall On Hudson ES HA 34 Transite Panel Above Window 20% Chrysotile	

APPENDIX D

ASBESTOS ANALYTICAL RESULTS

CORNWALL MIDDLE SCHOOL

Client Name: Adelaide Environmental Health

Table I
Summary of Bulk Asbestos Analysis Results

Cornwall M.S.; 122 Main St., Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	1	1	0.709	6.2	12.6	81.2	NAD	NAD
Location: 1st Floor, Back Parking Lot - Asphalt								
02	2	1	0.697	5.2	19.2	75.6	NAD	NAD
Location: 1st Floor, Back Parking Lot - Asphalt								
03	3	2	0.484	6.6	23.5	69.9	NAD	NAD
Location: 1st Floor, Back Parking Lot - Asphalt Patch								
04	4	2	0.827	6.2	14.2	79.7	NAD	NAD
Location: 1st Floor, Back Parking Lot - Asphalt Patch								

Analyzed by: Marik Peysakhov



Date: 6/9/2024

Reviewed by: Marik Peysakhov



**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 06/08/24
Date Examined 06/08/24
ELAP # 11480
AmeriSci Job # 224061717
P.O. #
Page 1 **of** 2
RE: Cornwall M.S.; 122 Main St., Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
1	224061717-01	***No***	NAD
1	**Location:** 1st Floor, Back Parking Lot - Asphalt		(by NYS ELAP 198.6) by Khaalid W. Perine on 06/08/24
Analyst Description: Black/Gray, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 81.2%			
2	224061717-02	***No***	NAD
1	**Location:** 1st Floor, Back Parking Lot - Asphalt		(by NYS ELAP 198.6) by Khaalid W. Perine on 06/08/24
Analyst Description: Black/Gray, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 75.6%			
3	224061717-03	***No***	NAD
2	**Location:** 1st Floor, Back Parking Lot - Asphalt Patch		(by NYS ELAP 198.6) by Khaalid W. Perine on 06/08/24
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 69.9%			
4	224061717-04	***No***	NAD
2	**Location:** 1st Floor, Back Parking Lot - Asphalt Patch		(by NYS ELAP 198.6) by Khaalid W. Perine on 06/08/24
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 79.7%			

See Reporting notes on last page

PLM Bulk Asbestos Report

Cornwall M.S.; 122 Main St., Cornwall, NY 12518

Reporting Notes:

Analyzed by: Khaalid W. Perine
Date: 6/8/2024



Reviewed by: Marik Peysakhov



*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Nikon , Model Labophot Pol, Microscope, Serial #: 952065, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

2240617 17

Site Address: Cornwall, N.Y. 122 Main St Cornwall, NY 12518	Date: 6/7/24	Inspector: Jason Fullum
	Client Project #	
	Project #:	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable Non Friable	Condition g, d, sd
1	1	1	Back Parking Lot - Asphalt		NF	D
2	1	1			↓	D
3	2	1	- Asphalt Path		↓	D
4	2	1			↓	D

Special Instructions/ Turnaround Time:

24 HR TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com and Jfullum@adelaidellc.com

Relinquished by:
Received by: Alexandra Vaccaro 6/7/24 1028
Relinquished by:
Received by:

CORNWALL ELEMENTARY SCHOOL

Client Name: Adelaide Environmental Health

Table I
Summary of Bulk Asbestos Analysis Results

Cornwall E.S.; 99 Lee Rd., Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	1	1	0.332	4.0	1.2	94.8	NAD	NAD
Location: 1st Floor, Bus Luup - Asphalt								
02	2	1	0.314	6.0	4.7	89.3	NAD	NAD
Location: 1st Floor, Back Parking Lot - Asphalt								
03	3	2	0.439	67.5	23.6	8.9	NAD	NAD
Location: 1st Floor, Back Parking Lot - Patching Asphalt								
04	4	2	0.344	8.3	6.7	85.0	NAD	NAD
Location: 1st Floor, Back Parking Lot - Patching Asphalt								

Analyzed by: Marik Peysakhov



Date: 6/9/2024

Reviewed by: Marik Peysakhov



**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 06/08/24
Date Examined 06/08/24
ELAP # 11480
AmeriSci Job # 224061716
P.O. #
Page 1 **of** 2
RE: Cornwall E.S.; 99 Lee Rd., Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
1 1	224061716-01 **Location:** 1st Floor, Bus Luup - Asphalt	***No***	NAD (by NYS ELAP 198.6) by Khaalid W. Perine on 06/08/24
	Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 94.8%		
2 1	224061716-02 **Location:** 1st Floor, Back Parking Lot - Asphalt	***No***	NAD (by NYS ELAP 198.6) by Khaalid W. Perine on 06/08/24
	Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 89.3%		
3 2	224061716-03 **Location:** 1st Floor, Back Parking Lot - Patching Asphalt	***No***	NAD (by NYS ELAP 198.6) by Khaalid W. Perine on 06/08/24
	Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 8.9%		
4 2	224061716-04 **Location:** 1st Floor, Back Parking Lot - Patching Asphalt	***No***	NAD (by NYS ELAP 198.6) by Khaalid W. Perine on 06/08/24
	Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 85%		

See Reporting notes on last page

PLM Bulk Asbestos Report

Cornwall E.S.; 99 Lee Rd., Cornwall, NY 12518

Reporting Notes:

Analyzed by: Khaalid W. Perine
Date: 6/8/2024



Reviewed by: Marik Peysakhov



*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Nikon , Model Labophot Pol, Microscope, Serial #: 952065, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

224061716

Site Address: Cornwall E.S. 99 Lee Rd. Cornwall, NY 12518	Date: 6/7/24	Inspector: **Jason Fullum**
	Client Project #	
	Project #:	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable Non Friable	Condition g, d, sd
1	1	1	Bus Loop - Asphalt		NF	D
2	1	1	Back Parking Lot - "		"	D
3	2	1	" - Patching Asphalt		"	D
4	2	1	" "		"	D

Special Instructions/ Turnaround Time:

Stop at 1st Positive per Homogenous Area 24 HR **TAT**
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com and Jfullum@adelaidellc.com

Relinquished by: [signature]
Received by: Alexandra Vaccaro 6824 1028
Relinquished by:
Received by:

PREVIOUS ASBESTOS ANALYTICAL RESULTS

CORNWALL MIDDLE SCHOOL

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	1	1	0.340	21.9	29.8	48.3	NAD	NAD
Location: 1st Fl., Bathroom B102 - Caulking @ Toilet (Older)								
02	2	1	0.164	22.8	34.9	42.2	NAD	NAD
Location: 1st Fl., Bathroom B102 - Caulking @ Toilet (Older)								
03	3	2	0.404	64.2	23.1	12.7	NAD	NAD
Location: 1st Fl., Exterior Door A7 - Int. Caulking (Newer, Gray)								
04	4	2	0.313	48.7	46.3	4.8	Chrysotile <0.25	Chrysotile <1.0
Location: 1st Fl., Exterior Door B4 - Ext. Caulking (Newer, Gray)								
05	5	3	0.257	61.4	26.0	12.7	NAD	NAD
Location: 1st Fl., Exterior Door A7 - Ext. Caulking (Brown / Gray)								
06	6	3	0.289	60.9	24.5	14.6	NAD	NAD
Location: 1st Fl., Exterior Door A7 - Ext. Caulking (Brown / Gray)								
07	7	4	0.244	33.2	61.1	5.6	NAD	NAD
Location: 1st Fl., Exterior Door A6 - Ext. Caulking (Older, Gray)								
08	8	4	0.227	32.4	63.4	4.2	NAD	NAD
Location: 1st Fl., Exterior Door A6 - Ext. Caulking (Older, Gray)								
09	9	5	0.482	26.6	34.2	39.1	NAD	NAD
Location: 2nd Fl., D Wing, Boys Bathroom - Caulking (White) @ Fixtures								
10	10	5	0.210	34.4	62.7	2.9	NAD	NAD
Location: 1st Fl., D Wing, Girls Bathroom - Caulking (White) @ Fixtures								
11	11	6	0.285	17.3	38.5	44.2	NAD	NAD
Location: 2nd Fl., B Wing, Womens Bathroom - 12 x 12 Beige W/ White (Top Layer)								
12	12	6	0.237	17.8	59.0	23.2	NAD	NAD
Location: 2nd Fl., B Wing, Womens Bathroom - 12 x 12 Beige W/ White (Top Layer)								
13	13	7	0.188	63.7	13.4	22.9	NAD	NAD
Location: 2nd Fl., B Wing, Womens Bathroom - Brown Mastic For 12 x 12								
14	14	7	0.128	55.4	35.2	9.4	NAD	NAD
Location: 2nd Fl., B Wing, Womens Bathroom - Brown Mastic For 12 x 12								
15	15	8	0.150	28.3	38.1	26.1	Chrysotile 7.5	NA
Location: 2nd Fl., B Wing, Womens Bathroom - 9 x 9 Floor Tile (2nd Layer)								
16	16	8	0.234	28.7	35.3	36.0	NA/PS	NA
Location: 2nd Fl., B Wing, Womens Bathroom - 9 x 9 Floor Tile (2nd Layer)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	17	9	0.259	61.9	16.1	22.1	NAD	NAD
Location: 2nd Fl., B Wing, Womens Bathroom - Black Mastic For 9 x 9								
18	18	9	0.191	79.0	10.0	11.0	NAD	NAD
Location: 2nd Fl., B Wing, Womens Bathroom - Black Mastic For 9 x 9								
19	19	10	0.103	87.7	0.5	11.8	NAD	NAD
Location: 1st Fl., D Wing, Boys Bathroom - Older Fiberglass Pipe Wrap								
20	20	10	0.159	86.8	1.6	11.6	NAD	NAD
Location: 1st Fl., D Wing, Boys Bathroom - Older Fiberglass Pipe Wrap								
21	21	10	0.140	86.3	1.9	11.7	NAD	NAD
Location: 1st Fl., D Wing, Boys Bathroom - Older Fiberglass Pipe Wrap								
22	22	11	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Boys Bathroom - Fire Door Insulation								
23	23	11	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Boys Bathroom - Fire Door Insulation								
24	24	12	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Grout (1st Layer)								
25	25	12	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Grout (1st Layer)								
26	26	13	0.231	43.5	54.7	1.8	NAD	NAD
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Adhesive (1st Layer)								
27	27	13	0.198	28.6	69.4	2.1	NAD	NAD
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Adhesive (1st Layer)								
28	28	14	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Grout (2nd Layer)								
29	29	14	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Grout (2nd Layer)								
30	30	15	----	----	----	----	NA	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Mudset (2nd Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."								
31	31	15	----	----	----	----	NA	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Mudset (2nd Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."								
32	32	16	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Floor Grout								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
33	33	16	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Floor Grout								
34	34	17	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Floor Mudset								
35	35	17	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Floor Mudset								
36	36	18	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Grout (1st Layer)								
37	37	18	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Grout (1st Layer)								
38	38	19	0.358	28.3	68.1	3.6	NAD	NAD
Location: 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Adhesive (1st Layer)								
39	39	19	0.292	28.4	49.1	22.5	NAD	NAD
Location: 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Adhesive (1st Layer)								
40	40	20	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Grout (2nd Layer)								
41	41	20	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Grout (2nd Layer)								
42	42	21	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Mudset (2nd Layer)								
43	43	21	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Mudset (2nd Layer)								
44	44	22	----	----	----	----	NAD	NA
Location: 1st Fl., B Wing (1957), B103 - Ceramic Wall Tile Grout								
45	45	22	----	----	----	----	NAD	NA
Location: 1st Fl., B Wing (1957), B103 - Ceramic Wall Tile Grout								
46	46	23	0.238	40.6	38.6	20.9	NAD	NAD
Location: 1st Fl., B Wing (1957), B103 - Ceramic Wall Tile Adhesive								
47	47	23	0.273	58.1	21.5	20.4	NAD	NAD
Location: 1st Fl., B Wing (1957), B103 - Ceramic Wall Tile Adhesive								
48	48	24	----	----	----	----	NAD	NA
Location: 1st Fl., B Wing (1957), B103 - Ceramic Floor Tile Grout								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
49	49	24	----	----	----	----	NAD	NA
Location: 1st Fl., B Wing (1957), B103 - Ceramic Floor Tile Grout								
50	50	25	----	----	----	----	NAD	NA
Location: 1st Fl., B Wing (1957), B103 - Ceramic Floor Tile Mudset								
51	51	25	----	----	----	----	NAD	NA
Location: 1st Fl., B Wing (1957), B103 - Ceramic Floor Tile Mudset								
52	52	26	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Boys Bathroom - Joint Compound								
53	53	26	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Girls Bathroom - Joint Compound								
54	54	27	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Girls Bathroom - Sheetrock								
55	55	27	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Boys Bathroom - Sheetrock								
56	56	28	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Joint Compound								
57	57	28	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Joint Compound								
58	58	29	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Sheetrock								
59	59	29	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Sheetrock								
60	60	30	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Top Coat)								
61	61	30	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Top Coat)								
62	62	30	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Top Coat)								
63	63	30	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B103 - Ceiling Plaster (Top Coat)								
64	64	30	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B102 - Ceiling Plaster (Top Coat)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
65	65	31	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Base Coat)								
66	66	31	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Base Coat)								
67	67	31	----	----	----	----	NAD	NA
Location: 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Base Coat)								
68	68	31	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B103 - Ceiling Plaster (Base Coat)								
69	69	31	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B102 - Ceiling Plaster (Base Coat)								
70	70	32	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Girls Bathroom - Ceiling Plaster (Top Coat)								
71	71	32	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, D104 - Ceiling Plaster (Top Coat)								
72	72	32	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Boys Bathroom - Ceiling Plaster (Top Coat)								
73	73	33	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Girls Bathroom - Ceiling Plaster (Base Coat)								
74	74	33	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, D104 - Ceiling Plaster (Base Coat)								
75	75	33	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Girls Bathroom - Ceiling Plaster (Base Coat)								
76	76	34	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B103 - Wall Plaster (Top Coat)								
77	77	34	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B103 - Wall Plaster (Top Coat)								
78	78	34	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B102 - Wall Plaster (Top Coat)								
79	79	35	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B103 - Wall Plaster (Base Coat)								
80	80	35	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B103 - Wall Plaster (Base Coat)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
81	81	35	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B102 - Wall Plaster (Base Coat)								
82	82	36	0.212	23.9	65.2	10.9	NAD	NAD
Location: 2nd Fl., B Wing, B103 - 1 x 1 Ceiling Tile								
83	83	36	0.214	15.0	80.4	4.6	NAD	NAD
Location: 2nd Fl., B Wing, B103 - 1 x 1 Ceiling Tile								
84	84	37	0.178	55.8	6.3	36.0	NAD	Anthophyllite 1.9
Location: 2nd Fl., B Wing, B103 - 1 x 1 Ceiling Tile Glue Daubs								
85	85	37	0.259	55.1	4.9	40.0	NAD	NA/PS
Location: 1st Fl., B Wing, B103 - 1 x 1 Ceiling Tile Glue Daubs								
86	86	38	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Girls Bathroom - CMU								
87	87	38	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Girls Bathroom - CMU								
88	88	39	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Girls Bathroom - CMU Mortar								
89	89	39	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Girls Bathroom - CMU Mortar								
90L1	90	40	0.221	54.2	42.0	3.8	NAD	NAD
Location: 2nd Fl., B Wing, Door B4 - Cove Base W/ Adhesive / Cove Base								
90L2	90	40	0.382	45.5	43.8	10.7	NAD	NAD
Location: 2nd Fl., B Wing, Door B4 - Cove Base W/ Adhesive / Adhesive								
91L1	91	40	0.267	48.2	49.5	2.3	NAD	NAD
Location: 2nd Fl., B Wing, Door B4 - Cove Base W/ Adhesive / Cove Base								
91L2	91	40	0.376	45.8	43.3	11.0	NAD	NAD
Location: 2nd Fl., B Wing, Door B4 - Cove Base W/ Adhesive / Adhesive								
92	92	41	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B103 - Drywall Above Ceiling Tile								
93	93	41	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, B103 - Drywall Above Ceiling Tile								
94	94	42	----	----	----	----	NAD	NA
Location: 2nd Fl., A7 Door - Brick Mortar								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
95	95	42	----	----	----	----	NAD	NA
Location: 2nd Fl., A7 Door - Brick Mortar								
96	96	43	----	----	----	----	NAD	NA
Location: 2nd Fl., A7 Door - Canopy Ceiling Plaster (Top Layer)								
97	97	43	----	----	----	----	NAD	NA
Location: 2nd Fl., A7 Door - Canopy Ceiling Plaster (Top Layer)								
98	98	43	----	----	----	----	NAD	NA
Location: 2nd Fl., A7 Door - Canopy Ceiling Plaster (Top Layer)								
99	99	44	----	----	----	----	NA	NA
Location: 2nd Fl., A7 Door - Canopy Ceiling Plaster (Base Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."								
100	100	44	----	----	----	----	NA	NA
Location: 2nd Fl., A7 Door - Canopy Ceiling Plaster (Base Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."								
101	101	44	----	----	----	----	NA	NA
Location: 2nd Fl., A7 Door - Canopy Ceiling Plaster (Base Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."								
102	102	45	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Hallway - Terrazzo Floor								
103	103	45	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Hallway - Terrazzo Floor								
104	104	46	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, Hallway - Terrazzo Floor								
105	105	46	----	----	----	----	NAD	NA
Location: 2nd Fl., B Wing, Hallway - Terrazzo Floor								
106	106	47	0.279	41.0	17.0	42.1	NAD	NAD
Location: 2nd Fl., D Wing, Hallway - Textured Coating (Top Layer)								
107	107	47	0.298	39.1	22.5	38.4	NAD	NAD
Location: 2nd Fl., D Wing, Hallway - Textured Coating (Top Layer)								
108	108	47	0.252	39.7	20.8	39.5	NAD	NAD
Location: 2nd Fl., D Wing, Hallway - Textured Coating (Top Layer)								
109	109	48	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Hallway - Skim Coating (2nd Layer)								
110	110	48	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Hallway - Skim Coating (2nd Layer)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
111	111	48	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Hallway - Skim Coating (2nd Layer)								
112.1	112	49	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Hallway - Skim Coat (Type 2) W/ Base Layer / Skim Coat								
112.2	112	49	----	----	----	----	NA	NA
Location: 2nd Fl., D Wing, Hallway - Skim Coat (Type 2) W/ Base Layer / Base Coat "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."								
113.1	113	49	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Hallway - Skim Coat W/ Base Layer / Skim Coat								
113.2	113	49	----	----	----	----	NA	NA
Location: 2nd Fl., D Wing, Hallway - Skim Coat W/ Base Layer / Base Coat "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."								
114.1	114	49	----	----	----	----	NAD	NA
Location: 2nd Fl., D Wing, Hallway - Skim Coat W/ Base Layer / Skim Coat								
114.2	114	49	----	----	----	----	NA	NA
Location: 2nd Fl., D Wing, Hallway - Skim Coat W/ Base Layer / Base Coat "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."								

Analyzed by: Karol H. Lu
Date: 9/15/2022



Reviewed by: Karol H. Lu



**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H600-Noran 7 System, Microscope, Serial #: 542-26-10. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 09/14/22
Date Examined 09/15/22
ELAP # 11480

AmeriSci Job # 222092097
P.O. #
Page 1 **of** 21

RE: CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
1 1	222092097-01 **Location:** 1st Fl., Bathroom B102 - Caulking @ Toilet (Older)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 48.3%			
2 1	222092097-02 **Location:** 1st Fl., Bathroom B102 - Caulking @ Toilet (Older)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Beige/Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 42.2%			
3 2	222092097-03 **Location:** 1st Fl., Exterior Door A7 - Int. Caulking (Newer, Gray)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 12.7%			
4 2	222092097-04 **Location:** 1st Fl., Exterior Door B4 - Ext. Caulking (Newer, Gray)	***Yes***	Trace (<0.25 % pc)[1] (ELAP 400 PC) by Valeriu Voicu on 09/15/22
Analyst Description: Gray/Red, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile <0.25 % pc **Other Material:** Non-fibrous 5%			
5 3	222092097-05 **Location:** 1st Fl., Exterior Door A7 - Ext. Caulking (Brown / Gray)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 12.7%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
6 3	222092097-06 **Location:** 1st Fl., Exterior Door A7 - Ext. Caulking (Brown / Gray)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 14.6%			
7 4	222092097-07 **Location:** 1st Fl., Exterior Door A6 - Ext. Caulking (Older, Gray)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.6%			
8 4	222092097-08 **Location:** 1st Fl., Exterior Door A6 - Ext. Caulking (Older, Gray)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.2%			
9 5	222092097-09 **Location:** 2nd Fl., D Wing, Boys Bathroom - Caulking (White) @ Fixtures	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Off-White/Beige, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 39.1%			
10 5	222092097-10 **Location:** 1st Fl., D Wing, Girls Bathroom - Caulking (White) @ Fixtures	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.9%			
11 6	222092097-11 **Location:** 2nd Fl., B Wing, Womens Bathroom - 12 x 12 Beige W/ White (Top Layer)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Off-White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 44.2%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
12 6	222092097-12 **Location:** 2nd Fl., B Wing, Womens Bathroom - 12 x 12 Beige W/ White (Top Layer)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Off-White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 23.2%			
13 7	222092097-13 **Location:** 2nd Fl., B Wing, Womens Bathroom - Brown Mastic For 12 x 12	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 22.9%			
14 7	222092097-14 **Location:** 2nd Fl., B Wing, Womens Bathroom - Brown Mastic For 12 x 12	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.4%			
15 8	222092097-15 **Location:** 2nd Fl., B Wing, Womens Bathroom - 9 x 9 Floor Tile (2nd Layer)	***Yes***	7.5% (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Dark Gray, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 7.5 % **Other Material:** Non-fibrous 26.1%			
16 8	222092097-16 **Location:** 2nd Fl., B Wing, Womens Bathroom - 9 x 9 Floor Tile (2nd Layer)		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
17 9	222092097-17 **Location:** 2nd Fl., B Wing, Womens Bathroom - Black Mastic For 9 x 9	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 22.1%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
18 9	222092097-18 **Location:** 2nd Fl., B Wing, Womens Bathroom - Black Mastic For 9 x 9	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11%			
19 10	222092097-19 **Location:** 1st Fl., D Wing, Boys Bathroom - Older Fiberglass Pipe Wrap	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Tan/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.8%			
20 10	222092097-20 **Location:** 1st Fl., D Wing, Boys Bathroom - Older Fiberglass Pipe Wrap	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Tan/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.6%			
21 10	222092097-21 **Location:** 1st Fl., D Wing, Boys Bathroom - Older Fiberglass Pipe Wrap	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Tan/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.7%			
22 11	222092097-22 **Location:** 1st Fl., D Wing, Boys Bathroom - Fire Door Insulation	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 60%, Fibrous glass 5%, Non-fibrous 35%			
23 11	222092097-23 **Location:** 1st Fl., D Wing, Boys Bathroom - Fire Door Insulation	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 55%, Fibrous glass 7%, Non-fibrous 38%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
24 12	222092097-24 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Grout (1st Layer)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Beige/Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
25 12	222092097-25 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Grout (1st Layer)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Beige/Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
26 13	222092097-26 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Adhesive (1st Layer)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.8%			
27 13	222092097-27 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Adhesive (1st Layer)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.1%			
28 14	222092097-28 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Grout (2nd Layer)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
29 14	222092097-29 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Grout (2nd Layer)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
30 15	222092097-30 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Mudset (2nd Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."		NA [2]
	Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**		
31 15	222092097-31 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Wall Mudset (2nd Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."		NA [2]
	Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**		
32 16	222092097-32 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Floor Grout	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
	Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%		
33 16	222092097-33 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Floor Grout	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
	Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%		
34 17	222092097-34 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Floor Mudset	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
	Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%		
35 17	222092097-35 **Location:** 2nd Fl., D Wing (1964), Boys Bathroom - Ceramic Floor Mudset	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
	Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%		

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
36	222092097-36	***No***	NAD
18	**Location:** 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Grout (1st Layer)		(by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Cellulose Trace, Non-fibrous 100%			
37	222092097-37	***No***	NAD
18	**Location:** 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Grout (1st Layer)		(by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Cellulose Trace, Non-fibrous 100%			
38	222092097-38	***No***	NAD
19	**Location:** 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Adhesive (1st Layer)		(by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 3.6%			
39	222092097-39	***No***	NAD
19	**Location:** 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Adhesive (1st Layer)		(by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 22.5%			
40	222092097-40	***No***	NAD
20	**Location:** 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Grout (2nd Layer)		(by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Lt. Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Cellulose Trace, Non-fibrous 100%			
41	222092097-41	***No***	NAD
20	**Location:** 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Grout (2nd Layer)		(by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White/Gray, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Cellulose Trace, Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
42	222092097-42	***No***	NAD
21	**Location:** 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Mudset (2nd Layer)		(by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
43	222092097-43	***No***	NAD
21	**Location:** 2nd Fl., C Wing (1957), Boys Bathroom - Ceramic Wall Mudset (2nd Layer)		(by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
44	222092097-44	***No***	NAD
22	**Location:** 1st Fl., B Wing (1957), B103 - Ceramic Wall Tile Grout		(by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
45	222092097-45	***No***	NAD
22	**Location:** 1st Fl., B Wing (1957), B103 - Ceramic Wall Tile Grout		(by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
46	222092097-46	***No***	NAD
23	**Location:** 1st Fl., B Wing (1957), B103 - Ceramic Wall Tile Adhesive		(by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 20.9%			
47	222092097-47	***No***	NAD
23	**Location:** 1st Fl., B Wing (1957), B103 - Ceramic Wall Tile Adhesive		(by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 20.4%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
48 24	222092097-48 **Location:** 1st Fl., B Wing (1957), B103 - Ceramic Floor Tile Grout	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
49 24	222092097-49 **Location:** 1st Fl., B Wing (1957), B103 - Ceramic Floor Tile Grout	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
50 25	222092097-50 **Location:** 1st Fl., B Wing (1957), B103 - Ceramic Floor Tile Mudset	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
51 25	222092097-51 **Location:** 1st Fl., B Wing (1957), B103 - Ceramic Floor Tile Mudset	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
52 26	222092097-52 **Location:** 1st Fl., D Wing, Boys Bathroom - Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
53 26	222092097-53 **Location:** 1st Fl., D Wing, Girls Bathroom - Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
54 27	222092097-54 **Location:** 1st Fl., D Wing, Girls Bathroom - Sheetrock	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10%, Fibrous glass Trace, Non-fibrous 90%			
55 27	222092097-55 **Location:** 1st Fl., D Wing, Boys Bathroom - Sheetrock	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Off-White, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 2%, Fibrous glass Trace, Non-fibrous 98%			
56 28	222092097-56 **Location:** 2nd Fl., C Wing, Boys Bathroom - Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
57 28	222092097-57 **Location:** 2nd Fl., C Wing, Boys Bathroom - Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
58 29	222092097-58 **Location:** 2nd Fl., C Wing, Boys Bathroom - Sheetrock	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 1%, Fibrous glass Trace, Non-fibrous 99%			
59 29	222092097-59 **Location:** 2nd Fl., C Wing, Boys Bathroom - Sheetrock	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 1%, Fibrous glass Trace, Non-fibrous 99%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
60 30	222092097-60 **Location:** 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
61 30	222092097-61 **Location:** 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
62 30	222092097-62 **Location:** 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
63 30	222092097-63 **Location:** 2nd Fl., B Wing, B103 - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
64 30	222092097-64 **Location:** 2nd Fl., B Wing, B102 - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
65 31	222092097-65 **Location:** 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Fibrous glass Trace, Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
66 31	222092097-66 **Location:** 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Fibrous glass Trace, Non-fibrous 100%			
67 31	222092097-67 **Location:** 2nd Fl., C Wing, Boys Bathroom - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Fibrous glass Trace, Non-fibrous 100%			
68 31	222092097-68 **Location:** 2nd Fl., B Wing, B103 - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
69 31	222092097-69 **Location:** 2nd Fl., B Wing, B102 - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
70 32	222092097-70 **Location:** 2nd Fl., D Wing, Girls Bathroom - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
71 32	222092097-71 **Location:** 1st Fl., D Wing, D104 - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
72 32	222092097-72 **Location:** 2nd Fl., D Wing, Boys Bathroom - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
73 33	222092097-73 **Location:** 1st Fl., D Wing, Girls Bathroom - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
74 33	222092097-74 **Location:** 1st Fl., D Wing, D104 - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
75 33	222092097-75 **Location:** 2nd Fl., D Wing, Girls Bathroom - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
76 34	222092097-76 **Location:** 2nd Fl., B Wing, B103 - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
77 34	222092097-77 **Location:** 2nd Fl., B Wing, B103 - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
78 34	222092097-78 **Location:** 2nd Fl., B Wing, B102 - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
79 35	222092097-79 **Location:** 2nd Fl., B Wing, B103 - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
80 35	222092097-80 **Location:** 2nd Fl., B Wing, B103 - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
81 35	222092097-81 **Location:** 2nd Fl., B Wing, B102 - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
82 36	222092097-82 **Location:** 2nd Fl., B Wing, B103 - 1 x 1 Ceiling Tile	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.9%			
83 36	222092097-83 **Location:** 2nd Fl., B Wing, B103 - 1 x 1 Ceiling Tile	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.6%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
84 37	222092097-84 **Location:** 2nd Fl., B Wing, B103 - 1 x 1 Ceiling Tile Glue Daubs	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous Talc Trace, Non-fibrous 37.9%			
85 37	222092097-85 **Location:** 1st Fl., B Wing, B103 - 1 x 1 Ceiling Tile Glue Daubs	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous Talc 1%, Non-fibrous 39%			
86 38	222092097-86 **Location:** 2nd Fl., D Wing, Girls Bathroom - CMU	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
87 38	222092097-87 **Location:** 2nd Fl., D Wing, Girls Bathroom - CMU	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
88 39	222092097-88 **Location:** 2nd Fl., D Wing, Girls Bathroom - CMU Mortar	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
89 39	222092097-89 **Location:** 2nd Fl., D Wing, Girls Bathroom - CMU Mortar	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
90 40	222092097-90L1 **Location:** 2nd Fl., B Wing, Door B4 - Cove Base W/ Adhesive / Cove Base	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.8%			
90 40	222092097-90L2 **Location:** 2nd Fl., B Wing, Door B4 - Cove Base W/ Adhesive / Adhesive	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.7%			
91 40	222092097-91L1 **Location:** 2nd Fl., B Wing, Door B4 - Cove Base W/ Adhesive / Cove Base	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.3%			
91 40	222092097-91L2 **Location:** 2nd Fl., B Wing, Door B4 - Cove Base W/ Adhesive / Adhesive	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11%			
92 41	222092097-92 **Location:** 2nd Fl., B Wing, B103 - Drywall Above Ceiling Tile	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10%, Non-fibrous 90%			
93 41	222092097-93 **Location:** 2nd Fl., B Wing, B103 - Drywall Above Ceiling Tile	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 20%, Non-fibrous 80%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
94	222092097-94	***No***	NAD
42	**Location:** 2nd Fl., A7 Door - Brick Mortar		(by NYS ELAP 198.1) by Valeriu Voicu on 09/14/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
95	222092097-95	***No***	NAD
42	**Location:** 2nd Fl., A7 Door - Brick Mortar		(by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
96	222092097-96	***No***	NAD
43	**Location:** 2nd Fl., A7 Door - Canopy Ceiling Plaster (Top Layer)		(by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: Off-White, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
97	222092097-97	***No***	NAD
43	**Location:** 2nd Fl., A7 Door - Canopy Ceiling Plaster (Top Layer)		(by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
98	222092097-98	***No***	NAD
43	**Location:** 2nd Fl., A7 Door - Canopy Ceiling Plaster (Top Layer)		(by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: Off-White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
99	222092097-99		NA [2]
44	**Location:** 2nd Fl., A7 Door - Canopy Ceiling Plaster (Base Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
100 44	222092097-100 **Location:** 2nd Fl., A7 Door - Canopy Ceiling Plaster (Base Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."		NA [2]
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
101 44	222092097-101 **Location:** 2nd Fl., A7 Door - Canopy Ceiling Plaster (Base Layer) "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."		NA [2]
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
102 45	222092097-102 **Location:** 2nd Fl., D Wing, Hallway - Terrazzo Floor	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: Pink, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
103 45	222092097-103 **Location:** 2nd Fl., D Wing, Hallway - Terrazzo Floor	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: Pink, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
104 46	222092097-104 **Location:** 2nd Fl., B Wing, Hallway - Terrazzo Floor	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: Pink, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
105 46	222092097-105 **Location:** 2nd Fl., B Wing, Hallway - Terrazzo Floor	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: Pink, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
106 47	222092097-106 **Location:** 2nd Fl., D Wing, Hallway - Textured Coating (Top Layer)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 42.1%			
107 47	222092097-107 **Location:** 2nd Fl., D Wing, Hallway - Textured Coating (Top Layer)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 38.4%			
108 47	222092097-108 **Location:** 2nd Fl., D Wing, Hallway - Textured Coating (Top Layer)	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 39.5%			
109 48	222092097-109 **Location:** 2nd Fl., D Wing, Hallway - Skim Coating (2nd Layer)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
110 48	222092097-110 **Location:** 2nd Fl., D Wing, Hallway - Skim Coating (2nd Layer)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
111 48	222092097-111 **Location:** 2nd Fl., D Wing, Hallway - Skim Coating (2nd Layer)	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
112	222092097-112.1	***No***	NAD
49	**Location:** 2nd Fl., D Wing, Hallway - Skim Coat (Type 2) W/ Base Layer / Skim Coat		(by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: White/Red, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
112	222092097-112.2		NA [2]
49	**Location:** 2nd Fl., D Wing, Hallway - Skim Coat (Type 2) W/ Base Layer / Base Coat "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
113	222092097-113.1	***No***	NAD
49	**Location:** 2nd Fl., D Wing, Hallway - Skim Coat W/ Base Layer / Skim Coat		(by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: White/Red, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
113	222092097-113.2		NA [2]
49	**Location:** 2nd Fl., D Wing, Hallway - Skim Coat W/ Base Layer / Base Coat "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
114	222092097-114.1	***No***	NAD
49	**Location:** 2nd Fl., D Wing, Hallway - Skim Coat W/ Base Layer / Skim Coat		(by NYS ELAP 198.1) by Valeriu Voicu on 09/15/22
Analyst Description: White/Red, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
114	222092097-114.2		NA [2]
49	**Location:** 2nd Fl., D Wing, Hallway - Skim Coat W/ Base Layer / Base Coat "(SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16 - see PLM footnote."		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Reporting Notes:

(1) Sample prepared for analysis by ELAP 198.6 method

(2) (SOF-V) and (SM-V) must be analyzed by ELAP 198.8 or equivalent, effective 5/6/16. 10 gram minimum sample weight is required.

Analyzed by: Valeriu Voicu
Date: 9/15/2022



Reviewed by: Karol H. Lu



*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

222092097

Site Address: Cornwall Middle School	Date: 09/12/22	Inspector(s) David Seddon
122 Main Street		
Cornwall, NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
1	1	1	Bathroom B102 - Caulking & Toilet (OLDER)			D
2	1	1	" " - " "			"
3	2	1	Exterior Door A7 - Caulking (Newer Gray) (Interior)			"
4	2	1	" B4 - " " (Exterior)			"
5	3	1	" A7 - Caulking (Brown/Gray) (Exterior)			"
6	3	1	" " - " " "			"
7	4	1	" A6 - Caulking (Older Gray) (Exterior)			"
8	4	1	" " - " " "			"
9	5	2	D wing Boys Bathroom - Caulking (White) & Fixtures			"
10	5	1	" Girls " - " " "			"
11	6	2	B wing - Womens Bathroom - Top Layer - 12x12 Beige w/ White			L
12	6	2	" - " - " - "			"
13	7	2	" - " - Brown Mastic fr 12x12			"
14	7	2	" - " - " " "			"

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

24h
TAT

Relinquished by:
Received by:
9/14/22 12:42
Relinquished by:
Received by:

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

 # 222092097

Site Address: Cornwall Middle School	Date: 09/12/22	Inspector(s) David Seddon
122 Main Street		
Cornwall, NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
15	8	2	B WING - WOOMENS BATHROOM - 2nd LAYER - 9X9 FLOOR TILE			G
16	8	2	" - " - " - "			"
17	9	2	" - " - BLACK MASTIC FOR 9X9			"
18	9	2	" - " - " - "			"
19	10	1	D WING - BOYS BATHROOM - OLDER FIBERGLASS PIPE WRAP			"
20	10	1	" - " - " - "			"
21	10	1	" - " - " - "			"
22	11	1	" - " - FIREDOOR INSULATION			"
23	11	1	" - " - " - "			"
24	12	2	D WING (1964) - BOYS BATHROOM - CERAMIC WALL - 1ST LAYER - GROUT			"
25	12	2	" - " - " - " - "			"
26	13	2	" - " - " - ADHESIVE			"
27	13	2	" - " - " - " - "			"
28	14	2	" - " - " - 2ND LAYER - GROUT			"

24 h
TAT

Stop at 1st Positive per Homogenous Area
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E-Mail results to AdelaideLabResults@Adelaidellc.com

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 # 222092097

Site Address: Cornwall Middle School	Date: 09/12/22	Inspector(s) David Seddon
122 Main Street		
Cornwall, NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
29	14	2	D WING (1964) - Boys BR - Ceramic Wall - 2nd Layer - Grout			F
30	15	2	- - - - Mudset			
31	15	2	- - - - "			
32	16	2	- - Ceramic Floor - Grout			
33	16	2	- - - "			
34	17	2	- - - Mudset			
35	17	2	- - - - "			
36	18		C WING (1957) - Boys BR - Ceramic Wall - 1st Layer - Grout			
37	18		- - - - "			
38	19		- - - Adhesive			
39	19		- - - - "			
40	20		- - - 2nd Layer - Grout			
41	20		- - - - "			
42	21	"	- - - - Mudset			

Stop at 1st Positive per Homogenous Area
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24h
TAT

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 # 222092097

Site Address: Cornwall Middle School	Date: 09/12/22	Inspector(s) David Seddon
122 Main Street		
Cornwall, NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
43	21	2	C Wing (1957) - Boys BR - Ceramic Wall - 2nd Layer - Mudset			F
44	22	1	B " " - B103 - Ceramic Wall Tile - Grout			"
45	22	"	" " - " - " - "			"
46	23	"	" " - " - " - Adhesive			"
47	23	"	" " - " - " - "			"
48	24	"	" " - " - Ceramic Floor Tile - Grout			"
49	24	"	" " - " - " - "			"
50	25	"	" " - " - " - Mudset			"
51	25	"	" " - " - " - "			"
52	26	1	D Wing - Boys Bathroom - Joint Compound			"
53	26	1	" - Girls " - " "			"
54	27	1	" - " " - Sheetrock			"
55	27	1	" - Boys " - "			"
56	28		C Wing - " " - Joint Compound			"

24h
TAT

Stop at 1st Positive per Homogenous Area
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2220920 97

Site Address: Cornwall Middle School	Date: 09/12/22	Inspector(s) David Seddon
122 Main Street		
Cornwall, NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
57	28	2	C Wing - Boys Bathroom - Joint Compound			G
58	29	2	" - " - Sheetrock			"
59	29	2	" - " - "			"
60	30	2	C Wing - Boys Bathroom - Plaster Ceiling - Top Coat			"
61	30	2	" " - " - " - "			"
62	30	2	" " - " - " - "			"
63	30	2	B Wing - B103 - " - "			"
64	30	2	" " - B102 - " - "			"
65	31	2	C " - Boys Bathroom - " - Base Coat			"
66	31	2	" " - " - " - "			"
67	31	2	" " - " - " - "			"
68	31	2	B " - B103 - " - "			"
69	31	2	" " - B102 - " - "			"
70	32	2	D Wing - Girls BR - Plaster Ceiling - Top Coat			"

24h
TAT

Stop at 1st Positive per Homogenous Area
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2220920 97

Site Address: Cornwall Middle School	Date: 09/12/22	Inspector(s) David Seddon
122 Main Street		
Cornwall, NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
71	32	1	D WING - D104 - - PLASTER CEILING - TOP COAT			G
72	32	2	- BOYS BR - -			
73	33	1	- GIRLS BR - - BASE COAT			
74	33	1	- D104 - -			
75	33	2	- GIRLS BR - -			
76	34	2	B WING - B103 - PLASTER WALL - TOP COAT			
77	34		- - - -			
78	34		- B102 - -			
79	35		- B103 - - BASE COAT			
80	35		- - - -			
81	35		- B102 - -			
82	36		- B103 - 1X1 CEILING TILE			
83	36		- - - -			
84	37		- - - - GLUE DAUBS			

24h
TAT

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Site Address: Cornwall Middle School	Date: 09/12/22	Inspector(s) David Seddon
122 Main Street		
Cornwall, NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
85	37	1	B Wing - B103 - 1x1 Ceiling Tile Glue dots			G
86	38	2	D Wing - Girls Bathroom - CMU			
87	38	2	" - " - "			
88	39	2	" - " - " Mortar			
89	39	2	" - " - "			
90	40		B Wing - Door B4 - Covebase & Adhesive			
91	40		" - " - " - "			
92	41		B Wing - B103 - Drywall Above Ceiling Tile			
93	41		" - " - " - "			
94	42		A7 Door - Brick Mortar			
95	42		" - "			D
96	43		" - Canopy - Plaster Ceiling - Top Layer			D
97	43		" - " - " - "			
98	43		" - " - " - "			

24h
TAT

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Site Address: Cornwall Middle School	Date: 9/12/22	Inspector(s) David Seddon
122 Main Street		
Cornwall, NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
99	44	2	A7 DOOR - CANOPY - PLASTER CEILING - BASE COAT			D
100	44	↓	↓ - ↓ - ↓ - ↓			↓
101	44	↓	↓ - ↓ - ↓ - ↓			↓
102	45	↓	D WING - HALLWAY - TERRAZZO FLOOR			G
103	45	↓	↓ - ↓ - ↓			↓
104	46	↓	B WING - ↓ - ↓			↓
105	46	↓	↓ - ↓ - ↓			↓
106	47	↓	D WING - ↓ - TEXTURE COATING - TOP LAYER			↓
107	47	↓	↓ - ↓ - ↓ - ↓			↓
108	47	↓	↓ - ↓ - ↓ - ↓			↓
109	48	↓	↓ - ↓ - SKIM COATING - 2nd LAYER			↓
110	48	↓	↓ - ↓ - ↓ - ↓			↓
111	48	↓	↓ - ↓ - ↓ - ↓			↓
112	49	↓	↓ - ↓ - SKIM COAT (TYPE 2) W/ BASE LAYER			↓

24h
TAT

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2220920 97

Site Address: Cornwall Middle School	Date: 09/12/22	Inspector(s) David Seddon
122 Main Street		
Cornwall, NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
113	49	2	Dining - Hallway - Skim Coat w/ Base Cove			G
114	49	〃	〃 - 〃 - 〃 〃			〃

2 Wk
TAT

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Relinquished by: 9/14/22 12:42
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carleplacelab@emsl.com | http://www.EMSL.com

EMSL ORDER ID: 062220214
EMSL CUSTOMER ID: ADEL50

Reported Date: 9/27/2022
Revision#: R0
Revision Comment: Initial Report

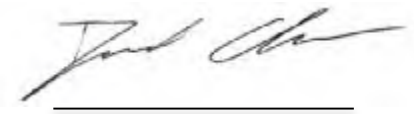
Attention: Stephanie Soter
Adelaide Associates, LLC
1511 Route 22
Suite C-24
Brewster, NY 10509

Phone: 845-278-7710
Email: ssoter@adelaidellc.com

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 09/20/2022. The results are tabulated on the attached data pages for the following client designated project:

CORN: 22154.01-IN

The reference number for these samples is EMSL Order #062220214. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (516)997-7251.



Daniel Clarke, Asbestos Laboratory Manager

or other approved signatory

The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.

NYS ELAP ID: Carle Place, NY 11469

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. When the information supplied by the customer can affect the validity of the results, it will be noted on the report.

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EMSL ORDER ID: 062220214
EMSL CUSTOMER ID: ADEL50

Attention: Stephanie Soter
Adelaide Associates, LLC
1511 Route 22
Suite C-24

Customer PO:
EMSL Project ID:
Project Name: CORN: 22154.01-IN

Phone: 845-278-7710
Email: ssoter@adelaidellc.com

Collected: 09/19/2022
Received: 09/20/2022
Analyzed: 9/27/2022
Reported: 9/27/2022

Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite

Lab Number	*Client Sample Identification*	Appearance	Percentage Matrix Material	Percentage non-Asbestos Fibers	Chrysotile Percentage	Amphibole Percentage	Total Percentage
062220214-0001	15-V30	Gray Non-Fibrous Homogeneous	100.00	0.0	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
062220214-0002	15-V31	Gray Non-Fibrous Homogeneous	100.00	0.0	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
062220214-0003	49-V112	Gray Non-Fibrous Homogeneous	100.00	0.0	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
062220214-0004	49-V113	Gray Non-Fibrous Homogeneous	100.00	0.0	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
062220214-0005	49-V114	Gray Non-Fibrous Homogeneous	100.00	0.0	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
062220214-0006	44-V99	Gray Non-Fibrous Homogeneous	100.00	0.0	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
062220214-0007	44-V100	Gray Non-Fibrous Homogeneous	100.00	0.0	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
062220214-0008	44-V101	Gray Non-Fibrous Homogeneous	100.00	0.0	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected

Report Date	Report Revision	Revision Comments
9/27/2022	R0	Initial Report



Daniel Clarke, Asbestos Laboratory Manager

or other approved signatory

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Carle Place, NY 11514
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EMSL ORDER ID: 062220214
EMSL CUSTOMER ID: ADEL50

Attention: Stephanie Soter
Adelaide Associates, LLC
1511 Route 22
Suite C-24

Customer PO:
EMSL Project ID:
Project Name: CORN: 22154.01-IN

Phone: 845-278-7710
Email: ssoter@adelaidellc.com

Collected: 09/19/2022
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Analyzed: 9/27/2022
Reported: 9/27/2022

Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite

Lab Number	*Client Sample Identification*	Appearance	Percentage Matrix Material	Percentage non-Asbestos Fibers	Chrysotile Percentage	Amphibole Percentage	Total Percentage

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EMSL ORDER ID: 062220214
EMSL CUSTOMER ID: ADEL50

Attention: Stephanie Soter
Adelaide Associates, LLC
1511 Route 22
Suite C-24
Brewster, NY 10509

Phone: 845-278-7710
Email: ssoter@adelaidellc.com

Customer PO:
EMSL Project ID:
Project Name: CORN: 22154.01-IN

Collected: 09/19/2022
Received: 09/20/2022
Analyzed: 9/27/2022
Reported: 9/27/2022

Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite
Bench Sheet

EMSL Sample ID 062220214-0001 **Crucible ID:** V30

	Analyst	Date
Gravimetric Prep	KS	9/23/2022
Chrysotile Analysis	TM	9/26/2022
Centrifugation Date	SF/PM	9/26/2022
Amphibole Analysis	SJ	9/26/2022

Stereoscopic			
Color	Gray	**Stereoscopic % Asbestos**	0
Texture	Non-Fibrous		
Homogeneity	Homogeneous	**Vermiculite Detected**	**Yes**

Initial Weights*	
Weight of Crucible	34.6590
Weight of Crucible and Sub Sample	37.9410
Weight of Sub-Sample	3.2820
Ashing	
Weight of Crucible & Ash	37.5127
Weight of Ash	2.8537
Weight Loss During Ashing	0.4283
Weight Percent Organic and Water	13.0500
Acid Treatment/ Flotation	
Weight of Dish for Floats	0.0000
Weight of Dish & Floats- 1	0.0000
Weight of Dish & Floats- 2	0.0000
Weight of Floats	0.0000
Weight Percent Floats	0.0000
Weight of Dish & Filter for Residue	8.9140
Weight of Dish & Filter & Residue- 1	10.7093
Weight of Dish & Filter & Residue- 2	10.7043
Weight of Residue	1.7903
Weight Loss During Acid/Flotation Treatment	1.0634
Weight Percent Acid-Soluble/Float Materials	32.4010
Weight Percent Residue	54.5491

%Diff	Criteria <3%
	0.0000
	0.0467

Non-Asbestos Fiber	Optical Property	Visual %	Calc %
			0
			0

Chrysotile ID Optical Properties			1.550 RI Lot#:			Temperature (C°):	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

Amphibole ID Optical Properties			1.625 RI Lot#:			Temperature (C°)	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

PLM Examination of Residue (Chrysotile)	Analyzed	PTCT	Chrysotile	Non-Empty	PTCT:	Chrysotile	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Chrysotile Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Chrysotile by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Chrysotile in Sample [1]	0.0000	Slide 4:	0	50	Slide 8:	0	50	

[1] If greater than 1% no further analysis needed

Heavy Liquid Centrifugation		%Diff
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 1	10.6468	Criteria <3%
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 2	10.6382	0.0808
Weight of Balance of Residue	1.7242	
Weight of Dish & Filter for Centrifugate	9.1142	%Diff
Weight of Dish & Filter & Centrifugate- 1	9.1716	Criteria <3%
Weight of Dish & Filter & Centrifugate- 2	9.1699	0.0185
Weight of Centrifugate	0.0557	
Weight Percent Centrifiugate	1.7622	

PLM Examination of Centrifugate (Amphibole)	Analyzed	PTCT	Amphibole	Non-Empty	PTCT	Amphibole	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Amphibole Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Amphibole by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Amphibole in Sample	0.0000	Slide 4:	0	50	Slide 8:	0	50	

Percent of Total Asbestos in Sample	**0.0000**

** All Weights in grams*

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EMSL ORDER ID: 062220214
EMSL CUSTOMER ID: ADEL50

Attention: Stephanie Soter
Adelaide Associates, LLC
1511 Route 22
Suite C-24
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Phone: 845-278-7710
Email: ssoter@adelaidellc.com

Customer PO:
EMSL Project ID:
Project Name: CORN: 22154.01-IN

Collected: 09/19/2022
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Analyzed: 9/27/2022
Reported: 9/27/2022

Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite
Bench Sheet

EMSL Sample ID 062220214-0002 **Crucible ID:** V31

	Analyst	Date
Gravimetric Prep	KS	9/23/2022
Chrysotile Analysis	TM	9/26/2022
Centrifugation Date	SF/PM	9/26/2022
Amphibole Analysis	SJ	9/26/2022

Stereoscopic			
Color	Gray	**Stereoscopic % Asbestos**	0
Texture	Non-Fibrous		
Homogeneity	Homogeneous	**Vermiculite Detected**	**Yes**

Initial Weights*	
Weight of Crucible	36.1537
Weight of Crucible and Sub Sample	39.2971
Weight of Sub-Sample	3.1434
Ashing	
Weight of Crucible & Ash	39.0445
Weight of Ash	2.8908
Weight Loss During Ashing	0.2526
Weight Percent Organic and Water	8.0359
Acid Treatment/ Flotation	
Weight of Dish for Floats	0.0000
Weight of Dish & Floats- 1	0.0000
Weight of Dish & Floats- 2	0.0000
Weight of Floats	0.0000
Weight Percent Floats	0.0000
Weight of Dish & Filter for Residue	8.5056
Weight of Dish & Filter & Residue- 1	10.3765
Weight of Dish & Filter & Residue- 2	10.3751
Weight of Residue	1.8695
Weight Loss During Acid/Flotation Treatment	1.0213
Weight Percent Acid-Soluble/Float Materials	32.4903
Weight Percent Residue	59.4738

%Diff Criteria <3%: 0.0000 (Floats); 0.0135 (Residue)

Non-Asbestos Fiber	Optical Property	Visual %	Calc %
			0
			0

Chrysotile ID Optical Properties — **1.550 RI Lot#:** — Temperature (C°):

⊥RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

Amphibole ID Optical Properties — **1.625 RI Lot#:** — Temperature (C°)

⊥RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

PLM Examination of Residue (Chrysotile)	**Analyzed**	**PTCT**	**Chrysotile**	**Non-Empty**	**PTCT:**	**Chrysotile**	**Non-Empty**	**Trace Detected?**
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Chrysotile Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Chrysotile by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Chrysotile in Sample [1]	0.0000	Slide 4:	0	50	Slide 8:	0	50	

[1] If greater than 1% no further analysis needed

Heavy Liquid Centrifugation	
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 1	10.2723
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 2	10.2634
Weight of Balance of Residue	1.7578
Weight of Dish & Filter for Centrifugate	8.5160
Weight of Dish & Filter & Centrifugate- 1	8.6447
Weight of Dish & Filter & Centrifugate- 2	8.6333
Weight of Centrifugate	0.1173
Weight Percent Centrifiugate	3.9688

%Diff Criteria <3%: 0.0867 (Residue); 0.1320 (Centrifugate)

PLM Examination of Centrifugate (Amphibole)	**Analyzed**	**PTCT**	**Amphibole**	**Non-Empty**	**PTCT**	**Amphibole**	**Non-Empty**	**Trace Detected?**
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Amphibole Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Amphibole by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Amphibole in Sample	0.0000	Slide 4:	0	50	Slide 8:	0	50	

Percent of Total Asbestos in Sample	**0.0000**

** All Weights in grams*

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Reported: 9/27/2022

Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite
Bench Sheet

EMSL Sample ID 062220214-0003 **Crucible ID:** V112

	Analyst	Date
Gravimetric Prep	KS	9/23/2022
Chrysotile Analysis	TM	9/26/2022
Centrifugation Date	SF/PM	9/26/2022
Amphibole Analysis	SJ	9/26/2022

Stereoscopic			
Color	Gray	**Stereoscopic % Asbestos**	0
Texture	Non-Fibrous		
Homogeneity	Homogeneous	**Vermiculite Detected**	**Yes**

*Initial Weights**	
Weight of Crucible	40.5153
Weight of Crucible and Sub Sample	44.1074
Weight of Sub-Sample	3.5921

Ashing	
Weight of Crucible & Ash	43.8566
Weight of Ash	3.3413
Weight Loss During Ashing	0.2508
Weight Percent Organic and Water	6.9820

Acid Treatment/ Flotation		
Weight of Dish for Floats	0.0000	%Diff
Weight of Dish & Floats- 1	0.0000	Criteria <3%
Weight of Dish & Floats- 2	0.0000	0.0000
Weight of Floats	0.0000	
Weight Percent Floats	0.0000	

Weight of Dish & Filter for Residue	9.1096	%Diff
Weight of Dish & Filter & Residue- 1	11.3114	Criteria <3%
Weight of Dish & Filter & Residue- 2	11.3101	0.0115
Weight of Residue	2.2005	
Weight Loss During Acid/Flotation Treatment	1.1408	
Weight Percent Acid-Soluble/Float Materials	31.7586	
Weight Percent Residue	61.2594	

Non-Asbestos Fiber	Optical Property	Visual %	Calc %
			0
			0

Chrysotile ID Optical Properties				1.550 RI Lot#:		Temperature (C°):	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

Amphibole ID Optical Properties				1.625 RI Lot#:		Temperature (C°)	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

PLM Examination of Residue (Chrysotile)	Analyzed	PTCT	Chrysotile	Non-Empty	PTCT:	Chrysotile	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Chrysotile Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Chrysotile by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Chrysotile in Sample [1]	0.0000	Slide 4:	0	50	Slide 8:	0	50	

[1] If greater than 1% no further analysis needed

Heavy Liquid Centrifugation		
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 1	11.1871	%Diff
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 2	11.1788	Criteria <3%
Weight of Balance of Residue	2.0692	0.0742
Weight of Dish & Filter for Centrifugate	8.6221	%Diff
Weight of Dish & Filter & Centrifugate- 1	8.7258	Criteria <3%
Weight of Dish & Filter & Centrifugate- 2	8.7235	0.0264
Weight of Centrifugate	0.1014	
Weight Percent Centrifiugate	3.0020	

PLM Examination of Centrifugate (Amphibole)	Analyzed	PTCT	Amphibole	Non-Empty	PTCT	Amphibole	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Amphibole Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Amphibole by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Amphibole in Sample	0.0000	Slide 4:	0	50	Slide 8:	0	50	

Percent of Total Asbestos in Sample	**0.0000**

** All Weights in grams*

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EMSL ORDER ID: 062220214
EMSL CUSTOMER ID: ADEL50

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EMSL Project ID:
Project Name: CORN: 22154.01-IN

Collected: 09/19/2022
Received: 09/20/2022
Analyzed: 9/27/2022
Reported: 9/27/2022

Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite
Bench Sheet

EMSL Sample ID 062220214-0004 **Crucible ID:** V113

	Analyst	Date
Gravimetric Prep	KS	9/23/2022
Chrysotile Analysis	TM	9/26/2022
Centrifugation Date	SF/PM	9/26/2022
Amphibole Analysis	SJ	9/26/2022

Stereoscopic			
Color	Gray	**Stereoscopic % Asbestos**	0
Texture	Non-Fibrous		
Homogeneity	Homogeneous	**Vermiculite Detected**	**Yes**

Initial Weights*	
Weight of Crucible	37.5158
Weight of Crucible and Sub Sample	40.5309
Weight of Sub-Sample	3.0151
Ashing	
Weight of Crucible & Ash	40.2336
Weight of Ash	2.7178
Weight Loss During Ashing	0.2973
Weight Percent Organic and Water	9.8604
Acid Treatment/ Flotation	
Weight of Dish for Floats	0.0000
Weight of Dish & Floats- 1	0.0000
Weight of Dish & Floats- 2	0.0000
Weight of Floats	0.0000
Weight Percent Floats	0.0000
Weight of Dish & Filter for Residue	8.5541
Weight of Dish & Filter & Residue- 1	10.3029
Weight of Dish & Filter & Residue- 2	10.3011
Weight of Residue	1.7470
Weight Loss During Acid/Flotation Treatment	0.9708
Weight Percent Acid-Soluble/Float Materials	32.1979
Weight Percent Residue	57.9417

%Diff Criteria <3%: 0.0000 (Floats); 0.0175 (Residue)

Non-Asbestos Fiber	Optical Property	Visual %	Calc %
			0
			0

Chrysotile ID Optical Properties			1.550 RI Lot#:			Temperature (C°):	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

Amphibole ID Optical Properties			1.625 RI Lot#:			Temperature (C°)	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

PLM Examination of Residue (Chrysotile)	Analyzed	PTCT	Chrysotile	Non-Empty	PTCT:	Chrysotile	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Chrysotile Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Chrysotile by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Chrysotile in Sample [1]	0.0000	Slide 4:	0	50	Slide 8:	0	50	

[1] If greater than 1% no further analysis needed

Heavy Liquid Centrifugation	
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 1	10.2008
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 2	10.1933
Weight of Balance of Residue	1.6392
Weight of Dish & Filter for Centrifugate	9.1013
Weight of Dish & Filter & Centrifugate- 1	9.1592
Weight of Dish & Filter & Centrifugate- 2	9.1582
Weight of Centrifugate	0.0569
Weight Percent Centrifiugate	2.0113

%Diff Criteria <3%: 0.0736 (Balance of Residue); 0.0109 (Centrifugate)

PLM Examination of Centrifugate (Amphibole)	Analyzed	PTCT	Amphibole	Non-Empty	PTCT	Amphibole	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Amphibole Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Amphibole by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Amphibole in Sample	0.0000	Slide 4:	0	50	Slide 8:	0	50	

Percent of Total Asbestos in Sample	**0.0000**

** All Weights in grams*

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Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite
Bench Sheet

EMSL Sample ID 062220214-0005 **Crucible ID:** V114

	Analyst	Date
Gravimetric Prep	KS	9/23/2022
Chrysotile Analysis	TM	9/26/2022
Centrifugation Date	SF/PM	9/26/2022
Amphibole Analysis	SJ	9/26/2022

Stereoscopic			
Color	Gray	**Stereoscopic % Asbestos**	0
Texture	Non-Fibrous		
Homogeneity	Homogeneous	**Vermiculite Detected**	**Yes**

Initial Weights*	
Weight of Crucible	37.6135
Weight of Crucible and Sub Sample	41.0123
Weight of Sub-Sample	3.3988
Ashing	
Weight of Crucible & Ash	40.7058
Weight of Ash	3.0923
Weight Loss During Ashing	0.3065
Weight Percent Organic and Water	9.0179
Acid Treatment/ Flotation	
Weight of Dish for Floats	0.0000
Weight of Dish & Floats- 1	0.0000
Weight of Dish & Floats- 2	0.0000
Weight of Floats	0.0000
Weight Percent Floats	0.0000
Weight of Dish & Filter for Residue	8.8122
Weight of Dish & Filter & Residue- 1	10.8078
Weight of Dish & Filter & Residue- 2	10.8061
Weight of Residue	1.9939
Weight Loss During Acid/Flotation Treatment	1.0984
Weight Percent Acid-Soluble/Float Materials	32.3173
Weight Percent Residue	58.6648

%Diff Criteria <3%: 0.0000

%Diff Criteria <3%: 0.0157

Non-Asbestos Fiber	Optical Property	Visual %	Calc %
			0
			0

Chrysotile ID Optical Properties				**1.550 RI Lot#:**		Temperature (C°):	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

Amphibole ID Optical Properties				**1.625 RI Lot#:**		Temperature (C°)	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

PLM Examination of Residue (Chrysotile)	**Analyzed**	**PTCT**	**Chrysotile**	**Non-Empty**	**PTCT:**	**Chrysotile**	**Non-Empty**	**Trace Detected?**
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Chrysotile Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Chrysotile by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Chrysotile in Sample [1]	0.0000	Slide 4:	0	50	Slide 8:	0	50	

[1] If greater than 1% no further analysis needed

Heavy Liquid Centrifugation	
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 1	10.6986
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 2	10.6911
Weight of Balance of Residue	1.8789
Weight of Dish & Filter for Centrifugate	9.1132
Weight of Dish & Filter & Centrifugate- 1	9.1748
Weight of Dish & Filter & Centrifugate- 2	9.1714
Weight of Centrifugate	0.0582
Weight Percent Centrifiugate	1.8172

%Diff Criteria <3%: 0.0701

%Diff Criteria <3%: 0.0371

PLM Examination of Centrifugate (Amphibole)	**Analyzed**	**PTCT**	**Amphibole**	**Non-Empty**	**PTCT**	**Amphibole**	**Non-Empty**	**Trace Detected?**
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Amphibole Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Amphibole by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Amphibole in Sample	0.0000	Slide 4:	0	50	Slide 8:	0	50	

Percent of Total Asbestos in Sample	**0.0000**

** All Weights in grams*

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Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite
Bench Sheet

EMSL Sample ID 062220214-0006 **Crucible ID:** V99

	Analyst	Date
Gravimetric Prep	KS	9/23/2022
Chrysotile Analysis	TM	9/26/2022
Centrifugation Date	SF/PM	9/26/2022
Amphibole Analysis	SJ	9/26/2022

Stereoscopic			
Color	Gray	**Stereoscopic % Asbestos**	0
Texture	Non-Fibrous		
Homogeneity	Homogeneous	**Vermiculite Detected**	**Yes**

Initial Weights*	
Weight of Crucible	41.4253
Weight of Crucible and Sub Sample	44.6647
Weight of Sub-Sample	3.2394
Ashing	
Weight of Crucible & Ash	44.3124
Weight of Ash	2.8871
Weight Loss During Ashing	0.3523
Weight Percent Organic and Water	10.8755
Acid Treatment/ Flotation	
Weight of Dish for Floats	0.0000
Weight of Dish & Floats- 1	0.0000
Weight of Dish & Floats- 2	0.0000
Weight of Floats	0.0000
Weight Percent Floats	0.0000
Weight of Dish & Filter for Residue	8.7479
Weight of Dish & Filter & Residue- 1	9.1114
Weight of Dish & Filter & Residue- 2	9.1124
Weight of Residue	0.3645
Weight Loss During Acid/Flotation Treatment	2.5226
Weight Percent Acid-Soluble/Float Materials	77.8724
Weight Percent Residue	11.2521

%Diff Criteria <3%: 0.0000

%Diff Criteria <3%: 0.0110

Non-Asbestos Fiber	Optical Property	Visual %	Calc %
			0
			0

Chrysotile ID Optical Properties			1.550 RI Lot#:			Temperature (C°):	
⊥ RI	∥RI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

Amphibole ID Optical Properties			1.625 RI Lot#:			Temperature (C°)	
⊥ RI	∥RI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

PLM Examination of Residue (Chrysotile)	Analyzed	PTCT	Chrysotile	Non-Empty	PTCT:	Chrysotile	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Chrysotile Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Chrysotile by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Chrysotile in Sample [1]	0.0000	Slide 4:	0	50	Slide 8:	0	50	

[1] If greater than 1% no further analysis needed

Heavy Liquid Centrifugation	
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 1	9.0913
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 2	9.0770
Weight of Balance of Residue	0.3291
Weight of Dish & Filter for Centrifugate	8.5043
Weight of Dish & Filter & Centrifugate- 1	8.5052
Weight of Dish & Filter & Centrifugate- 2	8.5045
Weight of Centrifugate	0.0002
Weight Percent Centrifiugate	0.0068

%Diff Criteria <3%: 0.1574

%Diff Criteria <3%: 0.0082

PLM Examination of Centrifugate (Amphibole)	Analyzed	PTCT	Amphibole	Non-Empty	PTCT	Amphibole	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Amphibole Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Amphibole by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Amphibole in Sample	0.0000	Slide 4:	0	50	Slide 8:	0	50	

Percent of Total Asbestos in Sample	**0.0000**

** All Weights in grams*

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Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite
Bench Sheet

EMSL Sample ID 062220214-0007 **Crucible ID:** V100

	Analyst	Date
Gravimetric Prep	KS	9/23/2022
Chrysotile Analysis	TM	9/26/2022
Centrifugation Date	SF/PM	9/26/2022
Amphibole Analysis	SJ	9/26/2022

Stereoscopic			
Color	Gray	**Stereoscopic % Asbestos**	0
Texture	Non-Fibrous		
Homogeneity	Homogeneous	**Vermiculite Detected**	**Yes**

Initial Weights*	
Weight of Crucible	45.8287
Weight of Crucible and Sub Sample	49.1824
Weight of Sub-Sample	3.3537
Ashing	
Weight of Crucible & Ash	48.7804
Weight of Ash	2.9517
Weight Loss During Ashing	0.4020
Weight Percent Organic and Water	11.9868
Acid Treatment/ Flotation	
Weight of Dish for Floats	0.0000
Weight of Dish & Floats- 1	0.0000
Weight of Dish & Floats- 2	0.0000
Weight of Floats	0.0000
Weight Percent Floats	0.0000
Weight of Dish & Filter for Residue	8.8244
Weight of Dish & Filter & Residue- 1	9.2957
Weight of Dish & Filter & Residue- 2	9.2969
Weight of Residue	0.4725
Weight Loss During Acid/Flotation Treatment	2.4792
Weight Percent Acid-Soluble/Float Materials	73.9243
Weight Percent Residue	14.0889

%Diff Criteria <3%: 0.0000 (Floats); 0.0129 (Residue)

Non-Asbestos Fiber	Optical Property	Visual %	Calc %
			0
			0

Chrysotile ID Optical Properties — **1.550 RI Lot#:** — Temperature (C°):

⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

Amphibole ID Optical Properties — **1.625 RI Lot#:** — Temperature (C°)

⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

PLM Examination of Residue (Chrysotile)	Analyzed	PTCT	Chrysotile	Non-Empty	PTCT:	Chrysotile	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Chrysotile Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Chrysotile by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Chrysotile in Sample [1]	0.0000	Slide 4:	0	50	Slide 8:	0	50	

[1] If greater than 1% no further analysis needed

Heavy Liquid Centrifugation	
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 1	9.2603
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 2	9.2464
Weight of Balance of Residue	0.4220
Weight of Dish & Filter for Centrifugate	8.6033
Weight of Dish & Filter & Centrifugate- 1	8.6050
Weight of Dish & Filter & Centrifugate- 2	8.6054
Weight of Centrifugate	0.0021
Weight Percent Centrifiugate	0.0701

%Diff Criteria <3%: 0.1502 (Residue); 0.0046 (Centrifugate)

PLM Examination of Centrifugate (Amphibole)	Analyzed	PTCT	Amphibole	Non-Empty	PTCT	Amphibole	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Amphibole Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Amphibole by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Amphibole in Sample	0.0000	Slide 4:	0	50	Slide 8:	0	50	

Percent of Total Asbestos in Sample	**0.0000**

** All Weights in grams*

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Asbestos Analysis of NYS ELAP Method 198.8
PLM Analysis for Asbestos in Bulk Surfacing Materials Containing Vermiculite
Bench Sheet

EMSL Sample ID 062220214-0008 **Crucible ID:** V101

	Analyst	Date
Gravimetric Prep	KS	9/23/2022
Chrysotile Analysis	TM	9/26/2022
Centrifugation Date	SF/PM	9/26/2022
Amphibole Analysis	SJ	9/26/2022

Stereoscopic			
Color	Gray	Stereoscopic % Asbestos	0
Texture	Non-Fibrous		
Homogeneity	Homogeneous	Vermiculite Detected	Yes

*Initial Weights**	
Weight of Crucible	36.8898
Weight of Crucible and Sub Sample	39.9892
Weight of Sub-Sample	3.0994
Ashing	
Weight of Crucible & Ash	39.6187
Weight of Ash	2.7289
Weight Loss During Ashing	0.3705
Weight Percent Organic and Water	11.9539
Acid Treatment/ Flotation	
Weight of Dish for Floats	0.0000
Weight of Dish & Floats- 1	0.0000
Weight of Dish & Floats- 2	0.0000
Weight of Floats	0.0000
Weight Percent Floats	0.0000
Weight of Dish & Filter for Residue	8.9136
Weight of Dish & Filter & Residue- 1	9.4698
Weight of Dish & Filter & Residue- 2	9.4705
Weight of Residue	0.5569
Weight Loss During Acid/Flotation Treatment	2.1720
Weight Percent Acid-Soluble/Float Materials	70.0781
Weight Percent Residue	17.9680

%Diff Criteria <3%: 0.0000

%Diff Criteria <3%: 0.0074

Non-Asbestos Fiber	Optical Property	Visual %	Calc %
			0
			0

Chrysotile ID Optical Properties			1.550 RI Lot#:			Temperature (C°):	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

Amphibole ID Optical Properties			1.625 RI Lot#:			Temperature (C°)	
⊥ RI	IIRI	Morphology	Sign	Pleochorism	Birefringence	Fiber Color	Extinction

PLM Examination of Residue (Chrysotile)	Analyzed	PTCT	Chrysotile	Non-Empty	PTCT:	Chrysotile	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Chrysotile Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Chrysotile by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Chrysotile in Sample [1]	0.0000	Slide 4:	0	50	Slide 8:	0	50	

[1] If greater than 1% no further analysis needed

Heavy Liquid Centrifugation	
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 1	9.4238
Weight of Dish & Filter & Balance of Residue (Post Chrysotile Analysis)- 2	9.4125
Weight of Balance of Residue	0.4989
Weight of Dish & Filter for Centrifugate	9.0882
Weight of Dish & Filter & Centrifugate- 1	9.1042
Weight of Dish & Filter & Centrifugate- 2	9.1030
Weight of Centrifugate	0.0148
Weight Percent Centrifiugate	0.5330

%Diff Criteria <3%: 0.1200

%Diff Criteria <3%: 0.0132

PLM Examination of Centrifugate (Amphibole)	Analyzed	PTCT	Amphibole	Non-Empty	PTCT	Amphibole	Non-Empty	Trace Detected?
Number of Occupied Points	400	Slide 1:	0	50	Slide 5:	0	50	*dropdown select*
Number of Amphibole Points	0	Slide 2:	0	50	Slide 6:	0	50	
Percent Amphibole by PTCT	0.00	Slide 3:	0	50	Slide 7:	0	50	**No**
Percent Amphibole in Sample	0.0000	Slide 4:	0	50	Slide 8:	0	50	

Percent of Total Asbestos in Sample	**0.0000**

** All Weights in grams*

EMSL ANALYTICAL, INC.
528 Mineola Avenue
Carle Place, NY 11514
Phone/Fax: (516)997-7251 / (516)997-7528
carleplacelab@emsl.com | http://www.EMSL.com

EMSL ORDER ID: 062220214
EMSL CUSTOMER ID: ADEL50

Attention: Stephanie Soter
Adelaide Associates, LLC
1511 Route 22
Suite C-24
Brewster, NY 10509

Phone: 845-278-7710
Email: ssoter@adelaidellc.com

Customer PO:
EMSL Project ID:
Project Name: CORN: 22154.01-IN

Collected: 09/19/2022
Received: 09/20/2022
Analyzed: 9/27/2022
Reported: 9/27/2022

Signature Page

Report Date	Report Revision	Revision Comments
9/27/2022	R0	Initial Report



Daniel Clarke, Asbestos Laboratory Manager

or other approved signatory

Additional Comments: NYS ELAP #11469

About us

EMSL Analytical, Inc. offers a full line of analytical solutions for over 30 years across North America. For more information about our nationally accredited locations, vast line of testing services, and our food safety solutions please visit www.EMSL.com or call (800) 220-3675.



Disclaimers

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. When the information supplied by the customer can affect the validity of the results, it will be noted on the report.

OrderID: 062220214

EMSL Analytical, Inc.
528 Mineola Avenue

Carle Place, NY 11514
PHONE: (516) 997-7251
FAX: (516) 997-7528

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material
Chain of Custody
EMSL Order Number *(Lab Use Only)*: 062220214

Company: Adelaide Environmental Health Associates Inc.	**EMSL-Bill to:** ☑ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 1511 Route 22, Suite C24	
City: Brewster **State/Province:** NY	**Zip/Postal Code:** 10509 **Country:** US
Report To (Name): Stephanie Soter	**Telephone #:** 845.278.7710
Email Address: adelaidemail@adelaidellc.com	**Fax #:** 845.278.7750 **Purchase Order:**
Project Name/Number: CORN:22154.01-IN	**Please Provide Results:** ☐ Fax ✓ Email ☐ Mail
U.S. State Samples Taken: NY	**CT Samples:** ☐ Commercial/Taxable ☐ Residential/Tax Exempt

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☒ 1 Week ☐ 2 Week

*For TEM Air 3 hr through 6 hr, please call ahead to schedule. *There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

PLM - Bulk (reporting limit)	TEM – Bulk
☐ PLM EPA 600/R-93/116 (<1%)	☐ TEM EPA NOB – EPA 600/R-93/116 Section 2.5.5.1
☐ PLM EPA NOB (<1%)	☐ NY ELAP Method 198.4 (TEM)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ Chatfield Protocol (semi-quantitative)
Point Count w/Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ TEM % by Mass – EPA 600/R-93/116 Section 2.5.5.2
☐ NIOSH 9002 (<1%)	☐ TEM Qualitative via Filtration Prep Technique
☐ NY ELAP Method 198.1 (friable in NY)	☐ TEM Qualitative via Drop Mount Prep Technique
☐ NY ELAP Method 198.6 NOB (non-friable-NY)	**Other**
☐ OSHA ID-191 Modified	☒ NYS ELAP 198.8
☐ Standard Addition Method	

☐ **Check For Positive Stop – Clearly Identify Homogenous Group** **Date Sampled:** 09/19/2022

Samplers Name: Louis N. Johnson III **Samplers Signature:**

RECEIVED SEP 20 2022 EMSL ANALYTICAL, INC. CARLE PLACE, N.Y.

Sample #	HA #	Sample Location	Material Description
V30	15	2nd Fl D-wing Boys Bathroom ceramic wall 2nd layer	Mortar/Mastic B2
V31	15	" " " " " "	" / "
V112	49	2nd Fl D-wing Hallway plaster wall	Plaster Base Coat only
V113	49	↓ ↓ ↓ ↓ ↓	↓ ↓ ↓
V114	49		
V99	44	A-7 Over canopy ceiling	
V100	44		
V101	44	↓ ↓ ↓ ↓	↓ ↓ ↓

Client Sample # (s): V30, 31, V112-V-114, V99-101 **Total # of Samples:** 8

Relinquished (Client): **Date:** 9/19/22 **Time:** 1705

Received (Lab): Ojenne **Date:** 9-20-22 **Time:** 10:32AM

Comments/Special Instructions: Test 198.6 Vermiculite Samples
Please Email copy of results to ljohnson@adelaidellc.com Thank You
Tania Montes De Oca 9/26/22

Client Name: Adelaide Environmental Health

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01.1	1	1	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Shower - Ceiling Plaster (Skim Coat)								
01.2	1	2	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Shower - Ceiling Plaster (Base Coat)								
02.1	2	1	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Locker Room - Ceiling Plaster (Skim Coat)								
02.2	2	2	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Locker Room - Ceiling Plaster (Base Coat)								
03.1	3	1	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Locker Room - Ceiling Plaster (Skim Coat)								
03.2	3	2	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Locker Room - Ceiling Plaster (Base Coat)								
04.1	4	1	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Shower - Ceiling Plaster (Skim Coat)								
04.2	4	2	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Shower - Ceiling Plaster (Base Coat)								
05.1	5	1	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Coach Office - Ceiling Plaster (Skim Coat)								
05.2	5	2	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Coach Office - Ceiling Plaster (Base Coat)								
06.1	6	3	----	----	----	----	NAD	NA
Location: 1st Fl., Gym Storage Room - Wall Plaster (Skim Coat)								
06.2	6	4	----	----	----	----	NAD	NA
Location: 1st Fl., Gym Storage Room - Wall Plaster (Base Coat)								
07.1	7	3	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Shower - Wall Plaster (Skim Coat)								
07.2	7	4	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Shower - Wall Plaster (Base Coat)								
08.1	8	3	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Locker Room - Wall Plaster (Skim Coat)								
08.2	8	4	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Locker Room - Wall Plaster (Base Coat)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
09.1	9	3	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Locker Room - Wall Plaster (Skim Coat)								
09.2	9	4	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Locker Room - Wall Plaster (Base Coat)								
10.1	10	3	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Shower - Wall Plaster (Skim Coat)								
10.2	10	4	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Shower - Wall Plaster (Base Coat)								
11	11	5	----	----	----	----	Chrysotile 4.8	NA
Location: 1st Fl., Girl's Locker Room (Above Plaster Ceiling) - Pipe Insulation								
12	12	5	----	----	----	----	NA/PS	NA
Location: 1st Fl., Girl's Locker Room (Above Plaster Ceiling) - Pipe Insulation								
13	13	5	----	----	----	----	NA/PS	NA
Location: 1st Fl., Girl's Locker Room (Above Plaster Ceiling) - Pipe Insulation								
14	14	6	----	----	----	----	NAD	NA
Location: 1st Fl., Storage Room 147A (Above Ceiling On Pipe) - Pipe Insulation Wrap								
15	15	6	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Locker Room (Above Ceiling On Pipe) - Pipe Insulation Wrap								
16	16	6	----	----	----	----	NAD	NA
Location: 1st Fl., Corridor (Above Ceiling On Pipe) - Pipe Insulation Wrap								
17	17	7	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Locker Room, Stall Divider - Marble Panel								
18	18	7	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Locker Room, Stall Divider - Marble Panel								
19	19	8	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Locker Room - Ceramic Wall Tile Grout								
20	20	8	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Shower - Ceramic Wall Tile Grout								
21	21	9	0.202	56.5	7.6	35.9	NAD	NAD
Location: 1st Fl., Girl's Locker Room - Ceramic Wall Tile Adhesive Only								
22	22	9	0.111	56.4	21.0	22.7	NAD	NAD
Location: 1st Fl., Boy's Locker Room - Ceramic Wall Tile Adhesive Only								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
23L1	23	10	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Locker Room - Wall CMU Block								
23L2	23	11	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Locker Room - Wall CMU Block Mortar								
24L1	24	10	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Locker Room - Wall CMU Block								
24L2	24	11	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Locker Room - Wall CMU Block Mortar								
25	25	12	----	----	----	----	NAD	NA
Location: 1st Fl., Storage Room 147A Soffit - Sheetrock								
26	26	12	----	----	----	----	NAD	NA
Location: 1st Fl., Storage Room 147A Soffit - Sheetrock								
27L1	27	13	----	----	----	----	NAD	NA
Location: 1st Fl., Entry C-9 - Wall Brick								
27L2	27	14	----	----	----	----	NAD	NA
Location: 1st Fl., Entry C-9 - Wall Brick Mortar								
28L1	28	13	----	----	----	----	NAD	NA
Location: Ext., Exterior Facade O/S C-9 Entry - Brick								
28L2	28	14	----	----	----	----	NAD	NA
Location: Ext., Exterior Facade O/S C-9 Entry - Brick Mortar								
29	29	15	0.257	25.0	36.1	38.9	NAD	NAD
Location: 1st Fl., Corridor 116, Suspended Ceiling - 2' x 4' Ceiling Tile								
30	30	15	0.163	24.4	42.1	33.5	NAD	NAD
Location: 1st Fl., Corridor 116, Suspended Ceiling - 2' x 4' Ceiling Tile								
31	31	16	0.148	59.0	35.1	5.9	NAD	NAD
Location: 1st Fl., Storage Room 146, Suspended Ceiling - 2' x 4' Tectum Ceiling Tile								
32	32	16	0.180	59.1	35.7	5.3	NAD	NAD
Location: 1st Fl., Storage Room 146, Suspended Ceiling - 2' x 4' Tectum Ceiling Tile								
33	33	17	0.085	90.5	7.6	1.9	NAD	NAD
Location: 1st Fl., Boy's Locker Room, Electrical Wiring - Insulation (Black)								
34	34	17	0.106	89.5	5.8	4.6	NAD	NAD
Location: 1st Fl., Girl's Locker Room, Electrical Wiring - Insulation (Black)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
35	35	18	0.102	88.1	9.4	2.5	NAD	NAD
Location: 1st Fl., Girl's Locker Room, Electrical Wiring - Insulation (White)								
36	36	18	0.108	88.0	7.8	4.2	NAD	NAD
Location: 1st Fl., Boy's Locker Room, Electrical Wiring - Insulation (White)								
37L1	37	19	0.330	36.6	61.0	2.5	NAD	NAD
Location: 1st Fl., Girl's Team Room (On CMU Wall) - Cove Base Molding								
37L2	37	20	0.167	37.2	44.0	18.8	NAD	NAD
Location: 1st Fl., Girl's Team Room (On CMU Wall) - Cove Base Molding Adhesive								
38L1	38	19	0.345	36.5	58.9	4.6	NAD	NAD
Location: 1st Fl., Girl's Team Room (On CMU Wall) - Cove Base Molding								
38L2	38	20	0.244	46.5	18.0	35.6	NAD	NAD
Location: 1st Fl., Girl's Team Room (On CMU Wall) - Cove Base Molding Adhesive								
39	39	21	----	----	----	----	NAD	NA
Location: 1st Fl., Gym Storage Room, Between Unit - Vibration Isolator Damper								
40	40	21	----	----	----	----	NAD	NA
Location: 1st Fl., Gym Storage Room, Between Unit - Vibration Isolator Damper								
41	41	22	----	----	----	----	NAD	NA
Location: 1st Fl., Corridor 116 - Terrazzo Floor								
42	42	22	----	----	----	----	NAD	NA
Location: 1st Fl., Corridor 116 - Terrazzo Floor								
43	43	23	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Shower - Ceramic Floor Tile Mudset / Grout								
44	44	23	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Locker Room - Ceramic Floor Tile Mudset / Grout								
45	45	24	----	----	----	----	NAD	NA
Location: 1st Fl., Boy's Locker Room - Floor Concrete Slab								
46	46	24	----	----	----	----	NAD	NA
Location: 1st Fl., Girl's Shower - Floor Concrete Slab								
47	47	25	0.298	32.1	12.0	55.9	NAD	NAD
Location: 1st Fl., Entry C-9, Floor (On Concrete) - Carpet Mastic								
48	48	25	0.292	39.9	14.4	45.7	NAD	NAD
Location: 1st Fl., Entry C-9, Floor (On Concrete) - Carpet Mastic								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
49L1	49	26	0.331	28.8	24.0	40.7	Chrysotile 6.5	NA
Location: 1st Fl., Boy's Coach Office, Floor (On Concrete) - 9" x 9" Floor Tile								
49L2	49	27	0.182	79.7	13.8	6.3	NAD	Chrysotile Trace
Location: 1st Fl., Boy's Coach Office, Floor (On Concrete) - 9" x 9" Floor Tile Mastic								
50L1	50	26	0.342	30.0	23.3	46.7	NA/PS	NA
Location: 1st Fl., Girl's Coach Office, Floor (On Concrete) - 9" x 9" Floor Tile								
50L2	50	27	0.209	80.3	12.7	6.9	NAD	Chrysotile Trace
Location: 1st Fl., Girl's Coach Office, Floor (On Concrete) - 9" x 9" Floor Tile Mastic								
51	51	28	0.334	47.7	24.4	27.9	NAD	NAD
Location: 1st Fl., Entry C-9, Along Window System / Frame - Caulk (Interior)								
52	52	28	0.137	47.8	31.4	20.8	NAD	NAD
Location: Ext., Entry C-9, Along Window System / Frame - Caulk (Exterior)								
53	53	29	0.172	80.8	15.9	3.3	NAD	NAD
Location: Ext., Entry C-9, Roof (Top Layer On Metal) - EPDM								
54	54	29	0.166	80.6	17.0	2.4	NAD	NAD
Location: Ext., Entry C-9, Roof (Top Layer On Metal) - EPDM								
55	55	30	----	----	----	----	NAD	NA
Location: Ext., Entry C-9, Roof (Bottom Layer Between Metal) - Fiberboard								
56	56	30	----	----	----	----	NAD	NA
Location: Ext., Entry C-9, Roof (Bottom Layer Between Metal) - Fiberboard								

Analyzed by: Feyza Gungor 

Reviewed by: Feyza Gungor 

Date: 10/20/2022

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H600-Noran 7 System, Microscope, Serial #: 542-26-10. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 10/19/22
Date Examined 10/19/22
ELAP # 11480

AmeriSci Job # 222102493
P.O. #
Page 1 **of** 13

RE: CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
1 1	222102493-01.1 **Location:** 1st Fl., Girl's Shower - Ceiling Plaster (Skim Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
1 2	222102493-01.2 **Location:** 1st Fl., Girl's Shower - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
2 1	222102493-02.1 **Location:** 1st Fl., Girl's Locker Room - Ceiling Plaster (Skim Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
2 2	222102493-02.2 **Location:** 1st Fl., Girl's Locker Room - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
3 1	222102493-03.1 **Location:** 1st Fl., Boy's Locker Room - Ceiling Plaster (Skim Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
3	222102493-03.2	***No***	NAD
2	**Location:** 1st Fl., Boy's Locker Room - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
4	222102493-04.1	***No***	NAD
1	**Location:** 1st Fl., Boy's Shower - Ceiling Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
4	222102493-04.2	***No***	NAD
2	**Location:** 1st Fl., Boy's Shower - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
5	222102493-05.1	***No***	NAD
1	**Location:** 1st Fl., Boy's Coach Office - Ceiling Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
5	222102493-05.2	***No***	NAD
2	**Location:** 1st Fl., Boy's Coach Office - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
6	222102493-06.1	***No***	NAD
3	**Location:** 1st Fl., Gym Storage Room - Wall Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
6 4	222102493-06.2 **Location:** 1st Fl., Gym Storage Room - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
7 3	222102493-07.1 **Location:** 1st Fl., Boy's Shower - Wall Plaster (Skim Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
7 4	222102493-07.2 **Location:** 1st Fl., Boy's Shower - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
8 3	222102493-08.1 **Location:** 1st Fl., Boy's Locker Room - Wall Plaster (Skim Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
8 4	222102493-08.2 **Location:** 1st Fl., Boy's Locker Room - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
9 3	222102493-09.1 **Location:** 1st Fl., Girl's Locker Room - Wall Plaster (Skim Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
9 4	222102493-09.2 **Location:** 1st Fl., Girl's Locker Room - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
10 3	222102493-10.1 **Location:** 1st Fl., Girl's Shower - Wall Plaster (Skim Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
10 4	222102493-10.2 **Location:** 1st Fl., Girl's Shower - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
11 5	222102493-11 **Location:** 1st Fl., Girl's Locker Room (Above Plaster Ceiling) - Pipe Insulation	***Yes***	4.8% (ELAP 400 PC) by Kensen Caro on 10/19/22
	Analyst Description: Brown, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 4.8 % **Other Material:** Cellulose 90%, Non-fibrous 5.2%		
12 5	222102493-12 **Location:** 1st Fl., Girl's Locker Room (Above Plaster Ceiling) - Pipe Insulation		NA/PS
	Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**		
13 5	222102493-13 **Location:** 1st Fl., Girl's Locker Room (Above Plaster Ceiling) - Pipe Insulation		NA/PS
	Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**		

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
14 6	222102493-14 **Location:** 1st Fl., Storage Room 147A (Above Ceiling On Pipe) - Pipe Insulation Wrap	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Silver/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 60%, Fibrous glass 10%, Non-fibrous 30%			
15 6	222102493-15 **Location:** 1st Fl., Girl's Locker Room (Above Ceiling On Pipe) - Pipe Insulation Wrap	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Silver/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 60%, Fibrous glass 5%, Non-fibrous 35%			
16 6	222102493-16 **Location:** 1st Fl., Corridor (Above Ceiling On Pipe) - Pipe Insulation Wrap	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Silver/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 60%, Fibrous glass 5%, Non-fibrous 35%			
17 7	222102493-17 **Location:** 1st Fl., Girl's Locker Room, Stall Divider - Marble Panel	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
18 7	222102493-18 **Location:** 1st Fl., Girl's Locker Room, Stall Divider - Marble Panel	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
19 8	222102493-19 **Location:** 1st Fl., Boy's Locker Room - Ceramic Wall Tile Grout	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
20	222102493-20	***No***	NAD
8	**Location:** 1st Fl., Girl's Shower - Ceramic Wall Tile Grout		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
21	222102493-21	***No***	NAD
9	**Location:** 1st Fl., Girl's Locker Room - Ceramic Wall Tile Adhesive Only		(by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 35.9%			
22	222102493-22	***No***	NAD
9	**Location:** 1st Fl., Boy's Locker Room - Ceramic Wall Tile Adhesive Only		(by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 22.7%			
23	222102493-23L1	***No***	NAD
10	**Location:** 1st Fl., Boy's Locker Room - Wall CMU Block		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
23	222102493-23L2	***No***	NAD
11	**Location:** 1st Fl., Boy's Locker Room - Wall CMU Block Mortar		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
24	222102493-24L1	***No***	NAD
10	**Location:** 1st Fl., Girl's Locker Room - Wall CMU Block		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
24 11	222102493-24L2 **Location:** 1st Fl., Girl's Locker Room - Wall CMU Block Mortar	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
25 12	222102493-25 **Location:** 1st Fl., Storage Room 147A Soffit - Sheetrock	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White/Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 20%, Non-fibrous 80%			
26 12	222102493-26 **Location:** 1st Fl., Storage Room 147A Soffit - Sheetrock	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: White/Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10%, Non-fibrous 90%			
27 13	222102493-27L1 **Location:** 1st Fl., Entry C-9 - Wall Brick	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Red, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
27 14	222102493-27L2 **Location:** 1st Fl., Entry C-9 - Wall Brick Mortar	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
28 13	222102493-28L1 **Location:** Ext., Exterior Facade O/S C-9 Entry - Brick	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Red, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
28 14	222102493-28L2 **Location:** Ext., Exterior Facade O/S C-9 Entry - Brick Mortar	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
29 15	222102493-29 **Location:** 1st Fl., Corridor 116, Suspended Ceiling - 2' x 4' Ceiling Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 38.9%			
30 15	222102493-30 **Location:** 1st Fl., Corridor 116, Suspended Ceiling - 2' x 4' Ceiling Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 33.5%			
31 16	222102493-31 **Location:** 1st Fl., Storage Room 146, Suspended Ceiling - 2' x 4' Tectum Ceiling Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.9%			
32 16	222102493-32 **Location:** 1st Fl., Storage Room 146, Suspended Ceiling - 2' x 4' Tectum Ceiling Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.3%			
33 17	222102493-33 **Location:** 1st Fl., Boy's Locker Room, Electrical Wiring - Insulation (Black)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.9%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
34 17	222102493-34 **Location:** 1st Fl., Girl's Locker Room, Electrical Wiring - Insulation (Black)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.6%			
35 18	222102493-35 **Location:** 1st Fl., Girl's Locker Room, Electrical Wiring - Insulation (White)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.5%			
36 18	222102493-36 **Location:** 1st Fl., Boy's Locker Room, Electrical Wiring - Insulation (White)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.2%			
37 19	222102493-37L1 **Location:** 1st Fl., Girl's Team Room (On CMU Wall) - Cove Base Molding	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.5%			
37 20	222102493-37L2 **Location:** 1st Fl., Girl's Team Room (On CMU Wall) - Cove Base Molding Adhesive	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Cream, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 18.8%			
38 19	222102493-38L1 **Location:** 1st Fl., Girl's Team Room (On CMU Wall) - Cove Base Molding	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.6%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
38	222102493-38L2	***No***	NAD
20	**Location:** 1st Fl., Girl's Team Room (On CMU Wall) - Cove Base Molding Adhesive		(by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Cream, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 35.6%			
39	222102493-39	***No***	NAD
21	**Location:** 1st Fl., Gym Storage Room, Between Unit - Vibration Isolator Damper		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Brown, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 95%, Non-fibrous 5%			
40	222102493-40	***No***	NAD
21	**Location:** 1st Fl., Gym Storage Room, Between Unit - Vibration Isolator Damper		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Brown, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 95%, Non-fibrous 5%			
41	222102493-41	***No***	NAD
22	**Location:** 1st Fl., Corridor 116 - Terrazzo Floor		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Peach, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
42	222102493-42	***No***	NAD
22	**Location:** 1st Fl., Corridor 116 - Terrazzo Floor		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Peach, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
43	222102493-43	***No***	NAD
23	**Location:** 1st Fl., Girl's Shower - Ceramic Floor Tile Mudset / Grout		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
44	222102493-44	***No***	NAD
23	**Location:** 1st Fl., Boy's Locker Room - Ceramic Floor Tile Mudset / Grout		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
45	222102493-45	***No***	NAD
24	**Location:** 1st Fl., Boy's Locker Room - Floor Concrete Slab		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
46	222102493-46	***No***	NAD
24	**Location:** 1st Fl., Girl's Shower - Floor Concrete Slab		(by NYS ELAP 198.1) by Kensen Caro on 10/19/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
47	222102493-47	***No***	NAD
25	**Location:** 1st Fl., Entry C-9, Floor (On Concrete) - Carpet Mastic		(by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 55.9%			
48	222102493-48	***No***	NAD
25	**Location:** 1st Fl., Entry C-9, Floor (On Concrete) - Carpet Mastic		(by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 45.7%			
49	222102493-49L1	***Yes***	6.5%
26	**Location:** 1st Fl., Boy's Coach Office, Floor (On Concrete) - 9" x 9" Floor Tile		(by NYS ELAP 198.6) by Kensen Caro on 10/19/22
Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 6.5 % **Other Material:** Non-fibrous 40.7%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
49 27	222102493-49L2 **Location:** 1st Fl., Boy's Coach Office, Floor (On Concrete) - 9" x 9" Floor Tile Mastic	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
	Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 6.4%		
50 26	222102493-50L1 **Location:** 1st Fl., Girl's Coach Office, Floor (On Concrete) - 9" x 9" Floor Tile		NA/PS
	Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**		
50 27	222102493-50L2 **Location:** 1st Fl., Girl's Coach Office, Floor (On Concrete) - 9" x 9" Floor Tile Mastic	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
	Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7%		
51 28	222102493-51 **Location:** 1st Fl., Entry C-9, Along Window System / Frame - Caulk (Interior)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 27.9%		
52 28	222102493-52 **Location:** Ext., Entry C-9, Along Window System / Frame - Caulk (Exterior)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 20.8%		
53 29	222102493-53 **Location:** Ext., Entry C-9, Roof (Top Layer On Metal) - EPDM	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
	Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.3%		

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.03-IN; Cornwall Middle School; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
54 29	222102493-54 **Location:** Ext., Entry C-9, Roof (Top Layer On Metal) - EPDM	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/19/22
	Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.4%		
55 30	222102493-55 **Location:** Ext., Entry C-9, Roof (Bottom Layer Between Metal) - Fiberboard	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: Brown, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 98%, Non-fibrous 2%		
56 30	222102493-56 **Location:** Ext., Entry C-9, Roof (Bottom Layer Between Metal) - Fiberboard	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/19/22
	Analyst Description: Brown, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 98%, Non-fibrous 2%		

Reporting Notes:

Analyzed by: Kensen Caro
Date: 10/19/2022



Reviewed by: Feyza Gungor



*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229003, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
1511 Route 22, Suite C24
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

Site Address: Cornwall Middleschool	Date: 10-17+18-2022	Inspector(s): Louis N. Johnson III
122 Main street.	Client Project #:	
Cornwall, NY 12518	Project #: CORN: 22154.03-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
1	112	1ST	Girls Shower - Ceiling - plaster Both Layers		F	G
2	112	↓	↓ Locker Room - ↓ - ↓ ↓ ↓		F	G
3	112	↓	Boy's ↓ ↓ - ↓ - ↓ ↓ ↓		F	G
4	112	↓	↓ Shower - ↓ - ↓ ↓ ↓		F	G
5	112	↓	↓ Coach office - ↓ - ↓ ↓ ↓		F	G
6	314	↓	Gym Storage Room - Wall - ↓ ↓ ↓		F	D
7	314	↓	Boy's Shower - ↓ - ↓ ↓ ↓		F	D
8	314	↓	Boys Locker Room - ↓ - ↓ ↓ ↓		F	D
9	314	↓	Girls ↓ ↓ - ↓ - ↓ ↓ ↓		F	G
10	314	↓	Girls Shower - ↓ - ↓ ↓ ↓		F	G
11	5	↓	Girls Locker Room, Above plaster Ceiling - Pipe Insulation		F	D
12	5	↓	↓ ↓ ↓ ↓ ↓ ↓ ↓ - ↓ ↓		II	↓
13	5	↓	↓ ↓ ↓ ↓ ↓ ↓ ↓ - ↓ ↓		II	↓

Special Instructions/ Turnaround Time:

Stop at 1st Positive per Homogenous Area 24HR TAT

E-Mail Results to AdelaideLabResults@adelaidellc.com & ljohnson@adelaidellc.com

Relinquished by:
Received by: [signature] 10/19/22 10:38
Relinquished by:
Received by:

222102493

Adelaide Environmental Health Associates, Inc
1511 Route 22, Suite C24
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

Site Address: Cornwall middle school	Date: 10-17+18-2022	Inspector(s): Louis N. Johnson III
122 Main Street	Client Project #:	
Cornwall, NY 12518	Project #: CORN:22154.03-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
14	6	1ST	StorageRoom 147A, Above ceiling on pipe - Pipe Insulation wrap		F	G
15	6		Girls Locker Room, ↓ ↓ ↓ ↓ - ↓ ↓ ↓		"	"
16	6		Corridor, ↓ ↓ ↓ ↓ - ↓ ↓		"	"
17	7		Girls Locker Room, Stall Divider - Marble Panel		F	"
18	7		↓ ↓ ↓, ↓ ↓ - ↓ ↓		"	"
19	8		Boys ↓ ↓, Wall, Ceramic Tile - grout		F	D
20	8		Girls shower, ↓, ↓ ↓ - ↓		"	G
21	9		↓ Locker Room, ↓, ↓ ↓ - Adhesive only		WI=	G
22	9		Boys ↓ ↓, ↓, ↓ ↓ - ↓ ↓		"	D
23	10/11		↓ ↓ ↓, ↓ - CMU Block + mortar		F	G
24	10/11		Girls ↓ ↓, ↓ - ↓ ↓ + ↓		"	G
25	12		Storage Room 147A Joist - Sheetrock		"	"
26	12		↓ ↓ - ↓		"	"

Special Instructions/ Turnaround Time:

Stop at 1st Positive per Homogenous Area 24HR TAT

E-Mail Results to AdelaideLabResults@adelaideilc.com & ljohnson@adelaideilc.com

Relinquished by:
Received by: 10/19/22 10:38
Relinquished by:
Received by:

222102493

Adelaide Environmental Health Associates, Inc
1511 Route 22, Suite C24
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

Site Address: Cornwall Middle School
122 Main Street
Cornwall, NY 12518

Date: 10-17+18-2022

Client Project #:

Project #: CORN:22154.03-IN

Inspector(s): **Louis N. Johnson III**

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
27	13/14	1ST	Entry C-9, wall - Brick + Mortar		F	G
28	13/14	Ext	Exterior Facade OS C-9 Entry - Brick + mortar		"	G
29	15	1ST	Corridor 116, suspended Ceiling - 2'x4' Ceiling Tile		"	G
30	15	↓	↓ ↓ ↓ ↓ ↓ - ↓ ↓ ↓		"	G
31	16	↓	Storage Room 146, ↓ ↓ ↓ - Tectum Ceiling Tile		I	G
32	16	↓	↓ ↓ ↓ ↓ ↓ - ↓ ↓ ↓ ↓		N	G
33	17	↓	Boys Locker Room, Electrical Wiring - Insulation Black		WF	G
34	17	↓	Girls ↓ ↓ ↓ ↓ ↓ - ↓ ↓		"	G
35	18	↓	↓ ↓ ↓ ↓ ↓ - white		↓	G
36	18	↓	Boys ↓ ↓ ↓ ↓ ↓ - ↓ white			G
37	19/20	↓	Girls Team Room, wall on cmu - Cove Base Molding + Adhesive			D
38	19/20	↓	↓ ↓ ↓ ↓ ↓ - ↓ ↓ ↓ ↓ ↓		↓	D

Special Instructions/ Turnaround Time:

Stop at 1st Positive per Homogenous Area 24Hr TAT

E-Mail Results to AdelaideLabResults@adelaidellc.com & ljohnson@adelaidellc.com

Relinquished by:

Received by: [signature] 10/19/22 10:38

Relinquished by:

Received by:

#222102493

Adelaide Environmental Health Associates, Inc
1511 Route 22, Suite C24
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

Site Address: Cornwall Middle school	Date: 10-17 + 18- 2022	Inspector(s) **Louis N. Johnson III**
122 Main Street	Client Project #:	
Cornwall, NY 12518	Project #: CORN: 22154.03 - IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
39	21	1ST	Gym Storage Room Between unit - Vibration Isolator Damper		NF	D
40	21	↓	↓ ↓ ↓ ↓ ↓ ↓ - ↓ ↓ ↓		11	D
41	22	↓	Corridor 116, Floor - Terrazzo		F	G
42	22	↓	↓ ↓, ↓ - ↓		11	G
43	23	↓	Girls Shower, Floor - Ceramic Tile - Mudset/grout		F	G
44	23	↓	Boy's Locker Room, ↓ - ↓ ↓ - ↓ / ↓		11	D
45	24	↓	↓, ↓ - Concrete Slab		F	G
46	24	↓	Girl's Shower, ↓ - ↓ ↓		11	G
47	25	↓	Entry C-9, Floor on Concrete - Carpet Mastic		NF	G
48	25	↓	↓ ↓, ↓, ↓ ↓ - ↓ ↓		11	G
49	26/27	↓	Boy's Coach office, Floor, on Concrete - 9"x9" Floor Tile + Mastic		NF	G
50	26/27	↓	Lvls ↓ ↓, ↓, ↓ ↓ - ↓ ↓ + ↓		11	G

Special Instructions/ Turnaround Time:

24HR TAT

Stop at 1st Positive per Homogenous Area

E-Mail Results to AdelaideLabResults@adelaidellc.com & ljohnson@adelaidellc.com

Relinquished by:

Received by: [signature] 10/19/22 10:38

Relinquished by:

Received by:

222102493

Adelaide Environmental Health Associates, Inc
1511 Route 22, Suite C24
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

Site Address: Cornwall Middle school	Date: 10-17 + 18-2022	Inspector(s) **Louis N. Johnson III**
122 main Street	Client Project #:	
Cornwall, NY 12518	Project #: CORN:22154,03-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
51	28	1st	Entry C-9, Along Window System/Frame - caulk Interior		NF	G
52	28	Ext	↓ ↓ ↓ ↓ ↓ / ↓ - ↓ Exterior		F	G
53	29	↓	Entry C-9 Roof Top Layer on metal - EPDM		F	G
54	29	↓	↓ ↓ ↓ ↓ ↓ ↓ ↓ - ↓		F	G
55	30	↓	↓ ↓ ↓ Bottom layer Between metal - Fiberboard		F	G
56	30	↓	↓ ↓ ↓ ↓ ↓ ↓ ↓ - ↓		F	G
	#222102493					

Special Instructions/ Turnaround Time:

Stop at 1st Positive per Homogenous Area 24HR TAT

E-Mail Results to AdelaideLabResults@adelaideilc.com & ljohnson@adelaideilc.com

Relinquished by:
Received by: 10/19/22 10:38
Relinquished by:
Received by:

Client Name: Adelaide Environmental Health

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall MS; 122 Main Street, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	115	32	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Men's Bathroom - Ceiling Plaster (Top Coat)								
02	116	32	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Women's Bathroom - Ceiling Plaster (Top Coat)								
03	117	33	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Men's Bathroom - Ceiling Plaster (Base Coat)								
04	118	33	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Women's Bathroom - Ceiling Plaster (Base Coat)								
05	119	34	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Men's Bathroom - Wall Plaster (Top Coat)								
06	120	34	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Women's Bathroom - Wall Plaster (Top Coat)								
07	121	35	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Men's Bathroom - Wall Plaster (Base Coat)								
08	122	35	----	----	----	----	NAD	NA
Location: 1st Fl., D Wing, Women's Bathroom - Wall Plaster (Base Coat)								
09	123	50	0.465	41.6	54.1	4.2	NAD	Chrysotile Trace
Location: 1st Fl., D Wing, Men's Bathroom - Black Material Behind Radiator Cover								
10	124	50	0.310	44.2	53.5	2.2	NAD	Chrysotile Trace
Location: 1st Fl., D Wing, Men's Bathroom - Black Material Behind Radiator Cover								

Analyzed by: Feyza Gungor 

Date: 3/10/2023

Reviewed by: Feyza Gungor 

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H600-Noran 7 System, Microscope, Serial #: 542-26-10. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 03/09/23
Date Examined 03/10/23
ELAP # 11480
AmeriSci Job # 223031693
P.O. #
Page 1 **of** 3
RE: CORN:22154.01-IN; Cornwall MS; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
115 32	223031693-01 **Location:** 1st Fl., D Wing, Men's Bathroom - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 03/10/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
116 32	223031693-02 **Location:** 1st Fl., D Wing, Women's Bathroom - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 03/10/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
117 33	223031693-03 **Location:** 1st Fl., D Wing, Men's Bathroom - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 03/10/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
118 33	223031693-04 **Location:** 1st Fl., D Wing, Women's Bathroom - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 03/10/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
119 34	223031693-05 **Location:** 1st Fl., D Wing, Men's Bathroom - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 03/10/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall MS; 122 Main Street, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
120 34	223031693-06 **Location:** 1st Fl., D Wing, Women's Bathroom - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 03/10/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
121 35	223031693-07 **Location:** 1st Fl., D Wing, Men's Bathroom - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 03/10/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
122 35	223031693-08 **Location:** 1st Fl., D Wing, Women's Bathroom - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 03/10/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
123 50	223031693-09 **Location:** 1st Fl., D Wing, Men's Bathroom - Black Material Behind Radiator Cover	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 03/10/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.3%			
124 50	223031693-10 **Location:** 1st Fl., D Wing, Men's Bathroom - Black Material Behind Radiator Cover	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 03/10/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.3%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall MS; 122 Main Street, Cornwall, NY 12518

Reporting Notes:

Analyzed by: Kensen Caro
Date: 3/10/2023



Reviewed by: Feyza Gungor



*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Motic, Model BA310 Pol Scope, Microscope, Serial #: 1190000538, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

#223031693

Site Address:	Date:	Inspector:
Cornwall MS	03/07/2023	David Seddon
122 Main Street	Client Project #	
Cornwall NY 12518	Project #: CORN 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable Non Friable	Condition g, d, sd
115	32	1st	DWING - Mens Bathroom - Plaster Ceiling - Top Coat			
116	32	"	Womens - - "			
117	33	"	Mens - - Base Coat			
118	33	"	Womens - " - "			
119	34	"	Mens - Plaster Wall - Top Coat			
120	34	"	Womens - - "			
121	35	"	Mens - - Base Coat			
122	35	"	Womens " - " - "			
123	50	"	Mens - Black Material Behind Radiator Case			
124	50	"	" - " " "			

Special Instructions/ Turnaround Time:

24h

TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:
Received by: Alexandra Lucy 3-9-23 1050
Relinquished by:
Received by:

Client Name: Adelaide Environmental Health

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall M.S., 122 Main St., Cornwall, NY

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	1	1	0.334	11.2	11.2	77.6	NAD	NAD
Location: 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - White								
02	2	1	0.342	10.8	11.9	77.4	NAD	NAD
Location: 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - White								
03	3	2	0.369	10.1	12.7	77.2	NAD	NAD
Location: 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - Black								
04	4	2	0.341	10.4	12.4	77.2	NAD	NAD
Location: 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - Black								
05	5	3	0.369	9.1	12.1	78.8	NAD	NAD
Location: 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - Green								
06	6	3	0.456	9.7	11.3	79.0	NAD	NAD
Location: 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - Green								
07	7	4	0.335	10.2	13.3	76.5	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Green								
08	8	4	0.374	9.6	12.9	77.5	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Green								
09	9	5	0.348	11.3	12.2	76.5	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - White								
10	10	5	0.329	11.1	13.6	75.4	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - White								
11	11	6	0.342	10.9	13.1	76.0	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Black								
12	12	6	0.365	9.7	55.5	34.7	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Black								
13	13	7	0.354	17.6	13.7	68.7	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Red								
14	14	7	0.334	18.0	14.2	67.8	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Red								
15	15	8	0.408	17.4	13.9	68.7	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wire - Yellow								
16	16	8	0.357	17.6	13.0	69.4	NAD	NAD
Location: 1st Fl. - C-Wing - Boys Bathroom - Elec. Wire - Yellow								

See Reporting notes on last page

Client Name: Adelaide Environmental Health

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22154.01-IN; Cornwall M.S., 122 Main St., Cornwall, NY

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM

Analyzed by: Marik Peysakhov 

Date: 6/24/2023

Reviewed by: Marik Peysakhov 

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 06/23/23 **AmeriSci Job #** 223063443
Date Examined 06/23/23 **P.O. #**
ELAP # 11480 **Page** 1 **of** 4
RE: CORN:22154.01-IN; Cornwall M.S., 122 Main St., Cornwall, NY

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
1	223063443-01	***No***	NAD
1	**Location:** 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - White		(by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 77.6%			
2	223063443-02	***No***	NAD
1	**Location:** 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - White		(by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 77.4%			
3	223063443-03	***No***	NAD
2	**Location:** 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - Black		(by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 77.2%			
4	223063443-04	***No***	NAD
2	**Location:** 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - Black		(by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 77.2%			
5	223063443-05	***No***	NAD
3	**Location:** 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - Green		(by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Green, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 78.8%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall M.S., 122 Main St., Cornwall, NY

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
6 3	223063443-06 **Location:** 1st Fl. - E-Wing - Girls Bathroom - Elec. Wiring - Green	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Green, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 79%			
7 4	223063443-07 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Green	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Green, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 76.5%			
8 4	223063443-08 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Green	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Green, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 77.5%			
9 5	223063443-09 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - White	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 76.5%			
10 5	223063443-10 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - White	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 75.4%			
11 6	223063443-11 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Black	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 76%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall M.S., 122 Main St., Cornwall, NY

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
12 6	223063443-12 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Black	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 34.7%			
13 7	223063443-13 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Red	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Red, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 68.7%			
14 7	223063443-14 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wiring - Red	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Red, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 67.8%			
15 8	223063443-15 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wire - Yellow	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 68.7%			
16 8	223063443-16 **Location:** 1st Fl. - C-Wing - Boys Bathroom - Elec. Wire - Yellow	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 06/23/23
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 69.4%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22154.01-IN; Cornwall M.S., 122 Main St., Cornwall, NY

Reporting Notes:

Analyzed by: Kensen Caro
Date: 6/23/2023



Reviewed by: Marik Peysakhov



*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Motic, Model BA310 Pol Scope, Microscope, Serial #: 1190000538, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

223063443

Site Address:	Date:	Inspector:
Cornwall M.S. 122 Main St. Cornwall, NY	6/23/23	Jason Fullum
	Client Project #	
	Project #: CORN: 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable Non Friable	Condition g, d, sd
1	1	1	E-Wing - Girls Bathroom - Elec. Wing - White		N	G
2	1	1				
3	2	1	- Black			
4	2	1				
5	3	1	- Green			
6	3	1				
7	4	1	C-Wing - Boys Bathroom - Elec. Wing - Green			
8	4	1				
9	5	1	- White			
10	5	1				
11	6	1	- Black			
12	6	1				
13	7	1	- Red			
14	7	1				

Special Instructions/ Turnaround Time:

RUSH T.A.

~~24 HR TAT~~

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com and Jfullum@adelaidellc.com

Relinquished by:
Received by: J. Nerafich 6/23/23 19:36
Relinquished by:
Received by:

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

223063443

Site Address:	Date:	Inspector:
Cornwall M.S. 122 Main St. Cornwall NY	6/23/23	Jason Fullum
	Client Project #	
	Project #: CORN: 22154.01-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable Non Friable	Condition g, d, sd
15	8	1	C Wing - Boys Bathroom - Elec. Vine - Yellow		N	G
16	8	1	↓ ↓ ↓ ↓		↓	↓

Special Instructions/ Turnaround Time:

Rush T.A.

~~24 HR TAT~~

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com and Jfullum@adelaidellc.com

Relinquished by:	
Received by:	J-Nemeth
Relinquished by:	
Received by:	

CORNWALL ELEMENTARY SCHOOL

Client Name: Adelaide Environmental Health

Table I
Summary of Bulk Asbestos Analysis Results

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	1	1	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - CMU								
02	2	1	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207B - CMU								
03	3	2	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - CMU Mortar								
04	4	2	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207B - CMU Mortar								
05	5	3	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Parge Coating								
06	6	3	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Parge Coating								
07	7	3	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Parge Coating								
08	8	4	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Grout @ Urinal								
09	9	4	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207B - Grout @ Urinal								
10	10	5	0.270	26.9	70.0	3.1	NAD	NAD
Location: Floor 1 - Bathroom A33A - Caulking @ Fixtures								
11	11	5	0.260	33.1	47.4	19.5	NAD	NAD
Location: Floor 1 - Bathroom 107B - Caulking @ Fixtures								
12	12	6	0.289	50.5	5.5	44.1	NAD	NAD
Location: Floor 2 - Bathroom 207B - 1 x 1 Ceiling Tile Glue Daubs								
13	13	6	0.291	50.9	5.6	43.6	NAD	NAD
Location: Floor 2 - Bathroom 207B - 1 x 1 Ceiling Tile Glue Daubs								
14	14	7	0.359	18.6	37.7	39.0	Chrysotile 4.7	NA
Location: Floor 2 - Classroom 201 - Black Coating On Sink								
15	15	7	0.283	18.1	46.6	35.3	NA/PS	NA
Location: Floor 2 - Classroom 201 - Black Coating On Sink								
16	16	8	0.121	21.5	41.4	29.7	Chrysotile 7.4	NA
Location: Floor 2 - Classroom 201 - Pink Coating On Sink								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	17	8	0.143	16.9	37.7	45.4	NA/PS	NA
Location: Floor 1 - Classroom 102 - Pink Coating On Sink								
18	18	9	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Old Fiberglass Pipe Wrap								
19	19	9	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Old Fiberglass Pipe Wrap								
20	20	9	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Old Fiberglass Pipe Wrap								
21	21	10	----	----	----	----	Chrysotile 10.8	NA
Location: Floor 1 - Bathroom 107B - Mudded Fitting								
22	22	10	----	----	----	----	NA/PS	NA
Location: Floor 1 - Bathroom 107B - Mudded Fitting								
23	23	10	----	----	----	----	NA/PS	NA
Location: Floor 1 - Bathroom 107B - Mudded Fitting								
24	24	11	0.165	20.4	75.1	4.4	NAD	NAD
Location: Floor 2 - Bathroom 207B - 1 x 1 Ceiling Tile								
25	25	11	0.260	20.6	69.9	9.5	NAD	NAD
Location: Floor 2 - Bathroom 207B - 1 x 1 Ceiling Tile								
26	26	12	0.207	1.4	45.1	53.5	NAD	NAD
Location: Floor 2 - Bathroom 207B - Ceiling Tile - Creators								
27	27	12	0.184	2.0	53.3	44.7	NAD	NAD
Location: Floor 2 - Bathroom 207B - Ceiling Tile - Creators								
28	28	13	0.186	17.3	34.4	48.4	NAD	NAD
Location: Floor 1 - Bathroom 107B - Ceiling Tile - Large Holes								
29	29	13	0.406	15.3	28.7	55.9	NAD	NAD
Location: Floor 1 - Bathroom 107B - Ceiling Tile - Large Holes								
30	30	14	0.158	26.8	24.2	49.0	NAD	NAD
Location: Floor 2 - Classroom 207 - Ceiling Tile - Small Squiggles W/ Holes								
31	31	14	0.200	24.4	28.7	46.9	NAD	NAD
Location: Floor 2 - Classroom 207 - Ceiling Tile - Small Squiggles W/ Holes								
32	32	15	0.179	13.6	54.5	31.8	NAD	NAD
Location: Floor 2 - Classroom 204 - Ceiling Tile - Large Squiggles W/ Holes								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
33	33	15	0.260	13.6	43.8	42.6	NAD	NAD
Location: Floor 2 - Classroom 204 - Ceiling Tile - Large Squiggles W/ Holes								
34	34	16	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107A - Ceramic Floor Tile - Grout								
35	35	16	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207B - Ceramic Floor Tile - Grout								
36	36	17	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107A - Ceramic Floor Tile - Mudset								
37	37	17	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207B - Ceramic Floor Tile - Mudset								
38	38	18	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207A - Plaster Ceiling - Top Coat								
39	39	18	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207A - Plaster Ceiling - Top Coat								
40	40	18	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207A - Plaster Ceiling - Top Coat								
41	41	18	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Plaster Ceiling - Top Coat								
42	42	18	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Plaster Ceiling - Top Coat								
43	43	19	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207A - Plaster Ceiling - Base Coat								
44	44	19	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207A - Plaster Ceiling - Base Coat								
45	45	19	----	----	----	----	NAD	NA
Location: Floor 2 - Bathroom 207A - Plaster Ceiling - Base Coat								
46	46	19	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Plaster Ceiling - Base Coat								
47	47	19	----	----	----	----	NAD	NA
Location: Floor 1 - Bathroom 107B - Plaster Ceiling - Base Coat								
48	48	20	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 116 - Plaster Wall - Top Coat								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
49	49	20	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 102 - Plaster Wall - Top Coat								
50	50	20	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 102 - Plaster Wall - Top Coat								
51	51	20	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 106 - Plaster Wall - Top Coat								
52	52	20	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 106 - Plaster Wall - Top Coat								
53	53	21	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 116 - Plaster Wall - Base Coat								
54	54	21	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 102 - Plaster Wall - Base Coat								
55	55	21	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 102 - Plaster Wall - Base Coat								
56	56	21	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 106 - Plaster Wall - Base Coat								
57	57	21	----	----	----	----	NAD	NA
Location: Floor 1 - Classroom 106 - Plaster Wall - Base Coat								
58	58	22	0.113	61.7	11.5	26.9	NAD	NAD
Location: Floor 1 - Classroom 102 - Adhesive @ Casewalk & Wall								
59	59	22	0.198	46.7	38.6	14.6	NAD	NAD
Location: Floor 1 - Classroom 106 - Adhesive @ Casewalk & Wall								
60	60	23	0.372	15.7	45.1	39.1	NAD	NAD
Location: Floor 2 - Classroom 204 - 12 x 12 Brown W/ White Marble								
61	61	23	0.425	18.0	47.6	34.4	NAD	NAD
Location: Floor 2 - Classroom 204 - 12 x 12 Brown W/ White Marble								
62	62	24	0.304	17.0	47.1	35.9	NAD	NAD
Location: Floor 2 - Classroom 201 - 12 x 12 Tan W/ White Marble								
63	63	24	0.260	15.5	49.7	34.8	NAD	NAD
Location: Floor 2 - Classroom 201 - 12 x 12 Tan W/ White Marble								
64	64	25	0.193	84.5	11.8	3.7	NAD	NAD
Location: Floor 2 - Classroom 201 - 12 x 12 Floor Tile Mastic (Brown)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
65	65	25	0.125	90.2	9.4	0.4	NAD	NAD
Location: Floor 2 - Classroom 201 - 12 x 12 Floor Tile Mastic (Brown)								
66	66	26	0.260	15.6	84.3	0.1	NAD	NAD
Location: Floor 2 - Classroom 209 - 12 x 12 Blue W/ Black & White Floor Tile								
67	67	26	0.353	17.5	80.7	1.9	NAD	NAD
Location: Floor 2 - Classroom 205 - 12 x 12 Blue W/ Black & White Floor Tile (Bottom Layer)								
68	68	27	0.257	19.7	45.2	35.2	NAD	NAD
Location: Floor 2 - Classroom 209 - 12 x 12 Blue W/ Gray Mottle FT (Top Layer)								
69	69	27	0.272	19.9	46.1	34.0	NAD	NAD
Location: Floor 2 - Classroom 209 - 12 x 12 Blue W/ Gray Mottle FT (Top Layer)								
70	70	28	0.224	27.4	22.3	41.9	Chrysotile 8.4	NA
Location: Floor 2 - Classroom 203 - 9 x 9 Green W/ White Floor Tile								
71	71	28	0.188	28.8	16.7	54.5	NA/PS	NA
Location: Floor 2 - Classroom 203 - 9 x 9 Green W/ White Floor Tile								
72	72	29	0.304	27.2	31.0	35.0	Chrysotile 6.7	NA
Location: Floor 2 - Classroom 205 - 9 x 9 Gray Floor Tile								
73	73	29	0.195	26.4	23.8	49.8	NA/PS	NA
Location: Floor 2 - Classroom 205 - 9 x 9 Gray Floor Tile								
74	76	31	0.174	84.2	8.1	7.7	NAD	Chrysotile Trace
Location: Floor 2 - Classroom 205 - 9 x 9 Mastic - Black								
75	77	31	0.092	84.8	8.1	6.9	NAD	Chrysotile <1.0
Location: Floor 2 - Classroom 203 - 9 x 9 Mastic - Black								
76	78	32	----	----	----	----	NAD	NA
Location: Floor 2 - Classroom 209 - Leveling Compound								
77	79	32	----	----	----	----	NAD	NA
Location: Floor 2 - Classroom 209 - Leveling Compound								
78	80	33	0.277	22.8	61.3	15.9	NAD	NAD
Location: Floor 2 - Classroom 105 - 12 x 12 Tan W/ Brown & White Streaks								
79	81	33	0.226	23.1	70.7	6.2	NAD	NAD
Location: Floor 2 - Classroom 105 - 12 x 12 Tan W/ Brown & White Streaks								
80	82	34	0.226	23.1	70.7	6.2	NAD	NAD
Location: Floor 2 - Classroom 210 - 12 x 12 Beige W/ White, Blue & Rust								

See Reporting notes on last page

Client Name: Adelaide Environmental Health

Table I
Summary of Bulk Asbestos Analysis Results

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
81	83	34	0.266	22.1	71.6	6.3	NAD	NAD
Location: Floor 2 - Classroom 210 - 12 x 12 Beige W/ White, Blue & Rust								
82L1	84	35	0.328	35.3	63.7	1.0	NAD	NAD
Location: Floor 2 - Classroom 206 - Covebase								
82L2	84	35	0.222	47.8	17.7	34.6	NAD	NAD
Location: Floor 2 - Classroom 206 - Covebase W/ Adhesive								
83L1	85	35	0.326	35.5	64.4	0.1	NAD	NAD
Location: Floor 2 - Classroom 206 - Covebase								
83L2	85	35	0.299	48.9	3.6	47.4	NAD	NAD
Location: Floor 2 - Classroom 206 - Covebase W/ Adhesive								

Analyzed by: Khaalid W. Perine 

Date: 9/15/2022

Reviewed by: Khaalid W. Perine 

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 09/14/22
Date Examined 09/15/22
ELAP # 11480

AmeriSci Job # 222092098
P.O. #
Page 1 **of** 15

RE: CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
1	222092098-01	***No***	NAD
1	**Location:** Floor 1 - Bathroom 107B - CMU		(by NYS ELAP 198.1) by Kensen Caro on 09/15/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material		
	Asbestos Types:		
	Other Material: Non-fibrous 100%		
2	222092098-02	***No***	NAD
1	**Location:** Floor 2 - Bathroom 207B - CMU		(by NYS ELAP 198.1) by Kensen Caro on 09/15/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material		
	Asbestos Types:		
	Other Material: Non-fibrous 100%		
3	222092098-03	***No***	NAD
2	**Location:** Floor 1 - Bathroom 107B - CMU Mortar		(by NYS ELAP 198.1) by Kensen Caro on 09/15/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material		
	Asbestos Types:		
	Other Material: Non-fibrous 100%		
4	222092098-04	***No***	NAD
2	**Location:** Floor 2 - Bathroom 207B - CMU Mortar		(by NYS ELAP 198.1) by Kensen Caro on 09/15/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material		
	Asbestos Types:		
	Other Material: Non-fibrous 100%		
5	222092098-05	***No***	NAD
3	**Location:** Floor 1 - Bathroom 107B - Parge Coating		(by NYS ELAP 198.1) by Kensen Caro on 09/15/22
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material		
	Asbestos Types:		
	Other Material: Non-fibrous 100%		

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
6 3	222092098-06 **Location:** Floor 1 - Bathroom 107B - Parge Coating	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
7 3	222092098-07 **Location:** Floor 1 - Bathroom 107B - Parge Coating	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
8 4	222092098-08 **Location:** Floor 1 - Bathroom 107B - Grout @ Urinal	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
9 4	222092098-09 **Location:** Floor 2 - Bathroom 207B - Grout @ Urinal	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
10 5	222092098-10 **Location:** Floor 1 - Bathroom A33A - Caulking @ Fixtures	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.1%			
11 5	222092098-11 **Location:** Floor 1 - Bathroom 107B - Caulking @ Fixtures	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.5%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
12 6	222092098-12 **Location:** Floor 2 - Bathroom 207B - 1 x 1 Ceiling Tile Glue Daubs	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 44.1%			
13 6	222092098-13 **Location:** Floor 2 - Bathroom 207B - 1 x 1 Ceiling Tile Glue Daubs	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 43.6%			
14 7	222092098-14 **Location:** Floor 2 - Classroom 201 - Black Coating On Sink	***Yes***	4.7% (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 4.7 % **Other Material:** Non-fibrous 39%			
15 7	222092098-15 **Location:** Floor 2 - Classroom 201 - Black Coating On Sink		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
16 8	222092098-16 **Location:** Floor 2 - Classroom 201 - Pink Coating On Sink	***Yes***	7.4% (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Pink, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 7.4 % **Other Material:** Non-fibrous 29.7%			
17 8	222092098-17 **Location:** Floor 1 - Classroom 102 - Pink Coating On Sink		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
18 9	222092098-18 **Location:** Floor 1 - Bathroom 107B - Old Fiberglass Pipe Wrap	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Silver/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 75%, Non-fibrous 25%			
19 9	222092098-19 **Location:** Floor 1 - Bathroom 107B - Old Fiberglass Pipe Wrap	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Silver/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 75%, Non-fibrous 25%			
20 9	222092098-20 **Location:** Floor 1 - Bathroom 107B - Old Fiberglass Pipe Wrap	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Silver/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 75%, Non-fibrous 25%			
21 10	222092098-21 **Location:** Floor 1 - Bathroom 107B - Mudded Fitting	***Yes***	10.8% (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Off-White, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 10.8 % **Other Material:** Fibrous glass 20%, Non-fibrous 69.2%			
22 10	222092098-22 **Location:** Floor 1 - Bathroom 107B - Mudded Fitting		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
23 10	222092098-23 **Location:** Floor 1 - Bathroom 107B - Mudded Fitting		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
24 11	222092098-24 **Location:** Floor 2 - Bathroom 207B - 1 x 1 Ceiling Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.4%			
25 11	222092098-25 **Location:** Floor 2 - Bathroom 207B - 1 x 1 Ceiling Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.5%			
26 12	222092098-26 **Location:** Floor 2 - Bathroom 207B - Ceiling Tile - Creators	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 53.5%			
27 12	222092098-27 **Location:** Floor 2 - Bathroom 207B - Ceiling Tile - Creators	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 44.7%			
28 13	222092098-28 **Location:** Floor 1 - Bathroom 107B - Ceiling Tile - Large Holes	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 48.4%			
29 13	222092098-29 **Location:** Floor 1 - Bathroom 107B - Ceiling Tile - Large Holes	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 55.9%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
30 14	222092098-30 **Location:** Floor 2 - Classroom 207 - Ceiling Tile - Small Squiggles W/ Holes	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 49%			
31 14	222092098-31 **Location:** Floor 2 - Classroom 207 - Ceiling Tile - Small Squiggles W/ Holes	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 46.9%			
32 15	222092098-32 **Location:** Floor 2 - Classroom 204 - Ceiling Tile - Large Squiggles W/ Holes	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 31.8%			
33 15	222092098-33 **Location:** Floor 2 - Classroom 204 - Ceiling Tile - Large Squiggles W/ Holes	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 42.6%			
34 16	222092098-34 **Location:** Floor 1 - Bathroom 107A - Ceramic Floor Tile - Grout	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
35 16	222092098-35 **Location:** Floor 2 - Bathroom 207B - Ceramic Floor Tile - Grout	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
36 17	222092098-36 **Location:** Floor 1 - Bathroom 107A - Ceramic Floor Tile - Mudset	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
37 17	222092098-37 **Location:** Floor 2 - Bathroom 207B - Ceramic Floor Tile - Mudset	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
38 18	222092098-38 **Location:** Floor 2 - Bathroom 207A - Plaster Ceiling - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
39 18	222092098-39 **Location:** Floor 2 - Bathroom 207A - Plaster Ceiling - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
40 18	222092098-40 **Location:** Floor 2 - Bathroom 207A - Plaster Ceiling - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
41 18	222092098-41 **Location:** Floor 1 - Bathroom 107B - Plaster Ceiling - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
42 18	222092098-42 **Location:** Floor 1 - Bathroom 107B - Plaster Ceiling - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
43 19	222092098-43 **Location:** Floor 2 - Bathroom 207A - Plaster Ceiling - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
44 19	222092098-44 **Location:** Floor 2 - Bathroom 207A - Plaster Ceiling - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
45 19	222092098-45 **Location:** Floor 2 - Bathroom 207A - Plaster Ceiling - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
46 19	222092098-46 **Location:** Floor 1 - Bathroom 107B - Plaster Ceiling - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
47 19	222092098-47 **Location:** Floor 1 - Bathroom 107B - Plaster Ceiling - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
48 20	222092098-48 **Location:** Floor 1 - Classroom 116 - Plaster Wall - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
49 20	222092098-49 **Location:** Floor 1 - Classroom 102 - Plaster Wall - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
50 20	222092098-50 **Location:** Floor 1 - Classroom 102 - Plaster Wall - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
51 20	222092098-51 **Location:** Floor 1 - Classroom 106 - Plaster Wall - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
52 20	222092098-52 **Location:** Floor 1 - Classroom 106 - Plaster Wall - Top Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
53 21	222092098-53 **Location:** Floor 1 - Classroom 116 - Plaster Wall - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
54 21	222092098-54 **Location:** Floor 1 - Classroom 102 - Plaster Wall - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
55 21	222092098-55 **Location:** Floor 1 - Classroom 102 - Plaster Wall - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
56 21	222092098-56 **Location:** Floor 1 - Classroom 106 - Plaster Wall - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
57 21	222092098-57 **Location:** Floor 1 - Classroom 106 - Plaster Wall - Base Coat	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
58 22	222092098-58 **Location:** Floor 1 - Classroom 102 - Adhesive @ Casewalk & Wall	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Yellow/Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 26.9%			
59 22	222092098-59 **Location:** Floor 1 - Classroom 106 - Adhesive @ Casewalk & Wall	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Yellow/Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 14.6%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
60 23	222092098-60 **Location:** Floor 2 - Classroom 204 - 12 x 12 Brown W/ White Marble	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 39.1%			
61 23	222092098-61 **Location:** Floor 2 - Classroom 204 - 12 x 12 Brown W/ White Marble	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 34.4%			
62 24	222092098-62 **Location:** Floor 2 - Classroom 201 - 12 x 12 Tan W/ White Marble	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 35.9%			
63 24	222092098-63 **Location:** Floor 2 - Classroom 201 - 12 x 12 Tan W/ White Marble	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 34.8%			
64 25	222092098-64 **Location:** Floor 2 - Classroom 201 - 12 x 12 Floor Tile Mastic (Brown)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.7%			
65 25	222092098-65 **Location:** Floor 2 - Classroom 201 - 12 x 12 Floor Tile Mastic (Brown)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.4%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
66 26	222092098-66 **Location:** Floor 2 - Classroom 209 - 12 x 12 Blue W/ Black & White Floor Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Blue, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.1%			
67 26	222092098-67 **Location:** Floor 2 - Classroom 205 - 12 x 12 Blue W/ Black & White Floor Tile (Bottom Layer)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Blue, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.9%			
68 27	222092098-68 **Location:** Floor 2 - Classroom 209 - 12 x 12 Blue W/ Gray Mottle FT (Top Layer)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Green/Blue, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 35.2%			
69 27	222092098-69 **Location:** Floor 2 - Classroom 209 - 12 x 12 Blue W/ Gray Mottle FT (Top Layer)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Green/Blue, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 34%			
70 28	222092098-70 **Location:** Floor 2 - Classroom 203 - 9 x 9 Green W/ White Floor Tile	***Yes***	8.4% (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Olive, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 8.4 % **Other Material:** Non-fibrous 41.9%			
71 28	222092098-71 **Location:** Floor 2 - Classroom 203 - 9 x 9 Green W/ White Floor Tile		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
72 29	222092098-72 **Location:** Floor 2 - Classroom 205 - 9 x 9 Gray Floor Tile	***Yes***	6.7% (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 6.7 % **Other Material:** Non-fibrous 35%			
73 29	222092098-73 **Location:** Floor 2 - Classroom 205 - 9 x 9 Gray Floor Tile		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
76 31	222092098-74 **Location:** Floor 2 - Classroom 205 - 9 x 9 Mastic - Black	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.8%			
77 31	222092098-75 **Location:** Floor 2 - Classroom 203 - 9 x 9 Mastic - Black	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.1%			
78 32	222092098-76 **Location:** Floor 2 - Classroom 209 - Leveling Compound	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
79 32	222092098-77 **Location:** Floor 2 - Classroom 209 - Leveling Compound	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
80 33	222092098-78 **Location:** Floor 2 - Classroom 105 - 12 x 12 Tan W/ Brown & White Streaks	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 15.9%			
81 33	222092098-79 **Location:** Floor 2 - Classroom 105 - 12 x 12 Tan W/ Brown & White Streaks	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 6.2%			
82 34	222092098-80 **Location:** Floor 2 - Classroom 210 - 12 x 12 Beige W/ White, Blue & Rust	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 6.2%			
83 34	222092098-81 **Location:** Floor 2 - Classroom 210 - 12 x 12 Beige W/ White, Blue & Rust	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 6.3%			
84 35	222092098-82L1 **Location:** Floor 2 - Classroom 206 - Covebase	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1%			
84 35	222092098-82L2 **Location:** Floor 2 - Classroom 206 - Covebase W/ Adhesive	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 34.6%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN 22276.00-IN; Cornwall Elementary School; 99 Lee Road, Cornwall, NY 12518

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
85 35	222092098-83L1 **Location:** Floor 2 - Classroom 206 - Covebase	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.1%			
85 35	222092098-83L2 **Location:** Floor 2 - Classroom 206 - Covebase W/ Adhesive	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 47.4%			

Reporting Notes:

Analyzed by: Kensen Caro
Date: 9/15/2022



Reviewed by: Khaalid W. Perine



*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
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Brewster, NY 10509
845-278-7710
845-278-7750 - fax

222092098

Site Address: Cornwall Elementary School	Date: 09/09/22, 09/12/22	Inspector(s) David Seddon
99 Lee Road		
Cornwall, NY 12518	Project #: CORN 22276.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
1	1	1	Bathroom 107B - CMU			G
2	1	2	207B -			
3	2	1	107B - MORTAR			
4	2	2	207B -			
5	3	1	107B - PARGE COATING			
6	3	1	-			
7	3	1	-			
8	4	1	107B - GROUT @ URINAL			
9	4	2	207B -			
10	5	1	A33A - CAULKING @ FIXTURES			
11	5	1	107B -			
12	6	2	207B - 1X1 CEILING TILE GLUE DABS			
13	6	2	-			
14	7	2	Classroom 201 - BLACK COATING ON SINK	2 SMD		

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:
Received by:
Relinquished by:
Received by:

5/14/22 1242

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

 # 222092098

Site Address: Cornwall Elementary School	Date: 09/09/22, 09/12/22	Inspector(s) David Seddon
99 Lee Road		
Cornwall, NY 12518	Project #: CORN 22276.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
15	7	2	Classroom 201 - Black Coating on Sink			G
16	8	2	" - Pink			"
17	8	1	102 - "			"
18	9	1	Bathroom 107B - Old Fiberglass Pipe Wrap			"
19	9	1	" -			"
20	9	1	" -			"
21	10	1	" - Mudded Fitting			"
22	10	1	" -			"
23	10	1	" -			"
24	11	2	Bathroom 207B - 1x1 Ceiling Tile			"
25	11	2	" - "			"
26	12	2	" - Ceiling Tile - Creators			"
27	12	2	" - " - "			"
28	13	1	107B - " - Large Holes			"

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

24h
TAT

Relinquished by:
Received by:
Relinquished by:
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9/14/22 1242

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

 # 222092098

Site Address: Cornwall Elementary School	Date: 09/09/22, 09/12/22	Inspector(s) David Seddon
99 Lee Road		
Cornwall, NY 12518	Project #: CORN 22276.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
29	13	1	Bathroom 107B - Ceiling Tile - Large Holes			F
30	14	2	Classroom 207 - - Small Squiggles 4 Holes			
31	14	2	" - " - "			
32	15	2	204 - - Large Squiggle 4 Holes			
33	15	2	" - " - "			
34	16	1	Bathroom 107A - Ceramic Floor Tile - Grout			
35	16	2	207B - - "			
36	17	1	107A - - Mudset			
37	17	2	207B - - "			
38	18	2	207A - Plaster Ceiling - Top Coat			
39	18	2	A - - "			
40	18	2	A - - "			
41	18	1	107B - - "			
42	18	1	" - - "			

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:
Received by:
Relinquished by:
Received by:

5/14/22 12pm

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

222092098

Site Address: Cornwall Elementary School	Date: 09/09/22 09/12/22	Inspector(s) David Seddon
99 Lee Road		
Cornwall, NY 12518	Project #: CORN 22276.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
43	19	2	Bathroom 207A - Plaster Ceiling - Base Coat			F
44	19	↓	207A - -			
45	19	↓	207A - -			
46	19	1	107B - -			
47	19	↓	↓ - -			
48	20	↓	Classroom 116 - Plaster Wall - Top Coat			
49	20	↓	102 - -			
50	20	↓	↓ - -			
51	20	↓	106 - -			
52	20	↓	↓ - -			
53	21	↓	116 - - Base Coat			
54	21	↓	102 - -			
55	21	↓	↓ - -			
56	21	↓	106 - -			

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:
Received by:
Relinquished by:
Received by:

5/14/22 1242

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

222092098

Site Address: Cornwall Elementary School	Date: 09/09/22, 09/12/22	Inspector(s) David Seddon
99 Lee Road		
Cornwall, NY 12518	Project #: CORN 22276.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
57	21	1	Classroom 106 - Plaster Wall - Base Coat			F
58	22	↓	102 - Adhesive & Casework / Wall			↓
59	22	↓	106 - ↓ ↓ ↓			↓
60	23	2	Classroom 204 - 12x12 Brown & White Marble			↓
61	23	↓	↓ - ↓ ↓ ↓			↓
62	24	↓	201 - 12x12 Tan & White Marble			↓
63	24	↓	↓ - ↓ ↓ ↓			↓
64	25	↓	201 - 12x12 Floor Tile Mastic (Brown)			↓
65	25	↓	↓ - ↓ ↓ ↓			↓
66	26	↓	209 - 12x12 Blue & Black / White Floor Tile			↓
67	26	↓	205 - ↓ ↓ ↓ (Bottom Layer)			↓
68	27	↓	209 - 12x12 Blue & Gray Mottle FT (Top Layer)			↓
69	27	↓	↓ - ↓ ↓ ↓			↓
70	28	↓	203 - 9x9 Green & White Floor Tile			↓

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:
Received by:
Relinquished by: 5/14/22 1242
Received by:

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

222092098

Site Address:	Date:	Inspector(s)
Cornwall ES 99 Lee Road **Cornwall, NY 12518**	09/09/22, 09/12/22	**David Seddon**
	Project #: CORN 22276.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
71	28	2	Classroom 203 - 9x9 Green & White Floor Tile			G
72	29		205 - 9x9 Gray Floor Tile			
73	29		" - " " "			
~~74~~	~~30~~		~~209 - 9x9 Tan Floor Tile~~			
~~75~~	~~30~~		" - " " "			
76	31		205 - 9x9 Mastic - Black			
77	31		203 - " - "			
78	32		209 - Leveling Compound			
79	32		" - " "			
80	33		105 - 12x12 Tan & Brown & White Streaks			
81	33		" - " " "			
82	34		210 - 12x12 Beige & White, Blue & Rust			
83	34		" - " " "			
84	35		206 - Coveboase & Adhesive			

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:
Received by:
Relinquished by:
Received by:

9/14/22 1242

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

222092098

Site Address:	Date:	Inspector(s)
Cornwall ES 99 Leg Road **Cornwall, NY 12518**	09/09/22, 09/12/22 Project #: CORN 22276.00-IN	**David Seddon**

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
85	35	2	Classroom 206 - Covebase w/ Adhesive			F

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:
Received by:
Relinquished by:
Received by:

5/14/22 1242

CORNWALL-ON-HUDSON SCHOOL

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 04/14/23 **AmeriSci Job #** 223042110
Date Examined 04/15/23 **P.O. #**
ELAP # 11480 **Page** 1 **of** 3
RE: CORN:22278.00-IN; Cornwall-On-Hudson School; 234 Hudson Street, Cornwall-On-Hudson, NY 12520 (Report Amended 4/18/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
01 1	223042110-01L1 **Location:** Ext., Front Facade - Brick & Mortar - Brick	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
	Analyst Description: Red, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
01 2	223042110-01L2 **Location:** Ext., Front Facade - Brick & Mortar - Mortar	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
02 1	223042110-02L1 **Location:** Ext., Front Facade - Brick & Mortar - Brick	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
	Analyst Description: Red, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
02 2	223042110-02L2 **Location:** Ext., Front Facade - Brick & Mortar - Mortar	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
	Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		
03 3	223042110-03 **Location:** Ext., Front Of Column Base - Concrete	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
	Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%		

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall-On-Hudson School; 234 Hudson Street, Cornwall-On-Hudson, NY 12520 (Report Amended 4/18/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
04 3	223042110-04 **Location:** Ext., Front Of Column Base - Concrete	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
05 4	223042110-05 **Location:** Ext., Front Of Column Base - Stone	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
06 4	223042110-06 **Location:** Ext., Front Of Column Base - Stone	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
07 5	223042110-07 **Location:** Ext., Front Of Column Base - Stone Mortar	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
Analyst Description: Off-White, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
08 5	223042110-08 **Location:** Ext., Front Of Column Base - Stone Mortar	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 04/15/23
Analyst Description: Off-White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall-On-Hudson School; 234 Hudson Street, Cornwall-On-Hudson, NY 12520 (Report Amended 4/18/2023)

Reporting Notes:

Analyzed by: Ivan H. Reyes
Date: 4/15/2023

Reviewed by: John P. Koubiadis

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
1511 Route 22, Suite C24
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

Site Address: Cornwall-on-Hudson school
234 Hudson Street
Cornwall-on-Hudson, NY 12520

Date: 4-19-2023

Client Project #:

Project #: CORN: ~~22278.02~~ - IN

Inspector(s): **Louis N. Johnson III**

22278.00-IN

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
01	1/2	Ext	Front Facade - Brick + Mortar		F	G
02	1/2		" " - " + "		F	G
03	3		Front Column Base - Concrete		F	D
04	3		" " " - "		F	D
05	4		- Stone		F	D
06	4		" - "		"	"
07	5		- Stone Mortar		"	"
08	5		" - " "		"	"

#230421110

Special Instructions/ Turnaround Time:

Stop at 1st Positive per Homogenous Area 24HR TAT

E-Mail Results to AdelaideLabResults@adelaideltc.com & ljohnson@adelaideltc.com

Relinquished by:

Received by: Marilyn Kemmgal 4/14/23 10:38

Relinquished by:

Received by:

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 12/01/22
Date Examined 12/01/22
ELAP # 11480

AmeriSci Job # 222121015
P.O. #
Page 1 **of** 1

RE: CORN:22278.00; Cornwall On Hudson ES; 234 Hudson St., Cornwall On Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
88	222121015-01	***Yes***	20%
34	**Location:** Ext. - Transite Board Above Window		(by NYS ELAP 198.1) by Ivan H. Reyes on 12/01/22
	Analyst Description: Gray, Homogeneous, Fibrous, Cementitious, Bulk Material		
	Asbestos Types: Chrysotile 20.0 %		
	Other Material: Non-fibrous 80%		
89	222121015-02		NA/PS
34	**Location:** Ext. - Transite Board Above Window		
	Analyst Description: Bulk Material		
	Asbestos Types:		
	Other Material:		

Reporting Notes:

Analyzed by: Ivan H. Reyes
Date: 12/1/2022

Reviewed by: Ivan H. Reyes

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

Site Address: Cornwall on Hudson ES.	Date: 11/30/22	Inspector: **Jason Fullum**
234 Hudson St.	Client Project # ~~45877~~	
Cornwall on Hudson, NY 12520	Project #: CORN: 22278.60	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable Non Friable	Condition g, d, sd
88	34	Ext.	Transite Board Above Window		NF	G
89	34	↓	↓ ↓		↓	G
# 22212015						

Special Instructions/ Turnaround Time:

Stop at 1st Positive per Homogenous Area 24 HR. **TAT**
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com and Jfullum@adelaidellc.com

Relinquished by:
Received by: 12/1/22 10:53
Relinquished by:
Received by:

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	1	1	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Ceramic Floor Grout								
02	2	1	----	----	----	----	NAD	NA
Location: 1st Fl., Girls Bathroom - Ceramic Floor Grout								
03	3	2	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Ceramic Floor Mudset								
04	4	2	----	----	----	----	NAD	NA
Location: 1st Fl., Girls Bathroom - Ceramic Floor Mudset								
05	5	3	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Concrete Floor								
06	6	3	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Concrete Floor								
07	7	4	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Ceramic Wall Grout								
08	8	4	----	----	----	----	NAD	NA
Location: 1st Fl., Girls Bathroom - Ceramic Wall Grout								
09	9	5	0.483	35.6	54.4	9.9	NAD	NAD
Location: 1st Fl., Boys Bathroom - Ceramic Wall Adhesive								
10	10	5	0.206	27.2	52.8	20.0	NAD	NAD
Location: 1st Fl., Girls Bathroom - Ceramic Wall Adhesive								
11	11	6	0.231	14.0	84.7	1.4	NAD	NAD
Location: 2nd Fl., All Gender Bathroom - 12 x 12 Off-White W/ Gray Floor Tile								
12	12	6	0.338	12.1	83.2	4.8	NAD	NAD
Location: 2nd Fl., All Gender Bathroom - 12 x 12 Off-White W/ Gray Floor Tile								
13	13	7	0.220	19.3	53.2	27.5	NAD	NAD
Location: 2nd Fl., Hallway - 12 x 12 Beige W/ Brown Floor Tile								
14	14	7	0.205	17.6	57.0	25.5	NAD	NAD
Location: 2nd Fl., Hallway - 12 x 12 Beige W/ Brown Floor Tile								
15	15	8	0.181	57.8	25.4	16.8	NAD	NAD
Location: 2nd Fl., All Gender Bathroom - Brown Floor Tile Mastic								
16	16	8	0.164	58.9	24.7	16.4	NAD	NAD
Location: 2nd Fl., Hallway - Brown Floor Tile Mastic								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	17	9	0.323	14.1	81.1	4.7	NAD	NAD
Location: 2nd Fl., Hallway - Ceiling Tile (Deep Craters)								
18	18	9	0.204	17.4	79.1	3.5	NAD	NAD
Location: 2nd Fl., Hallway - Ceiling Tile (Deep Craters)								
19	19	10	0.145	16.8	54.1	29.1	NAD	NAD
Location: 2nd Fl., All Gender Bathroom - Ceiling Tile (Sheetrock Type)								
20	20	10	0.150	17.4	54.4	28.2	NAD	NAD
Location: 2nd Fl., All Gender Bathroom - Ceiling Tile (Sheetrock Type)								
21L1	21	11	0.213	54.4	44.2	1.4	NAD	NAD
Location: 2nd Fl., All Gender Bathroom - Cove Base								
21L2	21	11	0.241	45.3	37.8	16.9	NAD	NAD
Location: 2nd Fl., All Gender Bathroom - Cove Base W/ Adhesive								
22L1	22	11	0.227	51.4	47.8	0.8	NAD	NAD
Location: 2nd Fl., All Gender Bathroom - Cove Base								
22L2	22	11	0.281	46.2	42.5	11.3	NAD	NAD
Location: 2nd Fl., All Gender Bathroom - Cove Base W/ Adhesive								
23	23	12	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Clay Block								
24	24	12	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Clay Block								
25	25	13	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Clay Block Mortar								
26	26	13	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Clay Block Mortar								
27	27	14	0.088	49.7	42.6	7.7	NAD	NAD
Location: 3rd Fl., Boys Bathroom - Older Wall Adhesive (Behind Bui.)								
28	28	14	0.192	50.9	8.1	41.0	NAD	NAD
Location: 3rd Fl., Boys Bathroom - Older Wall Adhesive (Behind Bui.)								
29	29	15	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Textured Coating (Type 1) On Plaster Wall								
30	30	15	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Textured Coating (Type 1) On Plaster Wall								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
31	31	15	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Textured Coating (Type 1) On Plaster Wall								
32	32	15	----	----	----	----	NAD	NA
Location: 1st Fl., Girls Bathroom - Textured Coating (Type 1) On Plaster Wall								
33	33	15	----	----	----	----	NAD	NA
Location: 1st Fl., Girls Bathroom - Textured Coating (Type 1) On Plaster Wall								
34	34	16	----	----	----	----	Chrysotile 3.3	NA
Location: 3rd Fl., Boys Bathroom - Textured Coating (Type 2) On Plaster Wall								
35	35	16	----	----	----	----	NA/PS	NA
Location: 3rd Fl., Girls Bathroom - Textured Coating (Type 2) On Plaster Wall								
36	36	16	----	----	----	----	NA/PS	NA
Location: 3rd Fl., Girls Bathroom - Textured Coating (Type 2) On Plaster Wall								
37	37	17	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Sheetrock								
38	38	17	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Sheetrock								
39	39	18	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Joint Compound								
40	40	18	----	----	----	----	NAD	NA
Location: 1st Fl., Boys Bathroom - Joint Compound								
41	41	19	0.253	65.3	18.4	16.4	NAD	NAD
Location: 3rd Fl., Boys Bathroom - Epoxy Coating On Floor								
42	42	19	0.318	60.4	19.4	20.2	NAD	NAD
Location: 3rd Fl., Boys Bathroom - Epoxy Coating On Floor								
43	43	20	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Leveling Compound (Type 1)								
44	44	20	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Leveling Compound (Type 1)								
45	45	21	----	----	----	----	NAD	NA
Location: 2nd Fl., All Gender Bathroom - Leveling Compound (Type 2)								
46	46	21	----	----	----	----	NAD	NA
Location: 2nd Fl., All Gender Bathroom - Leveling Compound (Type 2)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
47	47	22	----	----	----	----	NAD	NA
Location: 1st Fl., Girls Bathroom - Wall Plaster (Top Coat)								
48	48	22	----	----	----	----	NAD	NA
Location: 2nd Fl., All Gender Bathroom - Wall Plaster (Top Coat)								
49	49	22	----	----	----	----	NAD	NA
Location: 3rd Fl., Room 304 - Wall Plaster (Top Coat)								
50	50	22	----	----	----	----	NAD	NA
Location: 3rd Fl., Room 303 - Wall Plaster (Top Coat)								
51	51	22	----	----	----	----	NAD	NA
Location: Nurses Office - Wall Plaster (Top Coat)								
52	52	22	----	----	----	----	NAD	NA
Location: Cafeteria - Wall Plaster (Top Coat)								
53	53	22	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Wall Plaster (Top Coat)								
54	54	23	----	----	----	----	NAD	NA
Location: 1st Fl., Girls Bathroom - Wall Plaster (Base Coat)								
55	55	23	----	----	----	----	NAD	NA
Location: 2nd Fl., All Gender Bathroom - Wall Plaster (Base Coat)								
56	56	23	----	----	----	----	NAD	NA
Location: 3rd Fl., Room 304 - Wall Plaster (Base Coat)								
57	57	23	----	----	----	----	NAD	NA
Location: 3rd Fl., Room 303 - Wall Plaster (Base Coat)								
58	58	23	----	----	----	----	NAD	NA
Location: Nurses Office - Wall Plaster (Base Coat)								
59	59	23	----	----	----	----	NAD	NA
Location: Cafeteria - Wall Plaster (Base Coat)								
60	60	23	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Wall Plaster (Base Coat)								
61	61	24	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Ceiling Plaster (Top Coat)								
62	62	24	----	----	----	----	NAD	NA
Location: 3rd Fl., Girls Bathroom - Ceiling Plaster (Top Coat)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
63	63	24	----	----	----	----	NAD	NA
Location: Nurses Office - Ceiling Plaster (Base Coat)								
64	64	24	----	----	----	----	NAD	NA
Location: Cafeteria - Ceiling Plaster (Base Coat)								
65	65	24	----	----	----	----	NAD	NA
Location: Cafeteria - Ceiling Plaster (Base Coat)								
66	66	25	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Ceiling Plaster (Base Coat)								
67	67	25	----	----	----	----	NAD	NA
Location: 3rd Fl., Girls Bathroom - Ceiling Plaster (Base Coat)								
68	68	25	----	----	----	----	NAD	NA
Location: Nurses Office - Ceiling Plaster (Base Coat)								
69	69	25	----	----	----	----	NAD	NA
Location: Cafeteria - Ceiling Plaster (Base Coat)								
70	70	25	----	----	----	----	NAD	NA
Location: Cafeteria - Ceiling Plaster (Base Coat)								
71	71	26	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Dura Rock Wallboard								
72	72	26	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Dura Rock Wallboard								
73	73	27	0.245	48.2	41.7	10.2	NAD	NAD
Location: Ext. - Window Caulk (Type 1) @ Bottom Sill								
74	74	27	0.488	31.7	59.2	9.1	NAD	NAD
Location: Ext. - Window Caulk (Type 1) @ Bottom Sill								
75	75	28	0.223	48.1	44.7	6.9	Chrysotile <0.25	Chrysotile <1.0
Location: Ext. - Window Caulk (Type 2) @ Side Of Window								
76	76	28	0.349	50.8	44.4	4.6	Chrysotile <0.25	Chrysotile <1.0
Location: Ext. - Window Caulk (Type 2) @ Side Of Window								
77	77	29	0.325	24.5	54.9	16.7	Chrysotile 3.9	NA
Location: Ext. - Window Caulk (Type 3) Older Caulk (2nd Layer)								
78	78	29	0.378	25.0	52.6	22.4	NA/PS	NA
Location: Ext. - Window Caulk (Type 3) Older Caulk (2nd Layer)								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
79	79	30	0.128	35.8	63.5	0.6	NAD	NAD
Location: 3rd Fl., Boys Bathroom - Caulk @ Fixtures								
80	80	30	0.129	34.9	63.6	1.5	NAD	NAD
Location: 2nd Fl., Boys Bathroom - Caulk @ Fixtures								
81	81	31	----	----	----	----	NAD	NA
Location: Nurses Office - Duct Insulation Wrap								
82	82	31	----	----	----	----	NAD	NA
Location: Nurses Office - Duct Insulation Wrap								
83	83	31	----	----	----	----	NAD	NA
Location: Nurses Office - Duct Insulation Wrap								
84	84	32	----	----	----	----	NAD	NA
Location: Ext. - Brick Mortar								
85	85	32	----	----	----	----	NAD	NA
Location: Ext. - Brick Mortar								
86	86	33	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Ceramic Wall Tile Mudset								
87	87	33	----	----	----	----	NAD	NA
Location: 3rd Fl., Boys Bathroom - Ceramic Wall Tile Mudset								

Analyzed by: Khaalid W. Perine 

Date: 9/15/2022

Reviewed by: Khaalid W. Perine 

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Adelaide Environmental Health
Attn: John Soter
1511 Rte. 22 Suite C24

Brewster, NY 10509

Date Received 09/14/22
Date Examined 09/15/22
ELAP # 11480

AmeriSci Job # 222092096
P.O. #
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RE: CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
1 1	222092096-01 **Location:** 1st Fl., Boys Bathroom - Ceramic Floor Grout	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
2 1	222092096-02 **Location:** 1st Fl., Girls Bathroom - Ceramic Floor Grout	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
3 2	222092096-03 **Location:** 1st Fl., Boys Bathroom - Ceramic Floor Mudset	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
4 2	222092096-04 **Location:** 1st Fl., Girls Bathroom - Ceramic Floor Mudset	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
5 3	222092096-05 **Location:** 1st Fl., Boys Bathroom - Concrete Floor	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

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PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
6 3	222092096-06 **Location:** 3rd Fl., Boys Bathroom - Concrete Floor	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
7 4	222092096-07 **Location:** 1st Fl., Boys Bathroom - Ceramic Wall Grout	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
8 4	222092096-08 **Location:** 1st Fl., Girls Bathroom - Ceramic Wall Grout	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
9 5	222092096-09 **Location:** 1st Fl., Boys Bathroom - Ceramic Wall Adhesive	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.9%			
10 5	222092096-10 **Location:** 1st Fl., Girls Bathroom - Ceramic Wall Adhesive	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 20%			
11 6	222092096-11 **Location:** 2nd Fl., All Gender Bathroom - 12 x 12 Off-White W/ Gray Floor Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Off-White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.4%			

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PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
12 6	222092096-12 **Location:** 2nd Fl., All Gender Bathroom - 12 x 12 Off-White W/ Gray Floor Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Off-White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.8%			
13 7	222092096-13 **Location:** 2nd Fl., Hallway - 12 x 12 Beige W/ Brown Floor Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Peach, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 27.5%			
14 7	222092096-14 **Location:** 2nd Fl., Hallway - 12 x 12 Beige W/ Brown Floor Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Peach, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 25.5%			
15 8	222092096-15 **Location:** 2nd Fl., All Gender Bathroom - Brown Floor Tile Mastic	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 16.8%			
16 8	222092096-16 **Location:** 2nd Fl., Hallway - Brown Floor Tile Mastic	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 16.4%			
17 9	222092096-17 **Location:** 2nd Fl., Hallway - Ceiling Tile (Deep Craters)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.7%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
18 9	222092096-18 **Location:** 2nd Fl., Hallway - Ceiling Tile (Deep Craters)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.5%			
19 10	222092096-19 **Location:** 2nd Fl., All Gender Bathroom - Ceiling Tile (Sheetrock Type)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Off-White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 29.1%			
20 10	222092096-20 **Location:** 2nd Fl., All Gender Bathroom - Ceiling Tile (Sheetrock Type)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Off-White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 28.2%			
21 11	222092096-21L1 **Location:** 2nd Fl., All Gender Bathroom - Cove Base	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.4%			
21 11	222092096-21L2 **Location:** 2nd Fl., All Gender Bathroom - Cove Base W/ Adhesive	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Cream, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 16.9%			
22 11	222092096-22L1 **Location:** 2nd Fl., All Gender Bathroom - Cove Base	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.8%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
22 11	222092096-22L2 **Location:** 2nd Fl., All Gender Bathroom - Cove Base W/ Adhesive	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Cream, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.3%			
23 12	222092096-23 **Location:** 3rd Fl., Boys Bathroom - Clay Block	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Red, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
24 12	222092096-24 **Location:** 3rd Fl., Boys Bathroom - Clay Block	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Red, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
25 13	222092096-25 **Location:** 3rd Fl., Boys Bathroom - Clay Block Mortar	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
26 13	222092096-26 **Location:** 3rd Fl., Boys Bathroom - Clay Block Mortar	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
27 14	222092096-27 **Location:** 3rd Fl., Boys Bathroom - Older Wall Adhesive (Behind Bui.)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.7%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
28 14	222092096-28 **Location:** 3rd Fl., Boys Bathroom - Older Wall Adhesive (Behind Bui.)	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 41%			
29 15	222092096-29 **Location:** 1st Fl., Boys Bathroom - Textured Coating (Type 1) On Plaster Wall	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
30 15	222092096-30 **Location:** 1st Fl., Boys Bathroom - Textured Coating (Type 1) On Plaster Wall	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
31 15	222092096-31 **Location:** 1st Fl., Boys Bathroom - Textured Coating (Type 1) On Plaster Wall	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
32 15	222092096-32 **Location:** 1st Fl., Girls Bathroom - Textured Coating (Type 1) On Plaster Wall	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
33 15	222092096-33 **Location:** 1st Fl., Girls Bathroom - Textured Coating (Type 1) On Plaster Wall	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
34 16	222092096-34 **Location:** 3rd Fl., Boys Bathroom - Textured Coating (Type 2) On Plaster Wall	***Yes***	3.3% (ELAP 400 PC) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 3.3 % **Other Material:** Non-fibrous 96.7%			
35 16	222092096-35 **Location:** 3rd Fl., Girls Bathroom - Textured Coating (Type 2) On Plaster Wall		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
36 16	222092096-36 **Location:** 3rd Fl., Girls Bathroom - Textured Coating (Type 2) On Plaster Wall		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
37 17	222092096-37 **Location:** 1st Fl., Boys Bathroom - Sheetrock	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Off-White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
38 17	222092096-38 **Location:** 1st Fl., Boys Bathroom - Sheetrock	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Off-White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
39 18	222092096-39 **Location:** 1st Fl., Boys Bathroom - Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
40 18	222092096-40 **Location:** 1st Fl., Boys Bathroom - Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
41 19	222092096-41 **Location:** 3rd Fl., Boys Bathroom - Epoxy Coating On Floor	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 16.4%			
42 19	222092096-42 **Location:** 3rd Fl., Boys Bathroom - Epoxy Coating On Floor	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 20.2%			
43 20	222092096-43 **Location:** 3rd Fl., Boys Bathroom - Leveling Compound (Type 1)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
44 20	222092096-44 **Location:** 3rd Fl., Boys Bathroom - Leveling Compound (Type 1)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
45 21	222092096-45 **Location:** 2nd Fl., All Gender Bathroom - Leveling Compound (Type 2)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
46 21	222092096-46 **Location:** 2nd Fl., All Gender Bathroom - Leveling Compound (Type 2)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
47 22	222092096-47 **Location:** 1st Fl., Girls Bathroom - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
48 22	222092096-48 **Location:** 2nd Fl., All Gender Bathroom - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
49 22	222092096-49 **Location:** 3rd Fl., Room 304 - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
50 22	222092096-50 **Location:** 3rd Fl., Room 303 - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
51 22	222092096-51 **Location:** Nurses Office - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
52 22	222092096-52 **Location:** Cafeteria - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
53 22	222092096-53 **Location:** 3rd Fl., Boys Bathroom - Wall Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
54 23	222092096-54 **Location:** 1st Fl., Girls Bathroom - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
55 23	222092096-55 **Location:** 2nd Fl., All Gender Bathroom - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
56 23	222092096-56 **Location:** 3rd Fl., Room 304 - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
57 23	222092096-57 **Location:** 3rd Fl., Room 303 - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
58 23	222092096-58 **Location:** Nurses Office - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
59 23	222092096-59 **Location:** Cafeteria - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
60 23	222092096-60 **Location:** 3rd Fl., Boys Bathroom - Wall Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
61 24	222092096-61 **Location:** 3rd Fl., Boys Bathroom - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
62 24	222092096-62 **Location:** 3rd Fl., Girls Bathroom - Ceiling Plaster (Top Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
63 24	222092096-63 **Location:** Nurses Office - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
64 24	222092096-64 **Location:** Cafeteria - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
65 24	222092096-65 **Location:** Cafeteria - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
66 25	222092096-66 **Location:** 3rd Fl., Boys Bathroom - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
67 25	222092096-67 **Location:** 3rd Fl., Girls Bathroom - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
68 25	222092096-68 **Location:** Nurses Office - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
69 25	222092096-69 **Location:** Cafeteria - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 2%, Cellulose Trace, Non-fibrous 98%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
70 25	222092096-70 **Location:** Cafeteria - Ceiling Plaster (Base Coat)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 2%, Cellulose 1%, Non-fibrous 97%			
71 26	222092096-71 **Location:** 3rd Fl., Boys Bathroom - Dura Rock Wallboard	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass Trace, Non-fibrous 100%			
72 26	222092096-72 **Location:** 3rd Fl., Boys Bathroom - Dura Rock Wallboard	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass Trace, Non-fibrous 100%			
73 27	222092096-73 **Location:** Ext. - Window Caulk (Type 1) @ Bottom Sill	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.2%			
74 27	222092096-74 **Location:** Ext. - Window Caulk (Type 1) @ Bottom Sill	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Gray/White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.1%			
75 28	222092096-75 **Location:** Ext. - Window Caulk (Type 2) @ Side Of Window	***Yes***	Trace (<0.25 % pc)[1] (ELAP 400 PC) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile <0.25 % pc **Other Material:** Non-fibrous 7.1%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
76 28	222092096-76 **Location:** Ext. - Window Caulk (Type 2) @ Side Of Window	***Yes***	Trace (<0.25 % pc)[1] (ELAP 400 PC) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile <0.25 % pc **Other Material:** Non-fibrous 4.8%			
77 29	222092096-77 **Location:** Ext. - Window Caulk (Type 3) Older Caulk (2nd Layer)	***Yes***	3.9% (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: Gray/Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 3.9 % **Other Material:** Non-fibrous 16.7%			
78 29	222092096-78 **Location:** Ext. - Window Caulk (Type 3) Older Caulk (2nd Layer)		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
79 30	222092096-79 **Location:** 3rd Fl., Boys Bathroom - Caulk @ Fixtures	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.6%			
80 30	222092096-80 **Location:** 2nd Fl., Boys Bathroom - Caulk @ Fixtures	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.5%			
81 31	222092096-81 **Location:** Nurses Office - Duct Insulation Wrap	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Silver/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 60%, Fibrous glass 25%, Non-fibrous 15%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
82 31	222092096-82 **Location:** Nurses Office - Duct Insulation Wrap	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Silver/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 60%, Fibrous glass 25%, Non-fibrous 15%			
83 31	222092096-83 **Location:** Nurses Office - Duct Insulation Wrap	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Silver/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 60%, Fibrous glass 25%, Non-fibrous 15%			
84 32	222092096-84 **Location:** Ext. - Brick Mortar	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
85 32	222092096-85 **Location:** Ext. - Brick Mortar	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
86 33	222092096-86 **Location:** 3rd Fl., Boys Bathroom - Ceramic Wall Tile Mudset	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
87 33	222092096-87 **Location:** 3rd Fl., Boys Bathroom - Ceramic Wall Tile Mudset	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 09/15/22
Analyst Description: White, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

CORN:22278.00-IN; Cornwall On Hudson ES; 234 Hudson Street, Cornwall-On-Hudson, NY 12520

Reporting Notes:

(1) Sample prepared for analysis by ELAP 198.6 method

Analyzed by: Kensen Caro
Date: 9/15/2022



Reviewed by: Khaalid W. Perine



*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Adelaide Environmental Health Associates, Inc
1511 Rte. 22, Suite C24
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

 # 222092096

Site Address: Cornwall on Hudson ES	Date: 9/6/2022, 09/12/22	Inspector(s) David Seddon
234 Hudson Street	OGS PN:	
Cornwall-On-Hudson, NY 12520	Project #: CORN: 22278.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g. d. ed
1	1	1	Boys Bathroom - Ceramic Floor - Grout			G
2	1	1	Girls - -			
3	2	1	Boys - - Mudset			
4	2	1	Girls - -			
5	3	1	Boys - Concrete Floor			
6	3	3	-			
7	4	1	Boys - Ceramic Wall - Grout			
8	4	1	Girls - -			
9	5	1	Boys - - Adhesive			
10	5	1	Girls - -			
11	6	2	All Gender Bathroom - 12x12 Off white & Gray Floor Tile			
12	6	2	-			
13	7	2	Hallway - 12 x 12 Beige & Brown Floor Tile			
14	7	2	-			

24hr
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:	
Received by:	9/14/22 1242
Relinquished by:	
Received by:	

Adelaide Environmental Health Associates, Inc
1511 Rte. 22, Suite C24
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

 # 222092096

Site Address: Cornwall on Hudson ES	Date: 9/6/2022, 09/02/22	Inspector(s) David Seddon
234 Hudson Street	OGS PN:	
Cornwall-On-Hudson, NY 12520	Project #: CORN: 22278.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
15	8	2	All Gender Bathroom - Brown Floor Tile Mastic			G
16	8	2	Hallway - ↓ ↓			↓
17	9	2	↓ - Ceiling Tile - Deep Craters			↓
18	9	2	↓ - ↓ - ↓			↓
19	10	2	All Gender Bathroom - Ceiling Tile - Sheetrock Type			↓
20	10	2	↓ ↓ - ↓ - ↓			↓
21	11	2	- Cove Base & Adhesive			↓
22	11	2	↓ ↓ - ↓ ↓			↓
23	12	3	Boys Bathroom - Clay Block			↓
24	12	3	↓ ↓ - ↓			↓
25	13	3	↓ ↓ - ↓ - Mortar			↓
26	13	3	↓ ↓ - ↓ - ↓			↓
27	14	3	↓ ↓ - Older Wall Adhesive (Behind Built-in)			↓
28	14	3	↓ ↓ - ↓ ↓ ↓			↓

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

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Relinquished by:	9/14/22 12pm
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1511 Rte. 22, Suite C24
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

 # 222092096

Site Address: Cornwall on Hudson ES	Date: 9/6/2022, 09/12/22	Inspector(s) David Seddon
234 Hudson Street	OGS PN:	
Cornwall-On-Hudson, NY 12520	Project #: CORN: 22278.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g. d. sd
29	15	1	Boys Bathroom - Textured Coating (Type 1) on Plaster Wall			L
30	15	1	-			
31	15	1	-			
32	15	1	Girls -			
33	15	1	-			
34	16	3	Boys - Coating (Type 2)			
35	16	3	Girls -			
36	16	3	-			
37	17	1	Boys - Sheet rock			
38	17	1	-			
39	18	1	- Joint Compound			
40	18	1	-			
41	19	3	- Epoxy Coating on Floor			L
42	19	3	-			

24 h
TAT

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Relinquished by:
Received by:

5/14/22 1242

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Adelaide Environmental Health Associates, Inc

1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

 # 222092096

Site Address: Cornwall on Hudson ES 234 Hudson St. Cornwall on Hudson, NY 12520	Date: 09/06/22, 09/12/22 Project #: CORN ÷ 22278.00-IN	Inspector(s) David Seddon

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g. d. sd
43	20	3	Boys Bathroom - Leveling Compound (Type 1)			G
44	20	3	↓ ↓ - ↓ ↓ ↓			
45	21	2	All Gender Bathroom - Leveling Compound (Type 2)			
46	21	2	↓ ↓ - ↓ ↓ ↓			
47	22	1	Girls Bathroom - Plaster Wall - Top Coat			
48	22	2	All Gender Bathroom - -			
49	22	3	Room 304 - -			
50	22	3	↓ 303 - -			
51	22		Nurses Office - -			
52	22		Cafeteria - -			
53	22	3	Boys Bathroom - - ↓			
54	23	1	Girls Bathroom - - Base Coat			
55	23	2	All Gender Bathroom - - ↓			
56	23	3	Room 304 - - ↓			

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:
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Relinquished by:
Received by: 9/14/22 12:42

Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

222092096

Site Address:	Date:	Inspector(s)
Cornwall on Hudson ES 234 Hudson St. Cornwall on Hudson, NY	09/06/22, 09/12/22 Project #: CORN 22278.00 IN	David Seaton

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g. d. sd
57	23	3	Room 303 - Plaster Wall - Base Coat			G
58	23		Nurses office - -			
59	23		Cafeteria - -			
60	23	3	Boys Bathroom - -			
61	24	3	" " Plaster Ceiling - Top Coat			
62	24	3	Girls Bathroom - Plaster Ceiling - Top Coat			
63	24		Nurses office - -			
64	24		Cafeteria - -			
65	24		" - -			
66	25	3	Boys Bathroom - - Base Coat			
67	25	3	Girls " - - B			
68	25		Nurses office - -			
69	25		Cafeteria - -			
70	25		" - -			

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

24h
TAT

Relinquished by:
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Adelaide Environmental Health Associates, Inc
1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

222092096

Site Address: Cornwall on Hudson ES	Date: 09/06/22, 09/12/22	Inspector(s) David Seddon
	Project #: CORN 22278.00-IN	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
71	26	3	Boys Bathroom - Duraflock Wall Board			G
72	26	3	" " "			"
73	27	Ext	Exterior - Window Calk (Type 1) @ Bottom Sill			"
74	27	"	" " " " " "			"
75	28	"	" " " (Type 2) @ Side of Window			"
76	28	"	" " " " " "			"
77	29	"	" " " (Type 3) Older Calk (2nd Layer)			"
78	29	"	" " " " " "			"
79	30	3	Boys Bathroom - Calk @ Fixtures			"
80	30	2	" " " " " "			"
81	31		Nurses Office - Duct Insulation Wrap			"
82	31		" " " " "			"
83	31		" " " " "			"
84	32	Ext	Exterior - Brick Mortar			F

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

Relinquished by:	
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Relinquished by:	9/14/22 1212
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1454 Rte. 22, Suite B202
Brewster, NY 10509
845-278-7710
845-278-7750 - fax

222092096

Site Address: Cornwall on Hudson ES	Date: 09/06/22, 09/12/22	Inspector(s) David Seddon
	Project #: CORN 22278.00-#N	

Sample ID #	Homogeneous Area	Floor Level	Sample Location/Description	Quantity (In Feet)	Friable NonFriable	Condition g, d, sd
85	32	EXT	Exterior - Buck Mortar			G
86	33	3	Bap Bathroom - Ceramic Wall Tile - Mortar			G
87	33	3	" " - " - "			"

24h
TAT

Stop at 1st Positive per Homogenous Area
Fax Results to 845-278-7750
E-Mail results to AdelaideLabResults@Adelaidellc.com

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9/14/22 1242

APPENDIX E

XRF READINGS

Adelaide Environmental Heath Associates Inc.
1511 Route 22, Suite C-24
Brewster, New York 10509
Adelaide Project# CORN:24103.02-IN
Project Name: Cornwall Phase 3
Inspector: Jason Fullum

Reading #	Date	Time	Space Type	Floor	Room	Component	Side	Substrate	Color	Condition	Lead Concentration (mg/cm2)	Result
1	6/7/2024	11:40:01			Calibration						1	Positive
2	6/7/2024	11:40:20			Calibration						1	Positive
3	6/7/2024	11:40:50			Calibration						1.1	Positive
4	6/7/2024	11:45:19	Middle School	Ground	Parking Lot	Floor	Floor	Tar	White	Intact	0.1	Negative
5	6/7/2024	11:47:10	Middle School	Ground	Parking Lot	Floor	Floor	Tar	Blue	Intact	0.4	Negative
6	6/7/2024	11:50:03	Middle School	Ground	Parking Lot	Floor	Floor	Tar	Yellow	Intact	0.1	Negative
7	6/7/2024	11:55:09			Calibration						1.2	Positive
8	6/7/2024	11:55:38			Calibration						1.1	Positive
9	6/7/2024	11:56:20			Calibration						1.1	Positive
10	6/7/2024	12:05:05			Calibration						1.2	Positive
11	6/7/2024	12:05:35			Calibration						1.1	Positive
12	6/7/2024	12:06:02			Calibration						0.9	Negative
13	6/7/2024	12:10:00	Elem School	Ground	Parking Lot	Floor	Floor	Tar	Blue	Intact	0.2	Negative
14	6/7/2024	12:12:38	Elem School	Ground	Parking Lot	Floor	Floor	Tar	Yellow	Intact	0.1	Negative
15	6/7/2024	12:15:55	Elem School	Ground	Parking Lot	Floor	Floor	Tar	White	Intact	0.4	Negative
16	6/7/2024	12:20:05			Calibration						1.1	Positive
17	6/7/2024	12:20:39			Calibration						1.1	Positive
18	6/7/2024	12:21:25			Calibration						0.9	Negative

PREVIOUS XRF READINGS

CORNWALL MIDDLE SCHOOL

Adelaide Environmental Heath Associates Inc.
1511 Route 22, Suite C24
Brewster, New York 10509

Reading #	Date	Time	Job Number	Job Name	Space Type	Floor	Room	Component	Side	Substrate	Color	Condition	Lead Concentration	Units	Result	Inspector Name
1	3/7/2023	19:12:37	22154.01-IN	Cornwall MS	Middle School		Calibration						1	mg/cm2	Positive	David Seddon
2	3/7/2023	19:12:48	22154.01-IN	Cornwall MS	Middle School		Calibration						1	mg/cm2	Positive	David Seddon
3	3/7/2023	19:12:58	22154.01-IN	Cornwall MS	Middle School		Calibration						1.1	mg/cm2	Positive	David Seddon
4	3/7/2023	19:13:23	22154.01-IN	Cornwall MS	Middle School	1st Floor	Men's Bathroom	Wall	A	Plaster	Blue	Intact	0.1	mg/cm2	Negative	David Seddon
5	3/7/2023	19:13:29	22154.01-IN	Cornwall MS	Middle School	1st Floor	Men's Bathroom	Wall	A	Ceramic	Blue	Intact	0.1	mg/cm2	Negative	David Seddon
6	3/7/2023	19:13:35	22154.01-IN	Cornwall MS	Middle School	1st Floor	Men's Bathroom	Radiator Cover	A	Metal	Blue	Intact	0.2	mg/cm2	Negative	David Seddon
7	3/7/2023	19:13:40	22154.01-IN	Cornwall MS	Middle School	1st Floor	Men's Bathroom	Door Frame	A	Metal	Blue	Intact	0.6	mg/cm2	Negative	David Seddon
8	3/7/2023	19:13:47	22154.01-IN	Cornwall MS	Middle School	1st Floor	Men's Bathroom	Door	A	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
9	3/7/2023	19:13:56	22154.01-IN	Cornwall MS	Middle School	1st Floor	Men's Bathroom	Ceiling	Ceiling	Plaster	Blue	Intact	0	mg/cm2	Negative	David Seddon
10	3/7/2023	19:14:10	22154.01-IN	Cornwall MS	Middle School	1st Floor	Women's Bathroom	Wall	A	Plaster	Pink	Intact	0.2	mg/cm2	Negative	David Seddon
11	3/7/2023	19:14:16	22154.01-IN	Cornwall MS	Middle School	1st Floor	Women's Bathroom	Wall	A	Ceramic	Cream	Intact	0.7	mg/cm2	Negative	David Seddon
12	3/7/2023	19:14:25	22154.01-IN	Cornwall MS	Middle School	1st Floor	Women's Bathroom	Radiator Cover	A	Metal	Pink	Intact	0.2	mg/cm2	Negative	David Seddon
13	3/7/2023	19:14:32	22154.01-IN	Cornwall MS	Middle School	1st Floor	Women's Bathroom	Door Frame	A	Metal	Green	Intact	0.5	mg/cm2	Negative	David Seddon
14	3/7/2023	19:14:38	22154.01-IN	Cornwall MS	Middle School	1st Floor	Women's Bathroom	Door	A	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
15	3/7/2023	19:14:47	22154.01-IN	Cornwall MS	Middle School	1st Floor	Women's Bathroom	Ceiling	Ceiling	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
16	3/7/2023	19:15:15	22154.01-IN	Cornwall MS	Middle School		Calibration						1.1	mg/cm2	Positive	David Seddon
17	3/7/2023	19:15:26	22154.01-IN	Cornwall MS	Middle School		Calibration						1.2	mg/cm2	Positive	David Seddon
18	3/7/2023	19:15:37	22154.01-IN	Cornwall MS	Middle School		Calibration						1	mg/cm2	Positive	David Seddon

Adelaide Environmental Heath Associates Inc.
1511 Route 22, Suite C24
Brewster, New York 10509

Reading #	Date	Time	Job Number	Job Name	Space Type	Floor	Room	Component	Side	Substrate	Color	Condition	Lead Concentration	Units	Result	Inspector Name
1	9/12/2022	11:12:31	22154.01-IN	Cornwall Middle	School		Calibration						0.9	mg/cm2	Negative	David Seddon
2	9/12/2022	11:12:45	22154.01-IN	Cornwall Middle	School		Calibration						1	mg/cm2	Positive	David Seddon
3	9/12/2022	11:12:57	22154.01-IN	Cornwall Middle	School		Calibration						0.9	mg/cm2	Negative	David Seddon
4	9/12/2022	11:14:50	22154.01-IN	Cornwall Middle	School	2nd Floor	D104	Ceiling	Ceiling	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
5	9/12/2022	11:15:12	22154.01-IN	Cornwall Middle	School	2nd Floor	D104	Door Case	A	Metal	White	Intact	0.1	mg/cm2	Negative	David Seddon
6	9/12/2022	11:15:32	22154.01-IN	Cornwall Middle	School	2nd Floor	D104	Door	A	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
7	9/12/2022	11:18:10	22154.01-IN	Cornwall Middle	School	2nd Floor	D104 Vest	Door	A	Plaster	White	Intact	0.3	mg/cm2	Negative	David Seddon
8	9/12/2022	11:18:26	22154.01-IN	Cornwall Middle	School	2nd Floor	D104 Vest	Wall	A	Plaster	White	Intact	0.7	mg/cm2	Negative	David Seddon
9	9/12/2022	11:18:41	22154.01-IN	Cornwall Middle	School	2nd Floor	D104 Vest	Wall	A	Plaster	White	Intact	0.6	mg/cm2	Negative	David Seddon
10	9/12/2022	11:39:10	22154.01-IN	Cornwall Middle	School	2nd Floor	Girls Bathroom	Wall	B	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
11	9/12/2022	11:39:32	22154.01-IN	Cornwall Middle	School	2nd Floor	Girls Bathroom	Ceiling	Ceiling	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
12	9/12/2022	11:46:07	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Boys Bathroom	Ceiling	Ceiling	Sheetrock	White	Intact	0.1	mg/cm2	Negative	David Seddon
13	9/12/2022	11:47:24	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Boys Bathroom	Ceiling	Ceiling	Plaster	White	Intact	0.1	mg/cm2	Negative	David Seddon
14	9/12/2022	11:47:42	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Boys Bathroom	Wall	B	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
15	9/12/2022	11:48:06	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Boys Bathroom	Door Case	A	Metal	White	Intact	0.1	mg/cm2	Negative	David Seddon
16	9/12/2022	11:48:29	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Boys Bathroom	Door	A	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
17	9/12/2022	12:05:44	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Girls Bathroom	Ceiling	Ceiling	Sheetrock	White	Intact	0	mg/cm2	Negative	David Seddon
18	9/12/2022	12:06:14	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Girls Bathroom	Door Case	A	Metal	White	Intact	0	mg/cm2	Negative	David Seddon
19	9/12/2022	12:06:34	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Girls Bathroom	Door	A	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
20	9/12/2022	12:08:13	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Girls Bathroom	Radiator Cover	B	Metal	White	Intact	0.1	mg/cm2	Negative	David Seddon
21	9/12/2022	12:15:39	22154.01-IN	Cornwall Middle	School	1st Floor	D Wing Hallway	Wall	A	Plaster	White	Intact	0.6	mg/cm2	Negative	David Seddon
22	9/12/2022	13:55:47	22154.01-IN	Cornwall Middle	School		Calibration						1	mg/cm2	Positive	David Seddon
23	9/12/2022	13:56:00	22154.01-IN	Cornwall Middle	School		Calibration						1	mg/cm2	Positive	David Seddon
24	9/12/2022	13:56:12	22154.01-IN	Cornwall Middle	School		Calibration						0.9	mg/cm2	Negative	David Seddon
25	9/12/2022	13:56:25	22154.01-IN	Cornwall Middle	School		Calibration						1	mg/cm2	Positive	David Seddon
26	9/12/2022	13:56:47	22154.01-IN	Cornwall Middle	School	1st Floor	B103	Ceiling	Ceiling	Plaster	White	Intact	0.1	mg/cm2	Negative	David Seddon
27	9/12/2022	13:57:12	22154.01-IN	Cornwall Middle	School	1st Floor	B103	Wall	B	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
28	9/12/2022	13:57:22	22154.01-IN	Cornwall Middle	School	1st Floor	B103	Wall	A	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
29	9/12/2022	14:02:46	22154.01-IN	Cornwall Middle	School	1st Floor	B102	Wall	A	Plaster	White	Intact	0.3	mg/cm2	Negative	David Seddon
30	9/12/2022	14:04:29	22154.01-IN	Cornwall Middle	School	1st Floor	B102	Ceiling	Ceiling	Plaster	White	Intact	0.2	mg/cm2	Negative	David Seddon

CORNWALL ELEMENTARY SCHOOL

Adelaide Environmental Heath Associates Inc.
1511 Route 22, Suite C24
Brewster, New York 10509

Reading #	Date	Time	Job Number	Job Name	Space Type	Floor	Room	Component	Side	Substrate	Color	Condition	Lead Concentration	Units	Result	Inspector Name
1	9/9/2022	8:10:27	22276.00-IN	Cornwall Elementary	School		Calibration						1	mg/cm2	Positive	David Seddon
2	9/9/2022	8:10:39	22276.00-IN	Cornwall Elementary	School		Calibration						1.1	mg/cm2	Positive	David Seddon
3	9/9/2022	8:10:51	22276.00-IN	Cornwall Elementary	School		Calibration						1.1	mg/cm2	Positive	David Seddon
4	9/9/2022	8:13:07	22276.00-IN	Cornwall Elementary	School		Calibration						1	mg/cm2	Positive	David Seddon
5	9/9/2022	8:13:53	22276.00-IN	Cornwall Elementary	School	2nd Floor	201	Wall	D	CMU	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
6	**9/9/2022**	**8:14:31**	**22276.00-IN**	**Cornwall Elementary**	**School**	**2nd Floor**	**201**	**Wall**	**B**	**CMU**	**Brown**	**Intact**	**1.6**	**mg/cm2**	**Positive**	**David Seddon**
7	**9/9/2022**	**8:14:40**	**22276.00-IN**	**Cornwall Elementary**	**School**	**2nd Floor**	**201**	**Wall**	**B**	**CMU**	**Brown**	**Intact**	**2.5**	**mg/cm2**	**Positive**	**David Seddon**
8	9/9/2022	8:17:19	22276.00-IN	Cornwall Elementary	School	2nd Floor	203	Wall	D	CMU	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
9	9/9/2022	8:17:32	22276.00-IN	Cornwall Elementary	School	2nd Floor	203	Wall	D	Plaster	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
10	9/9/2022	8:17:54	22276.00-IN	Cornwall Elementary	School	2nd Floor	203	Cabinet	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
11	9/9/2022	8:18:19	22276.00-IN	Cornwall Elementary	School	2nd Floor	203	Casework Door	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
12	9/9/2022	8:18:35	22276.00-IN	Cornwall Elementary	School	2nd Floor	203	Casework Shelf	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
13	9/9/2022	8:29:53	22276.00-IN	Cornwall Elementary	School	2nd Floor	206	Cabinet	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
14	9/9/2022	8:30:00	22276.00-IN	Cornwall Elementary	School	2nd Floor	206	Casework Door	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
15	9/9/2022	8:30:11	22276.00-IN	Cornwall Elementary	School	2nd Floor	206	Casework Shelf	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
16	9/9/2022	8:30:32	22276.00-IN	Cornwall Elementary	School	2nd Floor	206	Wall	D	CMU	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
17	9/9/2022	8:30:48	22276.00-IN	Cornwall Elementary	School	2nd Floor	206	Wall	D	CMU	Blue	Intact	0.4	mg/cm2	Negative	David Seddon
18	9/9/2022	8:51:23	22276.00-IN	Cornwall Elementary	School	2nd Floor	208	Wall	D	CMU	Blue	Intact	0.4	mg/cm2	Negative	David Seddon
19	9/9/2022	8:51:40	22276.00-IN	Cornwall Elementary	School	2nd Floor	208	Wall	D	CMU	Blue	Intact	0.1	mg/cm2	Negative	David Seddon
20	9/9/2022	8:51:56	22276.00-IN	Cornwall Elementary	School	2nd Floor	208	Wall	D	Plaster	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
21	9/9/2022	8:52:15	22276.00-IN	Cornwall Elementary	School	2nd Floor	208	Casework Door	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
22	9/9/2022	8:52:31	22276.00-IN	Cornwall Elementary	School	2nd Floor	208	Casework Shelf	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
23	9/9/2022	8:52:49	22276.00-IN	Cornwall Elementary	School	2nd Floor	208	Cabinet	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
24	9/9/2022	8:54:28	22276.00-IN	Cornwall Elementary	School	2nd Floor	209	Cabinet	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
25	9/9/2022	8:54:43	22276.00-IN	Cornwall Elementary	School	2nd Floor	209	Casework Door	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
26	9/9/2022	8:55:05	22276.00-IN	Cornwall Elementary	School	2nd Floor	209	Casework Shelf	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
27	9/9/2022	8:55:33	22276.00-IN	Cornwall Elementary	School	2nd Floor	209	Wall	B	CMU	Blue	Intact	0	mg/cm2	Negative	David Seddon
28	9/9/2022	8:55:52	22276.00-IN	Cornwall Elementary	School	2nd Floor	209	Wall	B	CMU	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
29	9/9/2022	8:56:05	22276.00-IN	Cornwall Elementary	School	2nd Floor	209	Wall	B	Plaster	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
30	9/9/2022	9:07:21	22276.00-IN	Cornwall Elementary	School	2nd Floor	210	Wall	D	Plaster	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
31	9/9/2022	9:07:40	22276.00-IN	Cornwall Elementary	School	2nd Floor	210	Wall	D	CMU	Cream	Intact	0.4	mg/cm2	Negative	David Seddon
32	9/9/2022	9:08:03	22276.00-IN	Cornwall Elementary	School	2nd Floor	210	Wall	D	CMU	Blue	Intact	0.1	mg/cm2	Negative	David Seddon
33	9/9/2022	9:08:30	22276.00-IN	Cornwall Elementary	School	2nd Floor	210	Casework Door	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
34	9/9/2022	9:08:51	22276.00-IN	Cornwall Elementary	School	2nd Floor	210	Casework Shelf	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
35	9/9/2022	9:09:09	22276.00-IN	Cornwall Elementary	School	2nd Floor	210	Cabinet	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
36	9/9/2022	9:11:17	22276.00-IN	Cornwall Elementary	School	2nd Floor	213	Cabinet	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
37	9/9/2022	9:13:41	22276.00-IN	Cornwall Elementary	School	2nd Floor	213	Casework Shelf	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
38	9/9/2022	9:15:34	22276.00-IN	Cornwall Elementary	School	2nd Floor	213	Casework Door	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
39	9/9/2022	9:15:52	22276.00-IN	Cornwall Elementary	School	2nd Floor	213	Wall	B	CMU	Blue	Intact	0.2	mg/cm2	Negative	David Seddon
40	9/9/2022	9:16:07	22276.00-IN	Cornwall Elementary	School	2nd Floor	213	Wall	B	CMU	Cream	Intact	0	mg/cm2	Negative	David Seddon
41	9/9/2022	9:16:21	22276.00-IN	Cornwall Elementary	School	2nd Floor	213	Wall	B	Plaster	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
42	9/9/2022	9:16:59	22276.00-IN	Cornwall Elementary	School	2nd Floor	216	Wall	B	Plaster	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
43	9/9/2022	9:17:12	22276.00-IN	Cornwall Elementary	School	2nd Floor	216	Wall	B	CMU	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
44	9/9/2022	9:17:31	22276.00-IN	Cornwall Elementary	School	2nd Floor	216	Wall	B	CMU	Blue	Intact	0.3	mg/cm2	Negative	David Seddon

Adelaide Environmental Heath Associates Inc.
1511 Route 22, Suite C24
Brewster, New York 10509

Reading #	Date	Time	Job Number	Job Name	Space Type	Floor	Room	Component	Side	Substrate	Color	Condition	Lead Concentration	Units	Result	Inspector Name
45	9/9/2022	9:17:53	22276.00-IN	Cornwall Elementary	School	2nd Floor	216	Casework Shelf	B	CMU	Blue	Intact	0	mg/cm2	Negative	David Seddon
46	9/9/2022	9:18:10	22276.00-IN	Cornwall Elementary	School	2nd Floor	216	Casework Door	B	CMU	Blue	Intact	0	mg/cm2	Negative	David Seddon
47	9/9/2022	9:18:27	22276.00-IN	Cornwall Elementary	School	2nd Floor	216	Cabinet	B	CMU	Blue	Intact	0	mg/cm2	Negative	David Seddon
48	9/9/2022	10:18:39	22276.00-IN	Cornwall Elementary	School	2nd Floor	207B	Wall	B	CMU	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
49	9/9/2022	10:19:01	22276.00-IN	Cornwall Elementary	School	2nd Floor	207B	Radiator Cover	B	Metal	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
50	9/9/2022	10:19:34	22276.00-IN	Cornwall Elementary	School	2nd Floor	207B	Sink Hanger Cap	B	Metal	Cream	Intact	0	mg/cm2	Negative	David Seddon
51	9/9/2022	10:20:28	22276.00-IN	Cornwall Elementary	School	2nd Floor	207B	Wall	D	CMU	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
52	9/9/2022	10:22:52	22276.00-IN	Cornwall Elementary	School	2nd Floor	207A	Wall	D	CMU	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
53	9/9/2022	10:23:08	22276.00-IN	Cornwall Elementary	School	2nd Floor	207A	Wall	B	CMU	Cream	Intact	0	mg/cm2	Negative	David Seddon
54	9/9/2022	10:23:34	22276.00-IN	Cornwall Elementary	School	2nd Floor	207A	Ceiling	Ceiling	Plaster	Cream	Intact	0	mg/cm2	Negative	David Seddon
55	9/9/2022	10:23:56	22276.00-IN	Cornwall Elementary	School	2nd Floor	207A	Radiator Cover	B	Metal	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
56	9/9/2022	10:24:20	22276.00-IN	Cornwall Elementary	School	2nd Floor	207A	Sink Hanger Cap	B	Metal	Cream	Intact	0	mg/cm2	Negative	David Seddon
57	9/9/2022	11:03:44	22276.00-IN	Cornwall Elementary	School	2nd Floor	107B	Radiator Cover	D	Metal	Cream	Intact	0	mg/cm2	Negative	David Seddon
58	9/9/2022	11:04:11	22276.00-IN	Cornwall Elementary	School	2nd Floor	107B	Sink cover	B	Metal	Cream	Intact	0	mg/cm2	Negative	David Seddon
59	9/9/2022	11:04:33	22276.00-IN	Cornwall Elementary	School	1st Floor	107B	Wall	B	CMU	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
60	9/9/2022	11:04:48	22276.00-IN	Cornwall Elementary	School	1st Floor	107B	Wall	D	CMU	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
61	9/9/2022	11:05:08	22276.00-IN	Cornwall Elementary	School	1st Floor	107B	Wall	A	CMU	Green	Intact	0.2	mg/cm2	Negative	David Seddon
62	9/9/2022	11:30:04	22276.00-IN	Cornwall Elementary	School	1st Floor	107A	Wall	B	CMU	Green	Intact	0.1	mg/cm2	Negative	David Seddon
63	9/9/2022	11:30:20	22276.00-IN	Cornwall Elementary	School	1st Floor	107A	Wall	A	CMU	Cream	Intact	0	mg/cm2	Negative	David Seddon
64	9/9/2022	11:30:50	22276.00-IN	Cornwall Elementary	School	1st Floor	107A	Wall	B	Metal	Green	Intact	0.1	mg/cm2	Negative	David Seddon
65	9/9/2022	11:31:33	22276.00-IN	Cornwall Elementary	School	1st Floor	107A	Sink Hanger Cap	B	Metal	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
66	9/9/2022	11:39:29	22276.00-IN	Cornwall Elementary	School	1st Floor	A33A	Wall	A	CMU	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
67	9/9/2022	11:39:42	22276.00-IN	Cornwall Elementary	School	1st Floor	A33A	Wall	D	CMU	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
68	9/9/2022	11:47:01	22276.00-IN	Cornwall Elementary	School	1st Floor	A33B	Wall	D	CMU	Cream	Intact	0	mg/cm2	Negative	David Seddon
69	9/9/2022	11:47:10	22276.00-IN	Cornwall Elementary	School	1st Floor	A33B	Wall	D	CMU	Cream	Intact	0.4	mg/cm2	Negative	David Seddon
70	9/9/2022	13:16:46	22276.00-IN	Cornwall Elementary	School		Calibration						1.1	mg/cm2	Positive	David Seddon
71	9/9/2022	13:16:58	22276.00-IN	Cornwall Elementary	School		Calibration						1.1	mg/cm2	Positive	David Seddon
72	9/9/2022	13:17:11	22276.00-IN	Cornwall Elementary	School		Calibration						1.1	mg/cm2	Positive	David Seddon
73	9/12/2022	7:44:29	22276.00-IN	Cornwall Elementary	School		Calibration						1.1	mg/cm2	Positive	David Seddon
74	9/12/2022	7:44:45	22276.00-IN	Cornwall Elementary	School		Calibration						1.1	mg/cm2	Positive	David Seddon
75	9/12/2022	7:44:57	22276.00-IN	Cornwall Elementary	School		Calibration						1	mg/cm2	Positive	David Seddon
76	9/12/2022	7:45:58	22276.00-IN	Cornwall Elementary	School	1st Floor	102	Wall	A	CMU	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
77	9/12/2022	7:46:17	22276.00-IN	Cornwall Elementary	School	1st Floor	102	Wall	A	CMU	Blue	Intact	0.3	mg/cm2	Negative	David Seddon
78	9/12/2022	7:46:34	22276.00-IN	Cornwall Elementary	School	1st Floor	102	Wall	A	Plaster	Cream	Intact	0	mg/cm2	Negative	David Seddon
79	9/12/2022	7:47:01	22276.00-IN	Cornwall Elementary	School	1st Floor	102	Casework Door	A	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
80	9/12/2022	7:47:17	22276.00-IN	Cornwall Elementary	School	1st Floor	102	Casework Shelf	A	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
81	9/12/2022	7:47:34	22276.00-IN	Cornwall Elementary	School	1st Floor	102	Cabinet	A	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
82	9/12/2022	8:01:53	22276.00-IN	Cornwall Elementary	School	1st Floor	101	Cabinet	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
83	9/12/2022	8:02:06	22276.00-IN	Cornwall Elementary	School	1st Floor	101	Casework Door	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
84	9/12/2022	8:02:23	22276.00-IN	Cornwall Elementary	School	1st Floor	101	Casework Shelf	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
85	9/12/2022	8:02:45	22276.00-IN	Cornwall Elementary	School	1st Floor	101	Wall	B	CMU	Blue	Intact	0	mg/cm2	Negative	David Seddon
86	9/12/2022	8:03:08	22276.00-IN	Cornwall Elementary	School	1st Floor	101	Wall	B	CMU	Cream	Intact	0	mg/cm2	Negative	David Seddon
87	9/12/2022	8:03:24	22276.00-IN	Cornwall Elementary	School	1st Floor	101	Wall	B	Plaster	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
88	9/12/2022	8:04:42	22276.00-IN	Cornwall Elementary	School	1st Floor	103	Wall	B	Plaster	Cream	Intact	0.1	mg/cm2	Negative	David Seddon

Adelaide Environmental Heath Associates Inc.
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Reading #	Date	Time	Job Number	Job Name	Space Type	Floor	Room	Component	Side	Substrate	Color	Condition	Lead Concentration	Units	Result	Inspector Name
89	9/12/2022	8:04:59	22276.00-IN	Cornwall Elementary	School	1st Floor	103	Wall	B	CMU	Cream	Intact	0.4	mg/cm2	Negative	David Seddon
90	9/12/2022	8:05:40	22276.00-IN	Cornwall Elementary	School	1st Floor	103	Cabinet	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
91	9/12/2022	8:05:53	22276.00-IN	Cornwall Elementary	School	1st Floor	103	Casework Door	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
92	9/12/2022	8:06:18	22276.00-IN	Cornwall Elementary	School	1st Floor	103	Casework Shelf	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
93	9/12/2022	8:19:35	22276.00-IN	Cornwall Elementary	School	1st Floor	105	Casework Shelf	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
94	9/12/2022	8:19:47	22276.00-IN	Cornwall Elementary	School	1st Floor	105	Casework Door	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
95	9/12/2022	8:19:59	22276.00-IN	Cornwall Elementary	School	1st Floor	105	Cabinet	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
96	9/12/2022	8:20:18	22276.00-IN	Cornwall Elementary	School	1st Floor	105	Wall	B	Plaster	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
97	9/12/2022	8:20:32	22276.00-IN	Cornwall Elementary	School	1st Floor	105	Wall	B	CMU	Cream	Intact	0	mg/cm2	Negative	David Seddon
98	9/12/2022	8:25:37	22276.00-IN	Cornwall Elementary	School	1st Floor	108	Wall	D	CMU	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
99	9/12/2022	8:25:52	22276.00-IN	Cornwall Elementary	School	1st Floor	108	Wall	D	Plaster	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
100	9/12/2022	8:26:18	22276.00-IN	Cornwall Elementary	School	1st Floor	108	Cabinet	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
101	9/12/2022	8:26:31	22276.00-IN	Cornwall Elementary	School	1st Floor	108	Casework Shelf	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
102	9/12/2022	8:26:42	22276.00-IN	Cornwall Elementary	School	1st Floor	108	Casework Door	D	Wood	Varnish	Intact	0.1	mg/cm2	Negative	David Seddon
103	9/12/2022	8:28:07	22276.00-IN	Cornwall Elementary	School	1st Floor	110	Casework Door	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
104	9/12/2022	8:28:18	22276.00-IN	Cornwall Elementary	School	1st Floor	110	Casework Shelf	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
105	9/12/2022	8:28:31	22276.00-IN	Cornwall Elementary	School	1st Floor	110	Cabinet	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
106	9/12/2022	8:28:52	22276.00-IN	Cornwall Elementary	School	1st Floor	110	Wall	D	CMU	Cream	Intact	0	mg/cm2	Negative	David Seddon
107	9/12/2022	8:29:08	22276.00-IN	Cornwall Elementary	School	1st Floor	110	Wall	D	Plaster	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
108	9/12/2022	8:34:38	22276.00-IN	Cornwall Elementary	School	1st Floor	109	Wall	B	Plaster	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
109	9/12/2022	8:34:55	22276.00-IN	Cornwall Elementary	School	1st Floor	109	Wall	B	CMU	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
110	9/12/2022	8:35:19	22276.00-IN	Cornwall Elementary	School	1st Floor	109	Wall	B	CMU	Blue	Intact	0	mg/cm2	Negative	David Seddon
111	9/12/2022	8:35:47	22276.00-IN	Cornwall Elementary	School	1st Floor	109	Casework Shelf	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
112	9/12/2022	8:36:06	22276.00-IN	Cornwall Elementary	School	1st Floor	109	Casework Door	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
113	9/12/2022	8:36:25	22276.00-IN	Cornwall Elementary	School	1st Floor	109	Cabinet	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
114	9/12/2022	8:37:52	22276.00-IN	Cornwall Elementary	School	1st Floor	111	Cabinet	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
115	9/12/2022	8:38:08	22276.00-IN	Cornwall Elementary	School	1st Floor	111	Casework Door	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
116	9/12/2022	8:38:21	22276.00-IN	Cornwall Elementary	School	1st Floor	111	Casework Shelf	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
117	9/12/2022	8:38:39	22276.00-IN	Cornwall Elementary	School	1st Floor	111	Wall	D	CMU	Blue	Intact	0.1	mg/cm2	Negative	David Seddon
118	9/12/2022	8:38:54	22276.00-IN	Cornwall Elementary	School	1st Floor	111	Wall	D	CMU	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
119	9/12/2022	8:39:07	22276.00-IN	Cornwall Elementary	School	1st Floor	111	Wall	D	Plaster	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
120	9/12/2022	8:40:41	22276.00-IN	Cornwall Elementary	School	1st Floor	114	Wall	D	Plaster	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
121	9/12/2022	8:40:56	22276.00-IN	Cornwall Elementary	School	1st Floor	114	Wall	D	CMU	Cream	Intact	0	mg/cm2	Negative	David Seddon
122	9/12/2022	8:41:14	22276.00-IN	Cornwall Elementary	School	1st Floor	114	Wall	D	CMU	Blue	Intact	0	mg/cm2	Negative	David Seddon
123	9/12/2022	8:41:47	22276.00-IN	Cornwall Elementary	School	1st Floor	114	Casework Shelf	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
124	9/12/2022	8:41:59	22276.00-IN	Cornwall Elementary	School	1st Floor	114	Casework Door	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
125	9/12/2022	8:42:10	22276.00-IN	Cornwall Elementary	School	1st Floor	114	Cabinet	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
126	9/12/2022	8:43:22	22276.00-IN	Cornwall Elementary	School	1st Floor	113	Cabinet	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
127	9/12/2022	8:43:38	22276.00-IN	Cornwall Elementary	School	1st Floor	113	Casework Door	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
128	9/12/2022	8:43:50	22276.00-IN	Cornwall Elementary	School	1st Floor	113	Casework Shelf	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
129	9/12/2022	8:44:19	22276.00-IN	Cornwall Elementary	School	1st Floor	113	Wall	B	Plaster	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
130	9/12/2022	8:44:34	22276.00-IN	Cornwall Elementary	School	1st Floor	113	Wall	B	CMU	Cream	Intact	0.3	mg/cm2	Negative	David Seddon
131	9/12/2022	8:45:41	22276.00-IN	Cornwall Elementary	School	1st Floor	115	Wall	B	CMU	Cream	Intact	0.4	mg/cm2	Negative	David Seddon
132	9/12/2022	8:45:54	22276.00-IN	Cornwall Elementary	School	1st Floor	115	Wall	B	Plaster	Cream	Intact	0.1	mg/cm2	Negative	David Seddon

Adelaide Environmental Heath Associates Inc.
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Reading #	Date	Time	Job Number	Job Name	Space Type	Floor	Room	Component	Side	Substrate	Color	Condition	Lead Concentration	Units	Result	Inspector Name
133	9/12/2022	8:46:19	22276.00-IN	Cornwall Elementary	School	1st Floor	115	Cabinet	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
134	9/12/2022	8:46:45	22276.00-IN	Cornwall Elementary	School	1st Floor	115	Casework Door	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
135	9/12/2022	8:46:56	22276.00-IN	Cornwall Elementary	School	1st Floor	115	Casework Shelf	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
136	9/12/2022	8:50:56	22276.00-IN	Cornwall Elementary	School	1st Floor	116	Casework Shelf	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
137	9/12/2022	8:51:07	22276.00-IN	Cornwall Elementary	School	1st Floor	116	Cabinet	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
138	9/12/2022	8:51:23	22276.00-IN	Cornwall Elementary	School	1st Floor	116	Casework Door	B	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
139	9/12/2022	8:51:45	22276.00-IN	Cornwall Elementary	School	1st Floor	116	Wall	B	CMU	Blue	Intact	0.1	mg/cm2	Negative	David Seddon
140	9/12/2022	8:52:02	22276.00-IN	Cornwall Elementary	School	1st Floor	116	Wall	B	CMU	Cream	Intact	0	mg/cm2	Negative	David Seddon
141	9/12/2022	8:52:15	22276.00-IN	Cornwall Elementary	School	1st Floor	116	Wall	B	Plaster	Cream	Intact	0.2	mg/cm2	Negative	David Seddon
142	9/12/2022	8:53:06	22276.00-IN	Cornwall Elementary	School		Calibration						1	mg/cm2	Positive	David Seddon
143	9/12/2022	8:53:19	22276.00-IN	Cornwall Elementary	School		Calibration						1	mg/cm2	Positive	David Seddon
144	9/12/2022	8:53:46	22276.00-IN	Cornwall Elementary	School		Calibration						1.1	mg/cm2	Positive	David Seddon

CORNWALL-ON-HUDSON SCHOOL

Adelaide Environmental Heath Associates Inc.
1511 Route 22, Suite C24
Brewster, New York 10509

Reading #	Date	Time	Job Number	Job Name	Space Type	Floor	Room	Component	Side	Substrate	Color	Condition	Lead Concentration	Units	Result	Inspector Name
1	9/6/2022	10:20:47	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.1	mg/cm2	Positive	David Seddon
2	9/6/2022	10:20:59	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.1	mg/cm2	Positive	David Seddon
3	9/6/2022	10:21:11	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.2	mg/cm2	Positive	David Seddon
4	9/6/2022	10:22:04	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Boys Bathroom	Ceiling	Ceiling	Sheetrock	Cream	Intact	0.1	mg/cm2	Negative	David Seddon
5	9/6/2022	10:22:28	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Boys Bathroom	Ceiling	B	Plaster	Off White	Intact	0.2	mg/cm2	Negative	David Seddon
6	9/6/2022	10:22:46	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Boys Bathroom	Ceiling	A	Plaster	Off White	Intact	0.5	mg/cm2	Negative	David Seddon
7	9/6/2022	10:23:06	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Boys Bathroom	Wall	A	Sheetrock	Off White	Intact	0	mg/cm2	Negative	David Seddon
8	9/6/2022	10:23:39	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Boys Bathroom	Wall	C	Plaster	Off White	Intact	0.4	mg/cm2	Negative	David Seddon
9	**9/6/2022**	**10:24:16**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**1st Floor**	**Boys Bathroom**	**Window Case**	**C**	**Wood**	**Off White**	**Intact**	**1.6**	**mg/cm2**	**Positive**	**David Seddon**
10	**9/6/2022**	**10:24:33**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**1st Floor**	**Boys Bathroom**	**Windowsill**	**C**	**Metal**	**Off White**	**Intact**	**4.8**	**mg/cm2**	**Positive**	**David Seddon**
11	**9/6/2022**	**10:34:21**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**1st Floor**	**Girls Bathroom**	**Windowsill**	**C**	**Wood**	**Off White**	**Intact**	**2.8**	**mg/cm2**	**Positive**	**David Seddon**
12	**9/6/2022**	**10:34:35**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**1st Floor**	**Girls Bathroom**	**Window Case**	**C**	**Wood**	**Off White**	**Intact**	**2**	**mg/cm2**	**Positive**	**David Seddon**
13	9/6/2022	10:34:55	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Girls Bathroom	Wall	C	Plaster	Off White	Intact	0	mg/cm2	Negative	David Seddon
14	9/6/2022	10:35:11	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Girls Bathroom	Wall	D	Plaster	Off White	Intact	0	mg/cm2	Negative	David Seddon
15	9/6/2022	10:35:33	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Girls Bathroom	Wall	C	Sheetrock	Off White	Intact	0.1	mg/cm2	Negative	David Seddon
16	9/6/2022	10:35:59	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Girls Bathroom	Ceiling	Ceiling	Sheetrock	Off White	Intact	0.1	mg/cm2	Negative	David Seddon
17	9/6/2022	10:36:15	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Girls Bathroom	Wall	B	Plaster	Off White	Intact	0.6	mg/cm2	Negative	David Seddon
18	9/6/2022	11:45:56	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Bathroom	Wall	A	Plaster	Light Green	Intact	0.1	mg/cm2	Negative	David Seddon
19	9/6/2022	11:46:07	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Bathroom	Wall	B	Plaster	Light Green	Intact	0.1	mg/cm2	Negative	David Seddon
20	9/6/2022	11:46:17	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Bathroom	Wall	C	Plaster	Light Green	Intact	0.3	mg/cm2	Negative	David Seddon
21	9/6/2022	11:46:27	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Bathroom	Wall	D	Plaster	Light Green	Intact	0	mg/cm2	Negative	David Seddon
22	**9/6/2022**	**11:46:48**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**2nd Floor**	**Bathroom**	**Door Case**	**A**	**Wood**	**Light Green**	**Intact**	**1.1**	**mg/cm2**	**Positive**	**David Seddon**
23	9/6/2022	11:47:10	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Bathroom	Door	A	Wood	Light Green	Intact	0	mg/cm2	Negative	David Seddon
24	9/6/2022	11:48:20	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Bathroom	Door	A	Wood	Light Green	Intact	0.2	mg/cm2	Negative	David Seddon
25	**9/6/2022**	**11:48:39**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**2nd Floor**	**Bathroom**	**Baseboard**	**D**	**Wood**	**Light Green**	**Intact**	**2.4**	**mg/cm2**	**Positive**	**David Seddon**
26	**9/6/2022**	**11:49:12**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**2nd Floor**	**Bathroom**	**Casework**	**C**	**Wood**	**Light Green**	**Intact**	**3.6**	**mg/cm2**	**Positive**	**David Seddon**
27	9/6/2022	11:50:27	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Hallway	Casework	D	Wood	Beige	Intact	0.1	mg/cm2	Negative	David Seddon
28	9/6/2022	11:50:35	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Hallway	Casework	D	Wood	Beige	Intact	0.1	mg/cm2	Negative	David Seddon
29	9/6/2022	11:51:07	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Hallway	Casework	D	Wood	Varnish	Intact	0	mg/cm2	Negative	David Seddon
30	9/6/2022	11:51:34	22278.00-IN	Cornwall on Hudson	Elementary School	2nd Floor	Hallway	Casework	D	Wood	Beige	Intact	0.1	mg/cm2	Negative	David Seddon
31	9/6/2022	13:11:49	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.2	mg/cm2	Positive	David Seddon
32	9/6/2022	13:12:02	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.2	mg/cm2	Positive	David Seddon
33	9/6/2022	13:12:15	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.2	mg/cm2	Positive	David Seddon
34	9/6/2022	13:13:14	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Boys Bathroom	Floor	Floor	Concrete	Grey	Fair	0.8	mg/cm2	Negative	David Seddon
35	**9/6/2022**	**13:13:30**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**3rd Floor**	**Boys Bathroom**	**Floor**	**Floor**	**Concrete**	**Grey**	**Fair**	**1**	**mg/cm2**	**Positive**	**David Seddon**
36	**9/6/2022**	**13:13:53**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**3rd Floor**	**Boys Bathroom**	**Floor**	**Floor**	**Concrete**	**Grey**	**Fair**	**1.5**	**mg/cm2**	**Positive**	**David Seddon**
37	9/6/2022	13:15:10	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Boys Bathroom	Wall	A	Plaster	Blue	Fair	0.6	mg/cm2	Negative	David Seddon
38	9/6/2022	13:15:37	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Boys Bathroom	Wall	B	Plaster	Blue	Fair	0.1	mg/cm2	Negative	David Seddon
39	9/6/2022	13:15:57	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Boys Bathroom	Wall	C	Plaster	Blue	Fair	0	mg/cm2	Negative	David Seddon
40	9/6/2022	13:16:17	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Boys Bathroom	Trim	C	Wood	Blue	Fair	0.6	mg/cm2	Negative	David Seddon
41	**9/6/2022**	**13:16:32**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**3rd Floor**	**Boys Bathroom**	**Window Case**	**C**	**Wood**	**Blue**	**Intact**	**7.8**	**mg/cm2**	**Positive**	**David Seddon**
42	**9/6/2022**	**13:16:45**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**3rd Floor**	**Boys Bathroom**	**Windowsill**	**C**	**Metal**	**Blue**	**Intact**	**4.5**	**mg/cm2**	**Positive**	**David Seddon**
43	9/6/2022	13:17:20	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Boys Bathroom	Ceiling	Ceiling	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
44	**9/6/2022**	**13:18:02**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**3rd Floor**	**Boys Bathroom**	**Door Case**	**A**	**Wood**	**Blue**	**Intact**	**4.2**	**mg/cm2**	**Positive**	**David Seddon**

Adelaide Environmental Heath Associates Inc.
1511 Route 22, Suite C24
Brewster, New York 10509

Reading #	Date	Time	Job Number	Job Name	Space Type	Floor	Room	Component	Side	Substrate	Color	Condition	Lead Concentration	Units	Result	Inspector Name
45	9/6/2022	13:18:14	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Boys Bathroom	Door	A	Wood	Blue	Intact	0	mg/cm2	Negative	David Seddon
46	9/6/2022	14:05:57	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Girls Bathroom	Door	A	Wood	Blue	Intact	0.1	mg/cm2	Negative	David Seddon
47	**9/6/2022**	**14:06:19**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**3rd Floor**	**Girls Bathroom**	**Door Case**	**A**	**Wood**	**White**	**Intact**	**7.1**	**mg/cm2**	**Positive**	**David Seddon**
48	9/6/2022	14:06:40	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Girls Bathroom	Wall	A	Plaster	White	Intact	0.5	mg/cm2	Negative	David Seddon
49	9/6/2022	14:06:56	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Girls Bathroom	Wall	D	Plaster	White	Intact	0.3	mg/cm2	Negative	David Seddon
50	9/6/2022	14:07:09	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Girls Bathroom	Wall	C	Plaster	White	Intact	0.6	mg/cm2	Negative	David Seddon
51	**9/6/2022**	**14:07:30**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**3rd Floor**	**Girls Bathroom**	**Window Case**	**C**	**Wood**	**White**	**Intact**	**5.1**	**mg/cm2**	**Positive**	**David Seddon**
52	9/6/2022	14:07:46	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Girls Bathroom	Windowsill	C	Wood	White	Intact	0	mg/cm2	Negative	David Seddon
53	9/6/2022	14:08:31	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Girls Bathroom	Ceiling	Ceiling	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
54	9/6/2022	14:09:08	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Girls Bathroom	Floor	Floor	Concrete	Grey	Intact	1	mg/cm2	Positive	David Seddon
55	**9/6/2022**	**14:09:24**	**22278.00-IN**	**Cornwall on Hudson**	**Elementary School**	**3rd Floor**	**Girls Bathroom**	**Floor**	**Floor**	**Concrete**	**Grey**	**Intact**	**1.3**	**mg/cm2**	**Positive**	**David Seddon**
56	9/6/2022	14:10:04	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.1	mg/cm2	Positive	David Seddon
57	9/6/2022	14:10:16	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.2	mg/cm2	Positive	David Seddon
58	9/6/2022	14:10:29	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.2	mg/cm2	Positive	David Seddon
59	9/12/2022	9:13:46	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.1	mg/cm2	Positive	David Seddon
60	9/12/2022	9:13:59	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1	mg/cm2	Positive	David Seddon
61	9/12/2022	9:14:11	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						0.9	mg/cm2	Negative	David Seddon
62	9/12/2022	9:15:04	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	303	Window Case	C	Wood	Yellow	Fair	0.2	mg/cm2	Negative	David Seddon
63	9/12/2022	9:15:15	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	303	Window Case	C	Wood	Yellow	Fair	0.2	mg/cm2	Negative	David Seddon
64	9/12/2022	9:15:28	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	303	Windowsill	C	Wood	Yellow	Fair	0.2	mg/cm2	Negative	David Seddon
65	9/12/2022	9:19:40	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	303	Wall	C	Plaster	White	Fair	0	mg/cm2	Negative	David Seddon
66	9/12/2022	9:20:02	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	303	Ceiling	Ceiling	Plaster	White	Fair	0.1	mg/cm2	Negative	David Seddon
67	9/12/2022	9:20:20	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	304	Ceiling	Ceiling	Plaster	White	Fair	0.1	mg/cm2	Negative	David Seddon
68	9/12/2022	9:20:43	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	304	Window Case	C	Wood	White	Fair	0.2	mg/cm2	Negative	David Seddon
69	9/12/2022	9:20:59	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	304	Windowsill	C	Wood	Grey	Fair	0.1	mg/cm2	Negative	David Seddon
70	9/12/2022	9:30:59	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Nurses Office	Windowsill	C	Wood	White	Fair	0.2	mg/cm2	Negative	David Seddon
71	9/12/2022	9:31:13	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Nurses Office	Window Case	C	Wood	White	Fair	0.3	mg/cm2	Negative	David Seddon
72	9/12/2022	9:31:37	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Nurses Office	Wall	C	Plaster	Blue	Intact	0	mg/cm2	Negative	David Seddon
73	9/12/2022	9:32:04	22278.00-IN	Cornwall on Hudson	Elementary School	3rd Floor	Nurses Office	Ceiling	Ceiling	Plaster	White	Intact	0	mg/cm2	Negative	David Seddon
74	9/12/2022	9:43:09	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Cafeteria	Window Case	C	Wood	Light Blue	Fair	0.2	mg/cm2	Negative	David Seddon
75	9/12/2022	9:43:23	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Cafeteria	Windowsill	C	Wood	Blue	Fair	0.4	mg/cm2	Negative	David Seddon
76	9/12/2022	9:43:41	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Cafeteria	Wall	C	Plaster	Light Blue	Intact	0	mg/cm2	Negative	David Seddon
77	9/12/2022	9:46:19	22278.00-IN	Cornwall on Hudson	Elementary School	1st Floor	Cafeteria	Ceiling	Ceiling	Plaster	White	Intact	0.4	mg/cm2	Negative	David Seddon
78	9/12/2022	9:54:02	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.1	mg/cm2	Positive	David Seddon
79	9/12/2022	9:54:14	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1.1	mg/cm2	Positive	David Seddon
80	9/12/2022	9:54:26	22278.00-IN	Cornwall on Hudson	Elementary School		Calibration						1	mg/cm2	Positive	David Seddon

Adelaide Environmental Heath Associates Inc.
1511 Route 22, Suite C-24
Brewster, New York 10509
Adelaide Project: CORN:22278.00-IN
Project Name: Croton-on-Hudson Elementary School – Capital Project
Inspector: Louis N. Johnson III

Reading #	Date	Time	Building	Space Type	Floor	Room	Component	Substrate	Color	Condition	Lead Concentration (mg/cm2)	Result
1	4/13/2023	8:46:56				Calibration					1	Positive
2	4/13/2023	8:47:08				Calibration					1	Positive
3	4/13/2023	8:47:20				Calibration					1.2	Positive
4	4/13/2023	8:53:03	Cornwall-on-Hudson Elementary School	School	Exterior	Exterior	Column Base	Concrete	White	Poor	0.6	Negative
5	4/13/2023	8:53:23	Cornwall-on-Hudson Elementary School	School	Exterior	Exterior	Column Base	Wood	White	Poor	0.4	Negative
6	4/13/2023	8:55:21				Calibration					1.1	Positive
7	4/13/2023	8:56:12				Calibration					1	Positive
8	4/13/2023	8:57:06				Calibration					1	Positive

APPENDIX F

PREVIOUS PCB ANALYTICAL RESULTS

CORNWALL MIDDLE SCHOOL

PHOENIX
Environmental Laboratories, Inc.

Friday, September 23, 2022

Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Project ID: CORNWALL MIDDLE SCHOOL
SDG ID: GCM31637
Sample ID#s: CM31637 - CM31641

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

Sample Id Cross Reference

September 23, 2022

SDG I.D.: GCM31637

Project ID: CORNWALL MIDDLE SCHOOL

Client Id	Lab Id	Matrix
PCB-1 CAULK @ TOILET (B102)	CM31637	CAULK
PCB-2 CAULK @ DOOR (17/B4)	CM31638	CAULK
PCB-3 CAULK @ DOOR (A7)	CM31639	CAULK
PCB-4 CAULK @ DOOR (A6)	CM31640	CAULK
PCB-5 CAULK @ FIXTURES	CM31641	CAULK

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

September 23, 2022

FOR: Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:		09/12/22	
Location Code:	ADELAIDE	Received by:	LB	09/14/22	16:25
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:	CORN 22154.01-IN				

Laboratory Data

SDG ID: GCM31637
Phoenix ID: CM31637

Project ID: CORNWALL MIDDLE SCHOOL
Client ID: PCB-1 CAULK @ TOILET (B102)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Caulk Extraction for PCB	Completed				09/20/22	L/AL/Q	SW3540C
PCB (Soxhlet SW3540C)							
PCB-1016	ND	750	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1221	ND	750	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1232	ND	750	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1242	ND	750	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1248	ND	750	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1254	ND	750	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1260	ND	750	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1262	ND	750	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1268	ND	750	ug/Kg	2	09/21/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	62		%	2	09/21/22	SC	30 - 150 %
% DCBP (Confirmation)	66		%	2	09/21/22	SC	30 - 150 %
% TCMX	55		%	2	09/21/22	SC	30 - 150 %
% TCMX (Confirmation)	56		%	2	09/21/22	SC	30 - 150 %

Project ID: CORNWALL MIDDLE SCHOOL
Client ID: PCB-1 CAULK @ TOILET (B102)

Phoenix I.D.: CM31637

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

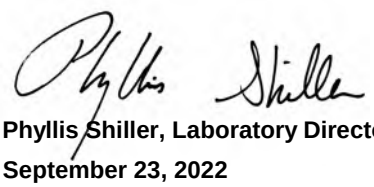
RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

September 23, 2022

Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH NY # 11301

Analysis Report

September 23, 2022

FOR: Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:		09/12/22	
Location Code:	ADELAIDE	Received by:	LB	09/14/22	16:25
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:	CORN 22154.01-IN				

Laboratory Data

SDG ID: GCM31637
Phoenix ID: CM31638

Project ID: CORNWALL MIDDLE SCHOOL
Client ID: PCB-2 CAULK @ DOOR (17/B4)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Caulk Extraction for PCB	Completed				09/20/22	L/AL/Q	SW3540C
PCB (Soxhlet SW3540C)							
PCB-1016	ND	690	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1221	ND	690	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1232	ND	690	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1242	ND	690	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1248	ND	690	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1254	ND	690	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1260	ND	690	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1262	ND	690	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1268	ND	690	ug/Kg	2	09/21/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	32		%	2	09/21/22	SC	30 - 150 %
% DCBP (Confirmation)	34		%	2	09/21/22	SC	30 - 150 %
% TCMX	31		%	2	09/21/22	SC	30 - 150 %
% TCMX (Confirmation)	31		%	2	09/21/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

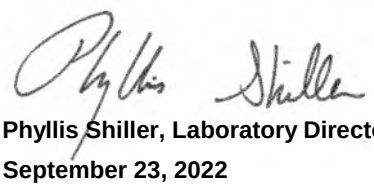
RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

September 23, 2022

Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH NY # 11301

Analysis Report

September 23, 2022

FOR: Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:		09/12/22	
Location Code:	ADELAIDE	Received by:	LB	09/14/22	16:25
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:	CORN 22154.01-IN				

Laboratory Data

SDG ID: GCM31637
Phoenix ID: CM31639

Project ID: CORNWALL MIDDLE SCHOOL
Client ID: PCB-3 CAULK @ DOOR (A7)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Caulk Extraction for PCB	Completed				09/21/22	L/Q/AL	SW3540C
PCB (Soxhlet SW3540C)							
PCB-1016	ND	1000	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1221	ND	1000	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1232	ND	1000	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1242	ND	1000	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1248	ND	1000	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1254	ND	1000	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1260	ND	1000	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1262	ND	1000	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1268	ND	1000	ug/Kg	1	09/22/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	59		%	1	09/22/22	SC	30 - 150 %
% DCBP (Confirmation)	45		%	1	09/22/22	SC	30 - 150 %
% TCMX	48		%	1	09/22/22	SC	30 - 150 %
% TCMX (Confirmation)	50		%	1	09/22/22	SC	30 - 150 %

Project ID: CORNWALL MIDDLE SCHOOL
Client ID: PCB-3 CAULK @ DOOR (A7)

Phoenix I.D.: CM31639

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

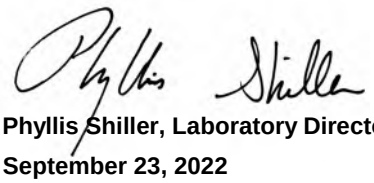
Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

PCB Comment:
Due to limited sample an elevated RL was reported.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
September 23, 2022
Reviewed and Released by: Anil Makol, Project Manager

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH NY # 11301

Analysis Report

September 23, 2022

FOR: Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:		09/12/22	
Location Code:	ADELAIDE	Received by:	LB	09/14/22	16:25
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:	CORN 22154.01-IN				

Laboratory Data

SDG ID: GCM31637
Phoenix ID: CM31640

Project ID: CORNWALL MIDDLE SCHOOL
Client ID: PCB-4 CAULK @ DOOR (A6)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Caulk Extraction for PCB	Completed				09/21/22	L/Q/AL	SW3540C
PCB (Soxhlet SW3540C)							
PCB-1016	ND	740	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1221	ND	740	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1232	ND	740	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1242	ND	740	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1248	ND	740	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1254	ND	740	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1260	ND	740	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1262	ND	740	ug/Kg	1	09/22/22	SC	SW8082A
PCB-1268	ND	740	ug/Kg	1	09/22/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	59		%	1	09/22/22	SC	30 - 150 %
% DCBP (Confirmation)	56		%	1	09/22/22	SC	30 - 150 %
% TCMX	43		%	1	09/22/22	SC	30 - 150 %
% TCMX (Confirmation)	36		%	1	09/22/22	SC	30 - 150 %

Project ID: CORNWALL MIDDLE SCHOOL
Client ID: PCB-4 CAULK @ DOOR (A6)

Phoenix I.D.: CM31640

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

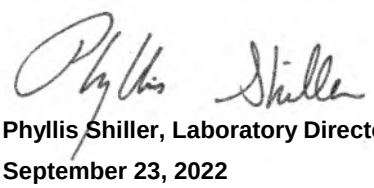
Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

PCB Comment:
For PCBs, in order to reach the desired RL, multiple cleanup steps were performed. The extract was cleaned up with a combination of sulfuric acid, potassium permanganate, copper powder and additional florisil.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

September 23, 2022

Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH NY # 11301

Analysis Report

September 23, 2022

FOR: Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:		09/12/22	
Location Code:	ADELAIDE	Received by:	LB	09/14/22	16:25
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:	CORN 22154.01-IN				

Laboratory Data

SDG ID: GCM31637
Phoenix ID: CM31641

Project ID: CORNWALL MIDDLE SCHOOL
Client ID: PCB-5 CAULK @ FIXTURES

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Caulk Extraction for PCB	Completed				09/20/22	L/AL/Q	SW3540C
PCB (Soxhlet SW3540C)							
PCB-1016	ND	770	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1221	ND	770	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1232	ND	770	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1242	ND	770	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1248	ND	770	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1254	ND	770	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1260	ND	770	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1262	ND	770	ug/Kg	2	09/21/22	SC	SW8082A
PCB-1268	ND	770	ug/Kg	2	09/21/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	43		%	2	09/21/22	SC	30 - 150 %
% DCBP (Confirmation)	46		%	2	09/21/22	SC	30 - 150 %
% TCMX	40		%	2	09/21/22	SC	30 - 150 %
% TCMX (Confirmation)	41		%	2	09/21/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

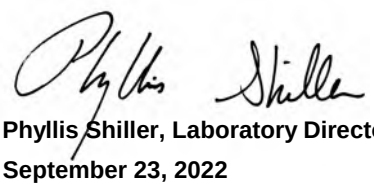
RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

September 23, 2022

Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

QA/QC Report

September 23, 2022

QA/QC Data

SDG I.D.: GCM31637

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 642932 (ug/Kg), QC Sample No: CM31295 10X (CM31637, CM31638, CM31641)										
Polychlorinated Biphenyls										
PCB-1016	ND	170	74	83	11.5				40 - 140	30
PCB-1221	ND	170							40 - 140	30
PCB-1232	ND	170							40 - 140	30
PCB-1242	ND	170							40 - 140	30
PCB-1248	ND	170							40 - 140	30
PCB-1254	ND	170							40 - 140	30
PCB-1260	ND	170	77	86	11.0				40 - 140	30
PCB-1262	ND	170							40 - 140	30
PCB-1268	ND	170							40 - 140	30
% DCBP (Surrogate Rec)	107	%	89	97	8.6				30 - 150	30
% DCBP (Surrogate Rec) (Confirm	111	%	96	117	19.7				30 - 150	30
% TCMX (Surrogate Rec)	86	%	80	91	12.9				30 - 150	30
% TCMX (Surrogate Rec) (Confirm	79	%	77	95	20.9				30 - 150	30

Comment:

A LCS and LCS Duplicate were performed instead of a matrix spike and matrix spike duplicate.

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 643139 (ug/Kg), QC Sample No: CM32486 10X (CM31639, CM31640)										
Polychlorinated Biphenyls										
PCB-1016	ND	170	88	82	7.1				40 - 140	30
PCB-1221	ND	170							40 - 140	30
PCB-1232	ND	170							40 - 140	30
PCB-1242	ND	170							40 - 140	30
PCB-1248	ND	170							40 - 140	30
PCB-1254	ND	170							40 - 140	30
PCB-1260	ND	170	98	82	17.8				40 - 140	30
PCB-1262	ND	170							40 - 140	30
PCB-1268	ND	170							40 - 140	30
% DCBP (Surrogate Rec)	100	%	88	83	5.8				30 - 150	30
% DCBP (Surrogate Rec) (Confirm	87	%	105	82	24.6				30 - 150	30
% TCMX (Surrogate Rec)	80	%	84	82	2.4				30 - 150	30
% TCMX (Surrogate Rec) (Confirm	82	%	83	81	2.4				30 - 150	30

Comment:

A LCS and LCS Duplicate were performed instead of a matrix spike and matrix spike duplicate.

QA/QC Data

SDG I.D.: GCM31637

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference



Phyllis Shiller, Laboratory Director
September 23, 2022

Friday, September 23, 2022

Criteria: None

State: NY

Sample Criteria Exceedances Report

GCM31637 - ADELAIDE

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

September 23, 2022 SDG I.D.: GCM31637

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report:

PCB Narration

AU-ECD29 09/22/22-1: CM31640

The following Continuing Calibration compounds did not meet % deviation criteria:
Samples: CM31640
Preceding CC 922B003 - None.
Succeeding CC 922B020 - DCBP SURR 83%L (15%), PCB 1016 73%H (%), PCB 1260 91%H (%)

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587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

NY Temperature Narration

September 23, 2022

SDG I.D.: GCM31637

The samples in this delivery group were received at 2.5°C.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)

Cooler: Yes ☑ No ☐
Coolant: IPK ☑ ICE ☐ No ☐
Temp 2.5°C Pg of

NY/NJ CHAIN OF CUSTODY RECORD

PHOENIX Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Contact Options:
☐ Fax:
☐ Phone:
☑ Email: adelaidelabresults@adelaidellc.com

Customer: Adelaide Environmental
Address: 1511 RT 22 SUITE C24
Brewster NY 10509

Project: Cornwall Middle School
Report to:
Invoice to:
QUOTE # :

Project P.O: CORN 22154.01-EN

This section MUST be completed with Bottle Quantities.

Client Sample Information - Identification

Sampler's Signature: [signature] Date: 9/13/22

Matrix Code:
DW=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
RW=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe
OIL=Oil **B**=Bulk **L**=Liquid

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	PCB	Bag	GL Amber 8 oz. w/H3PO4	Soil VOA Vials [ ] methanol [ ] H2O	GL Soil container ( ) oz	GL Soil container ( ) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] H2SO4	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H2SO4 [ ] 250ml [ ] 500ml	PL NaOH 250ml	PL HNO3 250ml	Bacteria Bottle w/thio	Bacteria Bottle as is
31637	PCB-1 - CAULK @ TOILET (B102)	B	9/12/22		✓	1												
31638	PCB-2 - CAULK @ DOOR (A7/B4)	B	09/12/22		✓	1												
31639	PCB-3 - CAULK @ DOOR (A7)	B	09/12/22		✓	1												
31640	PCB-4 - CAULK @ DOOR (A6)	B	09/12/22		✓	1												
31641	PCB-5 - CAULK @ FIXTURES	B	09/12/22		✓	1												

Relinquished by:	Accepted by:	Date:	Time:
[signature]		9/13/22	1700
[signature]	[signature]	9-14-22	10:45
[signature]	Krystal Hall	9/14/22	16:25

Comments, Special Requirements or Regulations:

Turnaround:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☑ 5 Days
☐ 10 Days
☐ Other
* SURCHARGE

NJ
☐ Res. Criteria
☐ Non-Res. Criteria
☐ Impact to GW Soil Cleanup Criteria
☐ Impact to GW soil screen Criteria
☐ GW Criteria

What State were samples collected? NY

NY
☐ TOGS GW
☐ CP-51 SOIL
☐ 375SCO Unrestricted Soil
☐ 375SCO Residential Soil
☐ 375SCO Residential
☐ 375SCO Commercial Soil
☐ 375SCO Industrial Soil
☐ Subpart 5 DW

Data Format
☐ Phoenix Std Report
☐ Excel
☐ PDF
☐ GIS/Key
☐ EQuIS
☐ NJ Hazsite EDD
☐ NY EZ EDD (ASP)
☐ Other

Data Package
☐ NJ Reduced Deliv. *
☐ NY Enhanced (ASP B) *
☐ Other

PHOENIX
Environmental Laboratories, Inc.

Friday, November 11, 2022

Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Project ID: CORN 22154.03-IN
SDG ID: GCM79998
Sample ID#s: CM79998

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Telephone (860) 645-1102 Fax (860) 645-0823

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

Sample Id Cross Reference

November 11, 2022

SDG I.D.: GCM79998

Project ID: CORN 22154.03-IN

Client Id	Lab Id	Matrix
C-9 WINDOW SYSTEM CAULK	CM79998	BULK

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

November 11, 2022

FOR: Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Sample Information		Custody Information		Date	Time
Matrix:	BULK	Collected by:		11/07/22	9:05
Location Code:	ADELAIDE	Received by:	LB	11/08/22	15:43
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCM79998
Phoenix ID: CM79998

Project ID: CORN 22154.03-IN
Client ID: C-9 WINDOW SYSTEM CAULK

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Caulk Extraction for PCB	Completed				11/08/22	R/AL/Q	SW3540C
PCB (Soxhlet SW3540C)							
PCB-1016	ND	780	ug/Kg	2	11/09/22	SC	SW8082A
PCB-1221	ND	780	ug/Kg	2	11/09/22	SC	SW8082A
PCB-1232	ND	780	ug/Kg	2	11/09/22	SC	SW8082A
PCB-1242	ND	780	ug/Kg	2	11/09/22	SC	SW8082A
PCB-1248	ND	780	ug/Kg	2	11/09/22	SC	SW8082A
PCB-1254	ND	780	ug/Kg	2	11/09/22	SC	SW8082A
PCB-1260	ND	780	ug/Kg	2	11/09/22	SC	SW8082A
PCB-1262	ND	780	ug/Kg	2	11/09/22	SC	SW8082A
PCB-1268	ND	780	ug/Kg	2	11/09/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	46		%	2	11/09/22	SC	30 - 150 %
% DCBP (Confirmation)	59		%	2	11/09/22	SC	30 - 150 %
% TCMX	41		%	2	11/09/22	SC	30 - 150 %
% TCMX (Confirmation)	44		%	2	11/09/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

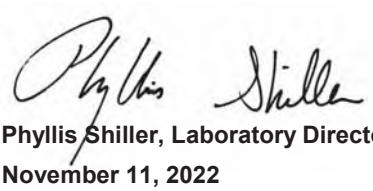
RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller, Laboratory Director
November 11, 2022
Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

QA/QC Report

November 11, 2022

QA/QC Data

SDG I.D.: GCM79998

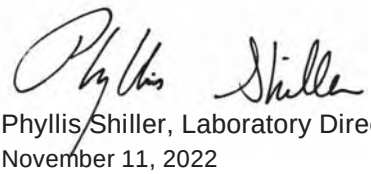
Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 651070 (ug/Kg), QC Sample No: CM80020 10X (CM79998)										
Polychlorinated Biphenyls - Bulk										
PCB-1016	ND	170	93	97	4.2				40 - 140	30
PCB-1221	ND	170							40 - 140	30
PCB-1232	ND	170							40 - 140	30
PCB-1242	ND	170							40 - 140	30
PCB-1248	ND	170							40 - 140	30
PCB-1254	ND	170							40 - 140	30
PCB-1260	ND	170	99	103	4.0				40 - 140	30
PCB-1262	ND	170							40 - 140	30
PCB-1268	ND	170							40 - 140	30
% DCBP (Surrogate Rec)	97	%	93	95	2.1				30 - 150	30
% DCBP (Surrogate Rec) (Confirm	94	%	92	95	3.2				30 - 150	30
% TCMX (Surrogate Rec)	92	%	89	93	4.4				30 - 150	30
% TCMX (Surrogate Rec) (Confirm	86	%	86	91	5.6				30 - 150	30

Comment:

A LCS and LCS Duplicate were performed instead of a matrix spike and matrix spike duplicate.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference



Phyllis Shiller, Laboratory Director
November 11, 2022

Friday, November 11, 2022

Criteria: None

State: NY

Sample Criteria Exceedances Report

GCM79998 - ADELAIDE

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

November 11, 2022 SDG I.D.: GCM79998

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

NY Temperature Narration

November 11, 2022

SDG I.D.: GCM79998

The samples in this delivery group were received at 3.0°C.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)

Cooler: Yes ☑ No ☐
Coolant: IPK ☐ ICE ☑ No ☐

PHOENIX
Environmental Laboratories, Inc.

NY/NJ/PA CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp 3.0 °C Pg 1 of 1

Contact Options:
☐ Phone:
☐ Fax:
☑ Email: adelaidelabresults@adelaidect.com

Customer: Adelaide Environmental
Address: 1571 Route 22
Brewster, NY 10509

Project: CORN 22154.03-IN
Report to:
~~Invoice to:~~ Cornwall Middle School
~~QUOTE # :~~ Lyn Reed

Project P.O:

This section MUST be completed with Bottle Quantities.

Client Sample - Information - Identification

Sampler's Signature
Date: 11/7/22

Matrix Code:
DW=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
RW=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe
OIL=Oil **B**=Bulk **L**=Liquid

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	PLB	GL Soil container ( )oz	GL Soil container ( )oz	BAG	GL Amber 8 oz. w/H3PO4	Soil VOA Vials [ ]methanol [ ] H2O	GL Soil container ( )oz	GL Soil container ( )oz	40 ml VOA Vial [ ]As is [ ] HCl	GL Amber 1000ml [ ]As is [ ] H2SO4	PL As is [ ]250ml [ ]500ml [ ]1000ml	PL H2SO4 [ ]250ml [ ]500ml	PL NaOH 250ml	PL HNO3 250ml	Bacteria Bottle w/thio	Bacteria Bottle as is
01	C-9 windowsystem	B	11/7/22	0905	✓			✓												
79998	CwIK																			

Relinquished by:	Accepted by:	Date:	Time:
		11/7/22	1045
		11/08/22	1543

Comments, Special Requirements or Regulations:
01- C-9 Entry
window Door System perimeter
CwIK (Interior/Exterior)
(Grey)

Data Format:
☐ Phoenix Std Report ☐ EQuIS
☐ Excel ☐ NJ Hazsite EDD
☐ PDF ☐ NY EZ EDD (ASP)
☐ GIS/Key ☐ Other

Turnaround:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☑ 5 Days
☐ 10 Days
☐ Other
* SURCHARGE APPLIES

NJ
☐ Res. Criteria
☐ Non-Res. Criteria
☐ Impact to GW Soil Cleanup Criteria
☐ Impact to GW soil screen Criteria
☐ GW Criteria

Data Package:
☐ NJ Reduced Deliv. * ☐ Other
☐ NY Enhanced (ASP B) *

NY
☐ TOGS GW
☐ CP-51 SOIL
☐ 375SCO Unrestricted Soil
☐ 375SCO Residential Soil
☐ 375SCO Residential Restricted Soil
☐ 375SCO Commercial Soil
☐ 375SCO Industrial Soil
☐ Subpart 5 DW

PA
☐ Clean Fill Limits
☐ PA-GW
☐ Reg Fill Limits
☐ PA Soil Restricted
☐ PA Soil non-restricted

State Samples Collected? NY

CORNWALL ELEMENTARY SCHOOL

PHOENIX
Environmental Laboratories, Inc.

Sunday, September 25, 2022

Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Project ID: **CORNWALL ES**
SDG ID: **GCM31644**
Sample ID#s: **CM31644**

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,



Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Sample Id Cross Reference

September 25, 2022

SDG I.D.: GCM31644

Project ID: CORNWALL ES

Client Id	Lab Id	Matrix
PCB-1 CAULK @ BATHROOM FIXTURES	CM31644	CAULK

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

September 25, 2022

FOR: Attn: Mr. Chris Slagle
Adelaide Environmental Health Assoc,Inc
1511 Route 22, Suite C24
Brewster, NY 10509

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:		09/12/22	
Location Code:	ADELAIDE	Received by:	LB	09/14/22	16:25
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	CORN 22276.00				

Laboratory Data

SDG ID: GCM31644
Phoenix ID: CM31644

Project ID: CORNWALL ES
Client ID: PCB-1 CAULK @ BATHROOM FIXTURES

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Caulk Extraction for PCB	Completed				09/20/22	R/AL/Q	SW3540C
PCB (Soxhlet SW3540C)							
PCB-1016	ND	730	ug/Kg	2	09/23/22	SC	SW8082A
PCB-1221	ND	730	ug/Kg	2	09/23/22	SC	SW8082A
PCB-1232	ND	730	ug/Kg	2	09/23/22	SC	SW8082A
PCB-1242	ND	730	ug/Kg	2	09/23/22	SC	SW8082A
PCB-1248	1200	730	ug/Kg	2	09/23/22	SC	SW8082A
PCB-1254	ND	730	ug/Kg	2	09/23/22	SC	SW8082A
PCB-1260	ND	730	ug/Kg	2	09/23/22	SC	SW8082A
PCB-1262	ND	730	ug/Kg	2	09/23/22	SC	SW8082A
PCB-1268	ND	730	ug/Kg	2	09/23/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	52		%	2	09/23/22	SC	30 - 150 %
% DCBP (Confirmation)	51		%	2	09/23/22	SC	30 - 150 %
% TCMX	63		%	2	09/23/22	SC	30 - 150 %
% TCMX (Confirmation)	59		%	2	09/23/22	SC	30 - 150 %

Project ID: CORNWALL ES
Client ID: PCB-1 CAULK @ BATHROOM FIXTURES

Phoenix I.D.: CM31644

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

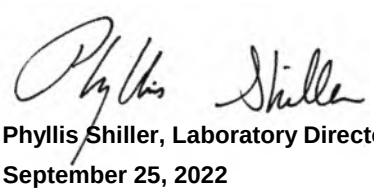
RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

September 25, 2022

Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH NY # 11301

QA/QC Report

September 25, 2022

QA/QC Data

SDG I.D.: GCM31644

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 642960 (ug/Kg), QC Sample No: CM31644 10X (CM31644)										
Polychlorinated Biphenyls										
PCB-1016	ND	170	65	52	22.2				40 - 140	30
PCB-1221	ND	170							40 - 140	30
PCB-1232	ND	170							40 - 140	30
PCB-1242	ND	170							40 - 140	30
PCB-1248	ND	170							40 - 140	30
PCB-1254	ND	170							40 - 140	30
PCB-1260	ND	170	67	67	0.0				40 - 140	30
PCB-1262	ND	170							40 - 140	30
PCB-1268	ND	170							40 - 140	30
% DCBP (Surrogate Rec)	64	%	92	70	27.2				30 - 150	30
% DCBP (Surrogate Rec) (Confirm	44	%	68	57	17.6				30 - 150	30
% TCMX (Surrogate Rec)	51	%	69	58	17.3				30 - 150	30
% TCMX (Surrogate Rec) (Confirm	51	%	69	58	17.3				30 - 150	30

Comment:

A LCS and LCS Duplicate were performed instead of a matrix spike and matrix spike duplicate.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
September 25, 2022

Sunday, September 25, 2022

Criteria: None

State: NY

Sample Criteria Exceedances Report

GCM31644 - ADELAIDE

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CM31644	$PCB_SOXR	PCB-1248	NY / Requested PCB RL /	1200	730	1000	1000	ug/Kg

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

September 25, 2022 SDG I.D.: GCM31644

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

NY Temperature Narration

September 25, 2022

SDG I.D.: GCM31644

The samples in this delivery group were received at 2.5°C.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)

Cooler: Yes [X] No [ ]
Coolant: IPK [ ] ICE [ ] No [ ]
Temp 2.5 C Pg of

NY/NJ CHAIN OF CUSTODY RECORD

PHOENIX Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Contact Options:
[ ] Fax:
[ ] Phone:
[ ] Email: adelaidelabresults@adelaidellc.com

Customer: Adelaide Environmental
Address: 154 Rt 22 Suite C24
Brewster NY 10509

Project: Cornwall ES
Report to:
Invoice to:
QUOTE # :

Project P.O: Corn 22276.00

This section MUST be completed with Bottle Quantities.

Client Sample - Information - Identification

Sampler's Signature: [signature] Date: 09/13/22

Matrix Code:
DW=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
RW=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe
OIL=Oil **B**=Bulk **L**=Liquid

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	PCB	1 day	GL Amber 8 oz. w/H3PO4	Soil VOA Vials [ ] methanol [ ] H2O	GL Soil container [ ] methanol [ ] H2O	GL Soil container ( ) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] HCl	PL As is [ ] 250ml [ ] 500ml [ ] H2SO4	PL H2SO4 [ ] 250ml [ ] 500ml [ ] 1000ml	PL NaOH 250ml	PL HNO3 250ml	Bacteria Bottle w/thio	Bacteria Bottle as is
31644	PCB-1 - CAULK @ Bathroom Fixtures	B	09/12/22		V							1						

Relinquished by:	Accepted by:	Date:	Time:
[signature]		9/13/22	15:00
[signature]	[signature]	9.14.22	10:45
[signature]	Krystal Hall	9/14/22	16:25

Comments, Special Requirements or Regulations:

Turnaround:
[ ] 1 Day*
[ ] 2 Days*
[ ] 3 Days*
[X] 5 Days
[ ] 10 Days
[ ] Other
* SURCHARGE

NJ
[ ] Res. Criteria
[ ] Non-Res. Criteria
[ ] Impact to GW Soil Cleanup Criteria
[ ] Impact to GW soil screen Criteria
[ ] GW Criteria

What State were samples collected? NY

NY
[ ] TOGS GW
[ ] CP-51 SOIL
[ ] 375SCO Unrestricted Soil
[ ] 375SCO Residential Soil
[ ] 375SCO Residential
[ ] 375SCO Commercial Soil
[ ] 375SCO Industrial Soil
[ ] Subpart 5 DW

Data Format
[ ] Phoenix Std Report
[ ] Excel
[ ] PDF
[ ] GIS/Key
[ ] EQuIS
[ ] NJ Hazsite EDD
[ ] NY EZ EDD (ASP)
[ ] Other

Data Package
[ ] NJ Reduced Deliv. *
[ ] NY Enhanced (ASP B) *
[ ] Other

APPENDIX G

PERSONNEL AND LABORATORY CERTIFICATIONS

WE ARE YOUR DOL

NEW YORK STATE | Department of Labor

DIVISION OF SAFETY & HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BLDG. 12, ALBANY, NY 12226

ASBESTOS HANDLING LICENSE

Adelaide Environmental Health Associates, Inc.
1511 Route 22, Suite C24, Brewster, NY, 10509

License Number: 29305
License Class: RESTRICTED
Date of Issue: 06/03/2024
Expiration Date: 07/31/2025
Duly Authorized Representative: John Soter

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Amy Phillips, Director
For the Commissioner of Labor

United States Environmental Protection Agency

This is to certify that

ADELAIDE ENVIRONMENTAL HEALTH ASSOCIATES INC

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires September 08, 2025

LBP-15081-2

Certification #

August 25, 2022

Issued On

Michelle Price, Chief

Lead, Heavy Metals, and Inorganics Branch

United States Environmental Protection Agency

This is to certify that

Adelaide Environmental Health Associates, Inc

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint renovation, repair, and painting activities pursuant to 40 CFR Part 745.89

In the Jurisdiction of:

All EPA Administered States, Tribes, and Territories

This certification is valid from the date of issuance and expires December 05, 2027

NAT-15081-3

Certification #

August 03, 2022

Issued On

Michelle Price, Chief

Lead, Heavy Metals, and Inorganics Branch

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE

N.Y.S



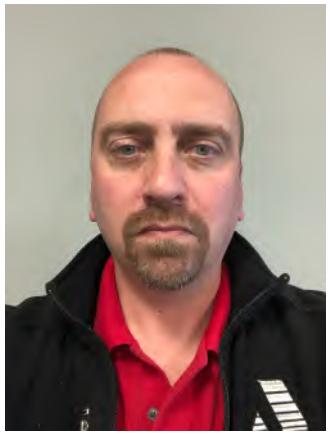
JASON FULLUM
CLASS(EXPIRES)
I PD (02/25) C ATEC (02/25)
D INSP (02/25) E MGPL (02/25)
H PM (02/25)

CERT# 24-6IUY7-SHAB
DMV# 375065936

MUST BE CARRIED ON ASBESTOS PROJECTS

United States Environmental Protection Agency

This is to certify that



Jason P Fullum

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires July 11, 2026

LBP-R-12098-3

Certification #

July 07, 2023

Issued On

Ben Conetta, Chief

Chemicals and Multimedia Programs Branch

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2025
Issued April 01, 2024

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. KAROL H. LU
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual

Serial No.: 68795

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing participation in the Program. Consumers may verify a laboratory's accreditation status online at https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/, by phone (518) 485-5570 or by email to elap@health.ny.gov.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2025
Issued April 01, 2024

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. DANIEL CLARKE
EMSL ANALYTICAL, INC.
528 MINEOLA AVE.
CARLE PLACE, NY 11514

NY Lab Id No: 11469

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Mate	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

	EPA 3051A

Serial No.: 68792

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing participation in the Program. Consumers may verify a laboratory's accreditation status online at https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/, by phone (518) 485-5570 or by email to elap@health.ny.gov.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2025
Issued April 01, 2024

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. PHYLLIS SHILLER
PHOENIX ENVIRONMENTAL LABS
587 EAST MIDDLE TURNPIKE
MANCHESTER, CT 06040

NY Lab Id No: 11301

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls

Aroclor 1262 (PCB-1262)	EPA 8082A
Aroclor 1262 (PCB-1262) in Oil	EPA 8082A
Aroclor 1268 (PCB-1268)	EPA 8082A
Aroclor 1268 (PCB-1268) in Oil	EPA 8082A
PCB 101	EPA 8082A
PCB 105	EPA 8082A
PCB 118	EPA 8082A
PCB 128	EPA 8082A
PCB 138	EPA 8082A
PCB 153	EPA 8082A
PCB 170	EPA 8082A
PCB 18	EPA 8082A
PCB 180	EPA 8082A
PCB 183	EPA 8082A
PCB 184	EPA 8082A
PCB 187	EPA 8082A
PCB 195	EPA 8082A
PCB 206	EPA 8082A
PCB 209	EPA 8082A
PCB 28	EPA 8082A
PCB 44	EPA 8082A
PCB 49	EPA 8082A
PCB 52	EPA 8082A
PCB 66	EPA 8082A
PCB 8	EPA 8082A
PCB 87	EPA 8082A
PCB Congeners, Total	EPA 8082A

Serial No.: 68722

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing participation in the Program. Consumers may verify a laboratory's accreditation status online at https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/, by phone (518) 485-5570 or by email to elap@health.ny.gov.

Appendix 'B'

Project Designer Certification



01213 0070123567 1

IF FOUND, RETURN TO:

NYSDOL - L&C UNIT

ROOM 161A BUILDING 12

STATE OFFICE CAMPUS

ALBANY NY 12226

SECTION 028300 - HANDLING of LEAD-CONTAINING MATERIALS

PART 1 GENERAL

1.1 SCOPE OF WORK

A. This Section specifies the requirements for protection of workers; prevention of contamination of adjacent areas; performing removals, pre-disposal testing of removed materials; and appropriate disposal of removed materials.

B. Lead-Based Paint

The requirements of this specification apply to the management of lead-based paint (LBP) materials at:

1. Cornwall Elementary School - 99 Lee Road Cornwall, New York 12518
2. Cornwall-On-Hudson Elem. School - 234 Hudson Street, Cornwall-On-Hudson, New York 12520
3. Cornwall Central Middle School - 122 Main Street, Cornwall, New York 12518

According to the New York Renovation Surveys for Asbestos, Lead & PCB's (Attachment 'A' at the end of Section 028200) lead based paint was found on painted and/or glazed surfaces at concentrations reported on said attachment.

Housing and Urban Development (HUD) Guidelines indicate a concentration of 5,000 ppm (or 1.0 mg/cm^2) is the maximum allowable lead concentration for dry paint surfaces scheduled for disturbance. Work activities in LBP areas that exceed the limit for dry paint on surfaces shall be performed in accordance with Occupational Safety and Health Act (OSHA) regulations as identified or inferred herein, and as indicated below.

1.2 RELATED WORK SPECIFIED ELSEWHERE - Entire project specification with specific attention to:

A. New York Renovation Surveys for Asbestos, Lead Based Paint & PCB's: Attached to end of Section 028200

B. 028200 – Asbestos Abatement

1.3 REFERENCES

A. New York State Department of Environmental Conservation (DEC) 6NYCRR:

1. Part 360 Solid Waste Management Facilities.
2. Part 364 Waste Transporter Permits.
3. Part 370 Hazardous Waste Management System-General.
4. Part 371 Identification and Listing of Hazardous Wastes.
5. Part 372 Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities.
6. Part 373 Hazardous Waste Management Facilities.

B. Occupational Safety and Health Administration (OSHA): Lead Exposure in Construction: Interim Final Rule 29 CFR 1926.62.

C. U.S. Environmental Protection Agency (EPA): Resource Conservation and Recovery Act (RCRA) Section 3004 Hazardous and Solid Waste Amendments.

D. U.S. Environmental Protection Agency (EPA): Toxicity Characteristics Leaching Procedure EPA Method 1311.

E. NYS DOH NYCRR 10 Part 67 Sub-part 67-2 Environmental Assessment and Abatement

F. HUD Technical Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing

G. U.S. Environmental Protection Agency (EPA): 40 CFR Part 745 Lead - Fees for Accreditation of Training Programs and Certification of Lead-based Paint Activities

1.4 DEFINITIONS

A. Lead Control Area: An enclosed area or structure with containment to prevent the spread of lead dust, paint chips, or debris from lead-containing paint abatement operations.

B. The term "Trim" means all base, wall trim systems, standing and or running trim systems and the like.

C. The term "Encapsulation" - A method of abatement that makes lead paint inaccessible by covering or sealing surfaces with durable coatings specifically formulated to be elastomeric, long lasting, and resistant to cracking, peeling, algae and fungus.

D. The term "Lead Paint" - Paint, plaster or other surface coating material containing more than one half of one percent of metallic lead based on the total weight of the contained solids or dried film of the paint or plaster or other similar surface coating material. - NYS DOH NYCRR 10 Section 67-2.2

1.5 SUBMITTALS

A. Quality Control Submittals:
   1. Worker's Qualifications Data:
      a. Name of each person who will be performing the Work and their employer's name, business address and telephone number.
      b. Names and addresses of 3 similar projects that each person has worked on during the past 3 years.
   2. Work Plan: Submit one copy of the work plan required under Quality Assurance Article.
   3. Waste Transporter Permit: One copy of transporter's current waste transporter permit.
   4. U.S. Environmental Protection Agency (EPA) Notification of Lead Based Paint Activities.
   5. U.S. Environmental Protection Agency (EPA) - Lead Based Paint Activities - Training Notification.
   6. U.S. Environmental Protection Agency (EPA) - Lead Based Paint Activities – Post Training Notification.

1.6 QUALITY ASSURANCE

A. Worker Exposure to LBP: Contractor shall inform workers of the presence of LBP Contractor shall assure that workers employed in LBP-areas are trained and certified as required in USEPA-approved state-of-the-art LBP abatement practices, prior to the start of work. Worker exposure to LBP shall be minimized through complete compliance with procedures and respirator protection described herein, and by following precautionary measures described in the HUD document "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing", OSHA 29 CFR 1910.1025, "Lead Standard for General Industry, and OSHA 29 CRF 1926.62, "Lead Construction Standard," and other applicable Federal, State and Local regulations, whichever is more stringent and as applicable.

B. Regulatory Requirements: Comply with the referenced standards.

C. All laborers, workers and mechanics working on the site must be certified as having successfully completed the OSHA 10-hour construction safety and health course.

1.7 PROJECT CONDITIONS

A. Shut-down of Air Handling System: Complete the Work of this Section within the time limitation allowed for shut-down of the air handling system serving the work area. The air handling system will not be restarted until approval following the final cleaning.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 INSPECTION AND ACCEPTANCE

A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part of the Work of this Contract, any defects affecting installation.

Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 PRE-ABATEMENT TESTING AND NOTIFICATION

A. Notify the Owner's representative a minimum of 5 working days prior to the start of any removal work.

3.3 PREPARATION OF EXISTING SURFACES

A. Protection:

1. Prior to removals, cover or otherwise protect finished Work of other trades and surfaces not being removed or not to be coated.

3.4 EMPLOYEE PROTECTION

A. Comply with all applicable Occupational Safety and Health Administration (OSHA) Requirements.

3.5 PROTECTION

A. Lead Control Area Requirements: Provide a lead control area where lead-containing paint removal operations will be performed in accordance with the approved Work Plan.

B. Protection of Existing Work to Remain: Perform removal work without damage or contamination of adjacent areas.

3.6 LEAD-CONTAINING MATERIAL REMOVAL

A. All air vents in the work area shall be closed and covered with plastic. All mechanical systems shall be powered off prior to removal work and shall not be powered on until removal and cleaning work has been completed.

B. Loose and peeling paint or plaster shall be removed wet, using water misting to reduce dust caused by the removal. Lead paint shall not be scraped or sanded when dry.

C. When renovation work is completed, adjacent surfaces shall be washed with detergent.

3.7 PRE-DISPOSAL TESTING

A. Prior to disposal, test the removed materials for toxicity in accordance with EPA Method 1311, Toxicity Characteristic Leaching Procedure (TCLP).

1. Test results indicating a value greater that 5 ppm lead classifies the removed material as Hazardous Waste.

3.8 DISPOSAL OF LEAD-CONTAINING MATERIAL AND RELATED DEBRIS

A. Transport and dispose of lead-containing material classified as Hazardous Waste in accordance with the standards referenced in Part 1 of this Section.

B. Transport and dispose of lead-containing material classified as Non-Hazardous Waste in accordance with standards referenced in Part 1 of this Section.

3.9 RESTORATION

A. Where existing work is damaged or contaminated, restore work to its original condition or better.

END OF SECTION 028300

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, accessories, placement procedures, and finishes, for the following:

1. Foundation walls.
2. Slabs-on-grade.
3. Concrete reconstruction and corrective work.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

A. Action Submittals:

1. Product Data: For each type of product indicated.

    a. Curing compound.
    b. Penetrating silane sealer.
    c. Chemical anchor adhesives.
    d. Corrective mortar (industry name is Repair mortar).
    e. Thin coat patching mortar.
    f. Corrective overlayment (industry name is Repair overlayment).

2. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments. Pumping of concrete requires a mix design specifically prepared and previously used for pumping.

    a. Indicate amounts of mixing water to be withheld for later addition at Project site.
    b. Include compressive strength test reports.
    c. Include all ingredient certifications and product data concurrently.

3. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. Show all concrete wall and footing reinforcement on elevation drawings at a scale not less than 1/4-inch = 1 ft. Do not submit placement plans showing only piece marks referencing a cut list.

4. Construction Joint Layout: Shop Drawings indicating proposed construction joint locations and details in elevated concrete slabs and concrete beams.

5. Slab-on-Grade Control Joint Layout Drawings: Indicate joints as shown on Drawings and proposed locations following required spacing requirements.

B. Informational Submittals:

1. Material Certificates: For each type of the following, signed by manufacturers or suppliers:

a. Reinforcing bars.
b. Epoxy-coated reinforcing bars.
c. Welded wire reinforcement.
d. Joint dowel bars.
e. Epoxy-coated joint dowel bars.
f. Cementitious materials.

2. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

a. Aggregates.
b. Vapor Barrier.

3. Proposed curing method for all concrete elements.

4. Curing compound compatibility with floor finishes and adhesives certificate.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

C. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 to perform material evaluation tests and to design concrete mixtures.

1. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

B. Chamfer Strips: Wood, metal, PVC, or rubber strips 3/4 by 3/4 inch, minimum.

C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. VOC compliant.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed bars, ASTM A 775/A 775M or ASTM A 934/A 934M, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.

C. Epoxy Corrective Coating: Liquid, two-part, epoxy corrective coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For exterior concrete, use galvanized wire or dielectric-polymer-coated wire bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I and/orType II. Supplement with the following (optional):

   a. Fly Ash: ASTM C 618, Class F or C.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

2. Blended Hydraulic Cement: ASTM C 595 – Type IL, portland limestone; Type IS, portland blast-furnace slag; Type IP, portland-pozzolan; Type I (PM), pozzolan-modified portland; or Type I (SM), slag-modified portland cement.

B. Normal-Weight Aggregates:

1. Provide aggregates from a single source.

2. ASTM C 33, Class 3S coarse aggregate or better, graded.

3. ASTM C 33, Class 4S coarse aggregate or better, graded, for exterior concrete.

4. Maximum Coarse-Aggregate Size:

   a. Slabs on Grade: 1-1/2 inches nominal.
   b. All Other Concrete: 1 inch nominal.

5. Fine Aggregate: ASTM C 33. Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 1602/C 1602M and potable.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing chlorides.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Accelerating Admixture: ASTM C 494/C 494M, Type C.
4. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
5. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
6. Mid-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type A or Type F. Water content reduction to be greater than 7%.
7. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
8. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
9. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.6 CURING MATERIALS

A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap–polyethylene sheet.
B. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1-D, Class B, dissipating, with fugitive dye.
C. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

2.7 RELATED MATERIALS

A. Penetrating, Silane Sealer: Single component, minimum 40% silane, waterbased slab sealer that forms chemical bond to the concrete. VOC compliant.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Master Builders Solutions US LLC; MasterProtect H 400.
b. Chem Masters; Aquanil Plus 40.
c. Dayton Superior Corporation; Weather Worker 40% J29.

B. Bond breakers: Waterborne, VOC compliant form release agent.

C. Bonding Agent: ASTM C 882/C 882M, liquid bonding agent specifically designed to bond fresh cementitious materials to a variety of substrates for interior and exterior applications and provide an anti-corrosion coating for reinforcing steel.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals; MasterEmaco P 124.
b. Euclid Chemical Company (The); DURAL LPL MV.
c. Sika Corporation; Sika Armatec 110 EpoCem.

D. Chemical Anchor Adhesives: Heavy duty, two component injectable adhesive designed to be dispensed using double chamber gun with mixing nozzle. Adhesives in capsule form will not be accepted.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. DeWalt.; AC200+
b. Hilti, Inc.; Hit-HY 200A; Hit-HY 200R; Hit-Ice
c. ITW Redhead; A7+.

2.8 RECONSTRUCTION AND CORRECTIVE MATERIALS

A. Corrective Mortar (Industry name is Repair Mortar): Site-mixed Portland-cement mix for vertical and overhead surfaces. Mix dry-pack corrective mortar, consisting of one part shrinkage-compensating, Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve by damp, loose volume, using only enough water for handling and placing.

B. Thin Coat Patching Mortar: Polymer modified, Portland cement, suitable for interior and exterior applications. Featheredge up to 3/16 inch. For thicker applications manufacturer's recommendations to extend mix with an aggregate may apply.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals; MasterTop 115FC.
b. ChemMasters, Inc.; Thin Patch
c. Euclid Chemical Company (The); Duraltop Flowable Mortar.

C. Corrective Overlayment (Industry name is Repair Overlayment): Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations. For thicker applications manufacturer's recommendations to extend mix with an aggregate may apply.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.9 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:

1. Fly Ash: 25 percent, but if used, a minimum of 15 percent.

a. In slabs to receive Flooring Treatment limit fly ash to a maximum 5 percent by weight of the total cementitious materials.

2. Combined Fly Ash and Pozzolan: 25 percent.

3. Ground Granulated Blast-Furnace Slag: 50 percent.

4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in all concrete. Design mix for optimum placement and workability.

2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use a mid-range, water-reducing admixture in pumped concrete, all concrete slabs (including concrete walks), concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings, Foundation Walls, Grade Beams, : Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.50.

3. Slump Limit: 4 inches, plus or minus 1 inch; or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.

2.11 CONCRETE MIXTURES FOR EXTERIOR CONCRETE

A. Exterior Architectural Concrete Elements And Retaining Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4500 psi at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.45.

3. Slump Limit: 4 inches, plus or minus 1 inch; or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.

B. Exterior Slabs (concrete pads, walks and curbs): Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4500 psi at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.45.

3. Slump Limit: 4 inches, plus or minus 1 inch; or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade conditions are satisfactory prior to forming or pouring concrete. Owner's Testing Agency shall inspect slab and footing subgrade prior to placing concrete.
B. Verify that reinforcing, including masonry dowels, is properly in place prior to pouring concrete.
C. Verify that formwork is complete and properly secured prior to placing concrete.
D. Proceed with installation only after unsatisfactory conditions have been corrected.
E. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Construct forms tight enough to prevent loss of concrete mortar.

D. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

E. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

F. Chamfer exterior corners and edges of permanently exposed concrete.

G. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Epoxy-Coated Reinforcement: Correct cut and damaged epoxy coatings with epoxy corrective coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Field bending or straightening of bars partially embedded in concrete is permitted only where shown on the Drawings.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

C. Control joints in Slabs-on-Grade: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Space joints as shown on Drawings or, if not indicated, at 12 feet average spacing and not exceeding 15 feet. Locate joints at column centerlines where possible.

D. Isolation Joints in Slabs-on-Grade: Install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.

3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, (4.3.2.1 Slump Adjustment.)

1. With each concrete mixture submittal, indicate amounts of mixing water to be withheld for later addition at Project site.

2. Water added must not increase the water-cement ratio past the approved mix design ratio.

3. Add additional water reducer or plasticizer to mix instead of adding water to achieve flowable, workable concrete. Do not add water to concrete after adding these admixtures to mixture.

4. Do not add water after truck is more than half empty.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.

2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcement in position on chairs during concrete placement.

3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and ACI 305R and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.6 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive broom finish.

C. Broom Finish: Apply a broom finish to exterior concrete walks, slabs, platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

D. Exterior Concrete Walks and Slabs: Apply penetrating, silane sealer per manufacturer's instructions.

3.7 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.

2. Construct concrete bases 4 inches high unless otherwise indicated; and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.

3. Minimum Compressive Strength: 4000 psi at 28 days.

4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.

5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete substrate.

6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

7. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 and 305R for hot-weather protection during curing.

B. Slabs: Protect slabs within building from precipitation accumulation. Immediately remove water, snow or ice from surface of slabs within building regardless if source is from precipitation, construction activities, etc.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces. Protect all slabs from precipitation accumulation.

E. Cure concrete according to ACI 308.1, by one of the following methods:

1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately correct any holes or tears during curing period using cover material and waterproof tape.

    a. Use moisture-retaining covers to cure all interior slabs on grade.

2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and correct damage during curing period.

3.9 JOINT SEALING

A. Prepare, clean, and install slab control joint sealer according to manufacturer's written instructions.

1. Defer joint sealing until concrete has aged at least one month(s). Do not seal joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint sealer full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint sealer flush with top of joint after hardening.

3.10 CONCRETE SURFACE CORRECTIVE WORK

A. Defective Concrete: Correct and patch defective areas when approved by Architect. Remove and replace concrete that cannot be corrected and patched to Architect's approval.

B. Correcting Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins, exposed or otherwise visible fiber reinforcement, and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Remove exposed or otherwise visible fiber reinforcement from the concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with corrective mortar before bonding agent has dried. Fill form-tie voids with corrective mortar or cone plugs secured in place with bonding agent.

2. Correct defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, corrective mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Correct defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

C. Correcting Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Correct finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions such as exposed or otherwise visible fiber reinforcement.

2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Remove exposed or otherwise visible fiber reinforcement from the concrete surface. If concrete surface is damaged by the process of fiber removal, correct surface as described by the remainder of this section.

4. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with thin coat patching mortar. Finish corrected areas to blend into adjacent concrete.

5. Correct other low areas scheduled to remain exposed with a corrective overlayment. Cut out low areas to ensure a minimum corrective overlayment depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply corrective overlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Correct defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Correct random cracks and single holes 1 inch or less in diameter with corrective overlayment. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete. Place corrective overlayment before surface has dried. Finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

D. Perform structural reconstruction of existing concrete according to the Drawings.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports, except where noted.

B. Contractor to supply all batch tickets to Owner’s testing agency. Batch tickets to note w/c ratio and amount of water allowed to be added at Project site.

C. Inspections:

1. Steel reinforcement placement.

    a. Installation of masonry wall reinforcement dowels prior to pouring of elevated slabs.

2. Chemical Anchors: Test 5% of all chemical anchors in tension, randomly selected but in varied locations. Testing to be in accordance with ASTM E 488 to the approved manufacturer’s allowable loads. Concrete must cure a minimum of 3 days prior to testing. Do not test anchors until after the anchor manufacturer’s recommended curing time. If an anchor fails during this test additional anchors may be requested to be tested as directed by the Architect.

3. Verification of use of required design mixture.

4. Concrete placement, including conveying and depositing.

5. Curing procedures and maintenance of curing temperature.

6. Verification of concrete strength before removal of shores and forms from beams and slabs.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day, nor less than once per each 5000 square foot of surface area of walls or slabs.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Include corresponding concrete mix batch tickets with each test report.

3. Indicate amount of water added to batch at Project site.

4. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change. Measure after slump adjustment. Pumped concrete is to be tested at point of placement, with an additional slump test taken at point of delivery.

5. Air Content: ASTM C 231, pressure method, for normal-weight concrete;one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

6. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

7. Density (Unit Weight): ASTM C 138/C 138M, fresh unit weight of concrete. Two tests per truck load; one at beginning of pour and near end of pour.

8. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and standard cure six (6) cylinder specimens for each composite sample.
    b. Cast and field cure two (2) standard cylinder specimens for each composite sample.
    c. Autoclave curing and oven-drying of test specimens containing synthetic fiber is not permitted.

9. Compressive-Strength Tests: ASTM C 39/C 39M;

    a. Test two standard cured specimens at 7 days, three specimens at 28 days, and retain one specimen for testing at 56 days as deemed necessary by Architect.

    b. Test two field-cured specimens at 28 days.

c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

d. If one specimen in the test shows evidence of improper sampling, molding or testing, discard the specimen and consider the strength of the remaining cylinders to be the test result. If more than one specimen in a test shows any defects, discard the entire test.

10. Test for workability and air content of each synthetic fiber reinforced concrete mixture composite sample taken according to ASTM C172 (except that wet-sieving is not permitted) and whenever consistency of concrete appears to vary, according to ASTM C 1116.

11. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

12. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

13. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

14. Nondestructive Testing: Impact-echo, ultrasonic methods, or other nondestructive methods may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

15. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

16. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

17. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 03 30 00

SECTION 04 01 20.19 - UNIT MASONRY RESTORATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cleaning unit masonry surfaces.
2. Removing and replacing brick masonry.
3. Patching brick.
4. Repointing joints with mortar.

1.3 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
B. Rebuilding (Setting) Mortar: Mortar used to set and anchor masonry in a structure, distinct from pointing mortar installed after masonry is set in place.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to unit masonry restoration including, but not limited to, the following:

a. Verify unit masonry restoration specialist's personnel, equipment, and facilities needed to make progress.
b. Materials, material application, sequencing, tolerances, and required clearances.
c. Cleaning program.
d. Reconstruction program.
e. Repointing program.
f. Quality-control program.

1.5 SEQUENCING AND SCHEDULING

A. Work Sequence: Perform unit masonry restoration work in the following sequence, which includes work specified in this and other Sections:

1. Remove plant growth.

2. Inspect masonry for open mortar joints and permanently or temporarily point them before cleaning to prevent the intrusion of water and other cleaning materials into the wall.

3. Clean masonry.

4. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry reconstruction areas along joints.

5. Reconstruct masonry, including replacing existing masonry with new masonry materials.

6. Rake out mortar from joints to be repointed.

7. Point mortar joints.

8. After reconstruction and repointing have been completed and cured, perform a final cleaning to remove residues from this work.

9. Where water repellents are to be used on or near masonry work, delay application of these chemicals until after pointing and cleaning. Refer to Division 07 Section "Water Repellents."

1.6 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Face brick.
2. Building brick.
3. Portland cement.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for item listed below, otherwise submit full Product Data for the following:

1. Nonacidic gel cleaner.
2. Nonacidic liquid cleaner.
3. Brick patching compound.
4. Liquid strippable masking agent.
5. Masonry reconstruction anchors, expansion type.
6. Masonry reconstruction anchors, spiral type.
7. Flexible flashing.
8. Weep products.

C. Samples for Initial Selection:

1. Mortar: Submit sets of mortar that will be left exposed in the form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or plastic channels.

   a. Have each set contain a close color range of at least three Samples of different mixes of colored sands and cements that produce a mortar matching existing, cleaned mortar when cured and dry.

   b. Submit with precise measurements on ingredients, proportions, gradations, and source of colored sands from which each Sample was made.

2. Patching Compound: Submit sets of patching compound Samples in the form of plugs (patches in drilled holes) in sample units of masonry representative of the range of masonry colors on the building.

   a. Have each set contain a close color range of at least three Samples of different mixes of patching compound that matches the variations in existing masonry when cured and dry.

D. Samples for Verification:

1. Face Brick: Each type of face brick unit to be used for replacing existing units. Include sets of Samples to show the full range of shape, color, and texture to be expected. For each brick type, provide straps or panels containing at least four bricks. Include multiple straps for brick with a wide range.

1.8 INFORMATIONAL SUBMITTALS

A. Qualification Data: For unit masonry restoration specialist including field supervisors and workers.
B. Cleaning program.
C. Reconstruction program.
D. Repointing program.
E. Quality-control program.

1.9 QUALITY ASSURANCE

A. Unit Masonry Restoration Specialist Qualifications: Engage an experienced unit masonry restoration firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing masonry is insufficient experience for masonry restoration work.

1. Field Supervision: Unit masonry restoration specialist firm shall maintain experienced full-time supervisors on Project site during times that unit masonry restoration work is in progress.

2. Workers: Persons who are experienced in unit masonry restoration work of types they will be performing.

3. At Contractor's option, work may be divided between two specialist firms: one for cleaning work and one for reconstruction/repointing work.

B. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used; protection of surrounding materials; and control of runoff during operations.

C. Reconstruction Program: Prepare a written reconstruction program that describes reconstruction process in detail, including materials, methods, and equipment to be used; and protection of surrounding materials.

D. Repointing Program: Prepare a written repointing program that describes repointing process in detail, including materials, methods, and equipment to be used; and protection of surrounding materials.

E. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage.

1.10 MOCKUPS

A. Cleaning Mockups: Prepare mockups of cleaning on existing surfaces to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Clean an area approximately 24 sq. ft. for each type of masonry and surface condition.

a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not test cleaners and methods known to have deleterious effect.
b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.

B. Brick Masonry Reconstruction Mockups: Prepare mockups of brick masonry reconstruction to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation.

1. Prepare sample areas for each type of masonry reconstruction work performed. If not otherwise indicated, size each mockup not smaller than 72 inches wide by 48 inches high. Construct sample areas in locations in existing walls where directed by Architect unless otherwise indicated. Demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

a. Replacement: Four brick units replaced.
b. Patching: Three small holes at least 1 inch in diameter for each type of brick indicated to be patched.
c. Reanchoring Veneers: Three masonry reconstruction anchors of each type installed.

C. Repointing Mockups: Prepare mockups of brick masonry repointing to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Rake out joints in an area not smaller than 72 inches wide by 48 inches high, in two halves, each approximately 36 inches wide demonstrating each type of repointing required and repoint one of the areas.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

E. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Deliver bricks to Project site strapped together in suitable packs or pallets or in heavy-duty cartons and protected against impact and chipping.
B. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
E. Store sand where grading and other required characteristics can be maintained and contamination avoided.
F. Handle bricks to prevent overstressing, chipping, defacement, and other damage.

1.12 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit unit masonry restoration work to be performed according to product manufacturers' written instructions and specified requirements.

B. Clean masonry surfaces only when air temperature is 50 deg F and above and is predicted to remain so for at least seven days after completion of cleaning.

C. Cold-Weather Requirements: Comply with the following procedures for masonry reconstruction and pointing unless otherwise indicated:

1. When air temperature is below 40 deg F, heat mortar ingredients, masonry reconstruction materials, mortar ingredients, and existing masonry walls to produce temperatures between 40 and 120 deg F.

2. When mean daily air temperature is below 40 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for seven days after reconstruction and pointing.

D. Hot-Weather Requirements: Protect masonry reconstruction areas and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and reconstruction materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.

E. For manufactured reconstruction materials, perform work within the environmental limits set by each manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Source Limitations: Obtain each type of material for restoring brick masonry (brick, cement, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Detergent Solution, Job Mixed: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

D. Mold, Mildew, and Algae Remover, Job Mixed: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 5 quarts of 5 percent sodium hypochlorite (bleach), and 15 quarts of hot water for every 5 gal. of solution required.

E. Nonacidic Gel Cleaner: Manufacturer's standard gel formulation, with pH between 6 and 9, that contains detergents with chelating agents and is specifically formulated for cleaning masonry surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cathedral Stone Products, Inc.; CSP Light Duty Cleaner.
b. PROSOCO, Inc.; Sure Klean 942 Limestone & Marble Cleaner.

F. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Cathedral Stone Products, Inc.; CSP Bio-Cleaner.
    b. PROSOCO, Inc.; Enviro Klean 2010 All Surface Cleaner.

2.3 MASONRY MATERIALS

A. Face Brick: As required to complete brick masonry restoration work.

1. Brick Matching Existing: Units with colors, color variation within units, surface texture, size, shape, and physical properties that match existing brickwork.

    a. For existing brickwork that exhibits a range of colors or color variation within units, provide brick that proportionally matches that range and variation rather than brick that matches an individual color within that range.

2. Special Shapes:

    a. Provide molded, 100 percent solid shapes for applications where core holes or "frogs" could be exposed to view or weather when in final position and where shapes produced by sawing would result in sawed surfaces being exposed to view.

    b. Provide specially ground units, shaped to match patterns, for arches and where indicated.

    c. Mechanical chopping or breaking brick, or bonding pieces of brick together by adhesive, are unacceptable procedures for fabricating special shapes.

3. Salvaged Brick: Obtain salvaged brick from Owner from location shown on Drawings. Clean off residual mortar and prepare for reuse.

B. Building Brick: ASTM C62, of same vertical dimension as face brick, for masonry work concealed from view.

1. Grade SW for concealed backup.

2.4 MORTAR MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction; white or gray, or both where required for color matching of mortar.

1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Mortar Sand: ASTM C144.

1. Exposed Mortar: Match size, texture, color, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.

D. Water: Potable.

2.5 MANUFACTURED RECONSTRUCTION MATERIALS

A. Brick Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching brick masonry.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cathedral Stone Products, Inc.; Jahn M100 Restoration Mortar.
b. Edison Coatings, Inc.; Custom System 45.

2. Use formulation that is vapor and water permeable (equal to or more than the brick), exhibits low shrinkage, has lower modulus of elasticity than bricks being patched, and develops high bond strength to all types of masonry.

3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.

4. Formulate patching compound in colors and textures to match each brick being patched. Provide sufficient number of colors to enable matching of the color, texture, and variation of each unit.

2.6 ACCESSORY MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, glazed masonry, and polished stone surfaces from damaging effects of masonry cleaners.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. American Building Restoration Products, Inc.; ABR Rubber Mask.
b. PROSOCO, Inc.; Sure Klean Strippable Masking.

B. Masonry Reconstruction Anchors, Expansion Type: Type 304 stainless-steel rods with brass expanding shells, length as required, for anchoring veneer to existing walls; providing positive mechanical anchorage to secure veneer to backing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Hohmann & Barnard, Inc.; Torq-Lok 500 Series Anchor.

C. Masonry Reconstruction Anchors, Spiral Type: Type 304 stainless steel spiral rods 8 mm in diameter, length as required, for anchoring veneer to existing walls; driven-in anchors for installation in drilled holes, relying on screw effect, rather than adhesive to secure veneer to backing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Heckmann Building Products, Div. of Mechanical Plastics Corp.; Helix Remedial Tie (391).
b. Hohmann & Barnard, Inc.; Spira-Lok.

D. Setting Buttons and Shims: Resilient plastic, nonstaining to masonry, sized to suit joint thicknesses and bed depths of bricks, less the required depth of pointing materials unless removed before pointing.

E. Masking Tape: Nonstaining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.

F. Flexible Flashing: Use the following unless otherwise indicated:

1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth/polymer fabric; non-asphaltic type. Use only where flashing is fully concealed in masonry.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Advanced Building Products, Inc.; Copper Sealtite 2000.
2) Wire-Bond; Copper Seal (Copper Fabric Flashing) #4140.
3) York Manufacturing, Inc.; Multi-Flash 500.

2. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

3. Termination Bars for Flexible Flashing: Stainless steel bars not less than 1/8 inch by 1 inch.

G. Weep Products: Use the following unless otherwise indicated:

1. Cellular Plastic Weep: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standards.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Advanced Building Products, Inc.; Mortar Maze Weep Vents.
2) Heckmann Building Products, Div. of Mechanical Plastics Corp.; Cell Vent (85).

3) Hohmann & Barnard, Inc.; QV – Quadro-Vent.
4) Wire-Bond; #3601 Cell Vent.

H. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Minimal possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could leave residue on surfaces.

2.7 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again, adding only enough water to produce a damp, unworkable mix that retains its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

B. Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.

C. Do not use admixtures in mortar unless otherwise indicated.

D. Mixes: Mix mortar materials in the following proportions:

1. Rebuilding (Setting) Mortar:

a. By Type: ASTM C270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to portland cement and lime.

2. Pointing Mortar:

a. By Type: ASTM C270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to portland cement and lime.

3. For Cornwall-On-Hudson Elementary School, use Type O for masonry repointing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Use the gentlest means to perform the Work and take the greatest of care to ensure materials are not damaged in the course of the Work.

1. In addition to the requirements in this Section, comply with “The Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.”

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PROTECTION

A. Comply with each manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless products being used will not damage adjacent surfaces. Use protective materials that are waterproof and UV resistant. Apply masking agents according to manufacturer's written instructions. Do not apply liquid strippable masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.

2. Do not apply chemical solutions during winds of enough force to spread them to unprotected surfaces.

3. Neutralize alkaline and acid wastes before disposal.

4. Dispose of runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

B. Prevent mortar from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
2. Keep wall area wet below restoration work to discourage mortar from adhering.
3. Immediately remove mortar splatters in contact with exposed masonry and other surfaces.

C. Remove downspouts and associated hardware adjacent to masonry and store during masonry restoration. Reinstall when restoration is complete.

1. Provide temporary rain drainage during work to direct water away from building.

3.3 CLEANING MASONRY, GENERAL

A. Cleaning Appearance Standard: Cleaned surfaces are to have a uniform appearance as viewed from 20 feet away by Architect.

B. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water do not wash over dry, cleaned surfaces.

C. Use only those cleaning methods indicated for each masonry material and location.

1. Brushes: Do not use wire brushes or brushes that are not resistant to chemical cleaner being used.

2. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at nozzle. Adjust pressure and volume to ensure that cleaning methods do not damage surfaces, including joints.

a. Equip units with pressure gages.

b. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with nozzle having a cone-shaped spray.

c. For water-spray application, use fan-shaped spray that disperses water at an angle of 25 to 50 degrees.

d. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F at flow rates indicated.

D. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces. Keep wall wet below area being cleaned to prevent streaking from runoff.

E. Perform additional general cleaning, paint and stain removal, and spot cleaning of small areas that are noticeably different when viewed according to the "Cleaning Appearance Standard" Paragraph, so that cleaned surfaces blend smoothly into surrounding areas.

F. Water Application Methods:

1. Water-Soak Application: Soak masonry surfaces by applying water continuously and uniformly to limited area for time indicated. Apply water at low pressures and low volumes in multiple fine sprays using perforated hoses or multiple spray nozzles. Erect a protective enclosure constructed of polyethylene sheeting to cover area being sprayed.

2. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches from masonry surface and apply water in horizontal back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.

G. Chemical-Cleaner Application Methods: Apply chemical cleaners to masonry surfaces according to chemical-cleaner manufacturer's written instructions; use brush or spray application. Do not spray apply at pressures exceeding 50 psi. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended in writing by manufacturer.

H. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.

1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

I. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.4 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing remaining growth to dry as long as possible before removal. Remove loose soil and plant debris from open joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to planned cleaning methods. Extraneous substances include paint, calking, asphalt, and tar.

1. Carefully remove heavy accumulations of rigid materials from masonry surface with sharp chisel. Do not scratch or chip masonry surface.

3.5 CLEANING MASONRY

A. Hot-Water Wash: Use hot water applied by low-pressure spray.

B. Detergent Cleaning:

1. Wet surface with hot water applied by low-pressure spray.

2. Scrub surface with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet.

3. Rinse with hot water applied by low-pressure spray to remove detergent solution and soil.

4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

C. Mold, Mildew, and Algae Removal:

1. Wet surface with hot water applied by low-pressure spray.

2. Apply mold, mildew, and algae remover by brush or low-pressure spray.

3. Scrub surface with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing. Use small brushes for mortar joints and crevices. Dip brush in mold, mildew, and algae remover often to ensure that adequate fresh cleaner is used and that surface remains wet.

4. Rinse with hot water applied by low-pressure spray to remove mold, mildew, and algae remover and soil.

5. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

D. Nonacidic Liquid Chemical Cleaning:

1. Wet surface with hot water applied by low-pressure spray.
2. Apply cleaner to surface in two applications by brush or low-pressure spray.
3. Let cleaner remain on surface for period recommended in writing by chemical-cleaner manufacturer.
4. Rinse with hot water applied by low-pressure spray to remove chemicals and soil.
5. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once.

3.6 MASONRY RECONSTRUCTION, GENERAL

A. Appearance Standard: Reconstructed surfaces are to have a uniform appearance as viewed from 20 feet away by Architect.

3.7 BRICK REMOVAL AND REPLACEMENT

A. At locations indicated, remove bricks that are damaged, spalled, or deteriorated. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

1. When removing single bricks, remove material from center of brick and work toward outside edges.

B. Support and protect remaining masonry that surrounds removal area.

C. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

D. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

E. Remove in an undamaged condition as many whole bricks as possible.

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
3. Store brick for reuse. Store off ground, on skids, and protected from weather.
4. Deliver cleaned brick not required for reuse to Owner unless otherwise indicated.

F. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for brick replacement.

G. Replace removed damaged brick with other removed brick in good condition, where possible, or with new brick matching existing brick. Do not use broken units unless they can be cut to usable size.

H. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

1. Maintain joint width for replacement units to match existing joints.
2. Use setting buttons or shims to set units accurately spaced with uniform joints.

I. Lay replacement brick with rebuilding (setting) mortar and with completely filled bed, head, and collar joints. Butter ends with enough mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.

1. Tool exposed mortar joints in reconstructed areas to match joints of surrounding existing brickwork.
2. Rake out mortar used for laying brick before mortar sets according to Article “Repointing." Point at same time as repointing of surrounding area.
3. When mortar is hard enough to support units, remove shims and other devices interfering with pointing of joints.

J. Curing: Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

1. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

3.8 REANCHORING VENEERS

A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry reconstruction anchors, spiral type, to comply with the following requirements:

1. Install in horizontal mortar joints and according to manufacturer's written instructions.
2. Space anchors as indicated, but not more than 16 inches o.c. vertically and 32 inches o.c. horizontally.

3. Install at locations to avoid penetrating flashing.
4. Recess anchors at least 5/8 inch from surface of mortar joint and fill recess with pointing mortar.

3.9 FLASHING AND WEEP HOLES

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 12 inches, and at least 6 inches above the top of cavity drainage material. Refer to Division 04 Section “Unit Masonry” for cavity drainage material. Fasten upper edge of flexible flashing to inner wythe through termination bar.

3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 12 inches, and at least 6 inches above the top of the cavity drainage material. Refer to Division 04 Section “Unit Masonry” for cavity drainage material. Fasten upper edge of flexible flashing to sheathing through termination bar.

4. Apply a continuous bead of compatible sealant to the top of the termination bar.

5. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

6. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep products to form weep holes.
2. Space weep holes 24 inches o.c. unless otherwise indicated.

3.10 BRICK MASONRY PATCHING

A. Patch the following bricks unless another type of reconstruction or replacement is indicated:

1. Bricks indicated to be patched.
2. Bricks with holes.

3. Bricks with chipped edges or corners. Patch chipped edges or corners measuring more than 3/4 inch in least dimension.
4. Bricks with small areas of deep deterioration. Patch deep deteriorations measuring more than 3/4 inch in least dimension and more than 1/4 inch deep.

B. Remove and replace existing patches where indicated.

C. Patching Bricks:

1. Remove loose material from masonry surface. Carefully remove additional material so patch does not have feathered edges but has square or slightly undercut edges on area to be patched and is at least 1/4 inch thick, but not less than recommended in writing by patching compound manufacturer.

2. Mask adjacent mortar joint or rake out for repointing if patch extends to edge of brick.

3. Mix patching compound in individual batches to match each unit being patched. Combine one or more colors of patching compound, as needed, to produce exact match.

4. Rinse surface to be patched and leave damp, but without standing water.

5. Brush-coat surfaces with slurry coat of patching compound according to manufacturer's written instructions.

6. Place patching compound in layers as recommended in writing by patching compound manufacturer, but not less than 1/4 inch or more than 2 inches thick. Roughen surface of each layer to provide a key for next layer.

7. Trowel, scrape, or carve surface of patch to match texture and surrounding surface plane or contour of brick. Shape and finish surface before or after curing, as determined by testing, to best match existing brick.

8. Keep each layer damp for 72 hours if recommended by manufacturer or until patching compound has set.

9. Remove and replace patches with hairline cracks or that show separation from brick at edges, and those that do not match adjoining brick in color or texture.

3.11 MASONRY REPOINTING, GENERAL

A. Appearance Standard: Repointed surfaces are to have a uniform appearance as viewed from 20 feet away by Architect.

3.12 REPOINTING

A. Rake out and repoint joints to the following extent:

1. All joints in areas indicated.

2. Joints indicated as sealant-filled joints.

3. Joints at locations of the following defects:

    a. Holes and missing mortar.
    b. Cracks that can be penetrated 1/4 inch or more by a knife blade 0.027 inch thick.
    c. Cracks 1/8 inch or more in width and of any depth.
    d. Hollow-sounding joints when tapped by metal object.
    e. Eroded surfaces 1/4 inch or more deep.
    f. Deterioration to point that mortar can be easily removed by hand, without tools.
    g. Joints filled with substances other than mortar.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth of joint width plus 1/8 inch, but not less than 1/2 inch and not less than that required to expose sound, unweathered mortar. Do not remove unsound mortar more than 2 inches deep; consult Architect for direction.

2. Remove mortar from brick and other masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.

3. Do not spall edges of brick or other masonry units or widen joints. Replace or patch damaged brick or other masonry units as directed by Architect.

    a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders without Architect's written approval.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.

2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer and allow it to become thumbprint hard before applying next layer.

3. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.

4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.

5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

6. Hairline cracking within mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

F. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.13 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water applied by low-pressure spray.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

B. Clean adjacent nonmasonry surfaces. Use detergent and soft brushes or cloths.

C. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

D. Remove masking materials, leaving no residues that could trap dirt.

E. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

3.14 FIELD QUALITY CONTROL

A. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Architect's Project representatives use of lift devices and scaffolding, as needed, to observe progress and quality of portion of the Work completed.

B. Notify Architect's Project representatives in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until Architect's Project representatives have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location.

END OF SECTION 04 01 20.19

SECTION 04 01 40 – STONE RESTORATION AND CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes maintenance of stone assemblies consisting of stone restoration and cleaning as follows:

1. Restoring stone masonry, including replacing whole and partial units.
2. Repointing joints.
3. Preliminary cleaning, including removing plant growth.
4. Cleaning exposed stone surfaces.
5. Embedded flashing.

1.3 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
B. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

1. Stone.
2. Portland cement.
3. Stone anchors.
4. Setting buttons.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for item listed below, otherwise submit full Product Data for the following:

1. Cementitious crack filler.
2. Stone-to-stone adhesive.
3. Nonacidic gel cleaner.
4. Nonacidic liquid cleaner.
5. Liquid strippable masking agent.
6. Flexible flashing.

C. Shop Drawings: For the following:

1. Replacement stone units and their jointing, showing relation of existing to new units.

D. Samples for Initial Selection: For the following:

1. Pointing Mortar: Submit sets of mortar for pointing in the form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or plastic channels.

a. Submit with precise measurements on ingredients, proportions, gradations, and sources of colored sands from which each Sample was made.

E. Samples for Verification: For the following:

1. Each type of replacement stone. Include sets of Samples as necessary to show full range of color, texture, grain, veining, and finish to be expected. Provide sets of at least two 12-by-12-inch Samples for each type, but no fewer than necessary to indicate full range and the proportion of variations within range.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For restoration specialists. Submit data demonstrating compliance including qualifications of field supervisors and a list of at least three projects with similar scope of work as this Project along with reference contact information for each project.

B. Restoration program.

C. Cleaning program.

1.7 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Engage an experienced stone restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience installing standard unit masonry or new stone masonry is not sufficient experience for stone restoration work.

B. Source Limitations: Obtain each type of material for stone restoration (stone, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

C. Restoration Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.

D. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

E. Cleaning and Restoration Appearance Standard: Cleaned and restored surfaces are to have a uniform appearance as viewed from 20 feet away by Architect. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

F. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Stone Restoration: Prepare sample areas for each type of stone indicated to have restoration work performed. If not otherwise indicated, size each mockup not smaller than 72 inches wide by 48 inches high. Erect sample areas in existing walls unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

    a. Replacement: Four stone units replaced.
    b. Partial Stone Replacement: Two partial stone replacements (dutchman restorations).
    c. Stone Plugging: Two stone plugs for each type of stone indicated to be plugged.
    d. Crack Injection: Apply crack injection in 2 separate areas, each approximately 36 inches long.
    e. Patching: Three small holes at least 1 inch in diameter.
    f. Flashing in exterior stonework.

2. Repointing: Rake out joints in areas an area not smaller than 72 inches wide by 48 inches high, in two halves, each approximately 36 inches s wide demonstrating each type of repointing required and repoint one of the areas.

3. Cleaning: Clean an area approximately 24 sq. ft. for each type of stone and surface condition.

    a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not use cleaners and methods known to have deleterious effect.
    b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of mockups for negative reactions.

4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to stone restoration and cleaning including, but not limited to, the following:

a. Construction Schedule: Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress.
b. Materials, material application, sequencing, and tolerances.
c. Restoration program.
d. Cleaning program.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver stone units to Project site strapped together in suitable packs or pallets or in heavy-duty crates.
B. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.9 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit stone restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

B. Cold-Weather Requirements: Comply with the following procedures for stone restoration and mortar-joint pointing unless otherwise indicated:

1. When air temperature is below 40 deg F, heat mortar ingredients, restoration materials, and existing stone to produce temperatures between 40 and 120 deg F.

2. When mean daily air temperature is below 40 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 7 days after restoration and pointing.

C. Hot-Weather Requirements: Protect stone restoration and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and patching materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.

D. For manufactured restoration materials, perform work within the environmental limits set by each manufacturer.

E. Clean stone surfaces only when air temperature is 40 deg F and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.10 SEQUENCING AND SCHEDULING

A. Order replacement materials at earliest possible date to avoid delaying completion of the Work.

B. Order sand for pointing mortar immediately after approval of mockups. Take delivery of and store at Project site a sufficient quantity to complete Project.

C. Perform stone restoration work in the following sequence:

1. Remove plant growth.
2. Rake out mortar from joints surrounding stone to be replaced and from joints adjacent to stone restoration along joints.
3. Restore stonework, including replacing existing stone with new stone.
4. Rake out mortar from joints to be repointed.
5. Point mortar joints.
6. Inspect for open mortar joints and correct before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
7. Clean stone surfaces.

PART 2 - PRODUCTS

2.1 STONE MATERIALS

A. Stone: Provide natural building stone of variety, color, texture, grain, veining, finish, size, and shape to match existing stone.

1. For existing stone that exhibits a range of colors, texture, grain, veining, finishes, sizes, or shapes, provide stone that proportionally matches that range rather than stone that matches an individual color, texture, grain, veining, finish, size, or shape within that range.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, white or gray, or both where required for color matching of exposed mortar.

1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Sand: ASTM C 144 unless otherwise indicated.

1. Color: Provide natural sand of color necessary to produce required mortar color.
2. For pointing mortar, provide sand with rounded edges.

3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.

D. Mortar Pigments: ASTM C 979/C 979M, compounded for use in mortar mixes, and having a record of satisfactory performance in stone mortars.

E. Water: Potable.

2.3 MANUFACTURED RESTORATION MATERIALS

A. Cementitious Crack Filler: An ultrafine superplasticized grout that can be injected into cracks, is suitable for application to wet or dry cracks, exhibits low shrinkage, and develops high bond strength to all types of stone.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cathedral Stone Products, Inc.; Jahn Injection Grout.
b. Edison Coatings, Inc.; Pump-X 53-Series.

B. Stone-to-Stone Adhesive: 2-part polyester or epoxy-resin stone adhesive with a 15- to 45-minute cure at 70 deg F or 1-part cementitious stone adhesive, recommended by adhesive manufacturer for type of stone restoration indicated, and matching stone color.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Two-Part Polyester or Epoxy-Resin Stone Adhesive:

1) Edison Coatings, Inc.; Flexi-Weld 520T.
2) Akemi North AmericaAkepox Series Marble Filler 1000 Series or MS76 Stone and Marble Adhesive.
3) Bonstone Materials Corporation; Fast Set 41.

b. One-Part Cementitious Stone Adhesive:

1) Cathedral Stone Products, Inc.; Jahn Masonre Adhesive.

2.4 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

D. Job-Mixed Mold, Mildew, and Algae Remover: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 5 quarts of 5 percent sodium hypochlorite (bleach), and 15 quarts of hot water for every 5 gal. of solution required.

E. Nonacidic Gel Cleaner: Manufacturer's standard gel formulation, with pH between 6 and 9, that contains detergents with chelating agents and is specifically formulated for cleaning masonry surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. PROSOCO; Price Research, Ltd.; Price Marble Cleaner-Gel.
b. PROSOCO; Sure Klean 942 Limestone and Marble Cleaner.

F. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dumond Chemicals, Inc.; Safe n' Easy Architectural Cleaner/Restorer.
b. PROSOCO; Enviro Klean 2010 All Surface Cleaner.

2.5 ACCESSORY MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABR Products, Inc.; Rubber Mask.
b. PROSOCO; Sure Klean Strippable Masking.

B. Stone Anchors and Pins: Type and size indicated or, if not indicated, to match existing anchors in size and type. Fabricate anchors from Type 304 stainless steel.

C. Setting Buttons: Resilient plastic buttons, nonstaining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of pointing materials.

D. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.

E. Flexible Flashing: Use the following unless otherwise indicated:

1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Advanced Building Products Inc.; Copper Sealtite 2000.
2) York Manufacturing, Inc.; Multi-Flash 500.

F. Miscellaneous Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.

2. Little possibility of damaging exposed surfaces.

3. Consistency of each application.

4. Uniformity of the resulting overall appearance.

5. Do not use products or tools that could do the following:

a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
b. Leave a residue on surfaces.

2.6 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

B. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.

1. Mortar Pigments: Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.

C. Do not use admixtures in mortar unless otherwise indicated.

D. Mortar Proportions: Mix mortar materials in the following proportions:

1. Pointing Mortar for Stone: 1 part white portland cement, 1 part lime, and 6 parts sand.

a. Add mortar pigments to produce mortar colors required.

2. Rebuilding (Setting) Mortar: Same as pointing mortar.

2.7 CHEMICAL CLEANING SOLUTIONS

A. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical-cleaner manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from stone restoration work.

1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.

B. Comply with chemical-cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.

2. Keep wall wet below area being cleaned to prevent streaking from runoff.

3. Do not clean stone during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.

5. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

C. Prevent mortar from staining face of surrounding stone and other surfaces.

1. Cover sills, ledges, and projections to protect from mortar droppings.
2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
3. Immediately remove mortar in contact with exposed stone and other surfaces.
4. Clean mortar splatters from scaffolding at end of each day.

D. Beginning restoration constitutes Contractor’s acceptance of substrates and conditions.

3.2 STONE REMOVAL AND REPLACEMENT

A. At locations indicated, remove stone that has deteriorated or is damaged beyond correction. Carefully demolish or remove entire units from joint to joint, without damaging surrounding stone, in a manner that permits replacement with full-size units.

B. Support and protect remaining stonework that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing stone or unit masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Clean stone surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

E. Replace removed damaged stone with new stone matching existing stone, including size.

F. Install replacement stone into bonding and coursing pattern of existing stone. If cutting is required, use a motor-driven saw designed to cut stone with clean, sharp, unchipped edges. Finish edges to blend with appearance of edges of existing stone.

1. Maintain joint width for replacement stone to match existing joints.
2. Use setting buttons or shims to set stone accurately spaced with uniform joints.

G. Set replacement stone with completely filled bed, head, and collar joints. Butter vertical joints for full width before setting and set units in full bed of mortar unless otherwise indicated. Replace existing anchors with new anchors of size and type indicated.

1. Tool exposed mortar joints in restored areas to match joints of surrounding existing stonework.

2. Rake out mortar used for laying stone before mortar sets and point new mortar joints in restored area to comply with requirements for repointing existing stone, and at same time as repointing of surrounding area.

3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

H. Curing: Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

3.3 PARTIAL STONE REPLACEMENT

A. Remove defective portion of existing stone unit (backing stone). Carefully remove defective portion of stone by making vertical and horizontal saw cuts at face of backing stone and demolishing defective material to depth required for fitting partial replacement (dutchman).

1. Make edges of backing stone at cuts smooth and square to each other and to finished surface; essentially rectangular. Make back of removal area flat and parallel to stone face.

2. Do not overcut at corners and intersections. Hand trim to produce clean sharp corners with no rounding and no damage to existing work to remain.

3. If existing stone that is to remain becomes damaged, remove damaged area and enlarge partial replacement as required.

B. Remove mortar from joints that abut area of stone removal to same depth as stone was removed. Remove loose mortar particles and other debris from surfaces to be bonded and surfaces of adjacent stone units that will receive mortar by cleaning with stiff-fiber brush.

C. Cut and trim partial replacement to accurately fit area where material was removed from backing stone. Fabricate to size required to produce joints between partial replacement and backing stone of no more than 1/16 inch in width, and joints between partial replacement and other stones that match existing joints between stones.

D. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of backing stone and partial replacement, completely filling all crevices and voids.

E. Apply partial replacement while adhesive is still tacky and hold securely in place until adhesive has cured. Use shims, clamps, wedges, or other devices as necessary to align face of partial replacement with face of backing stone.

F. Clean adhesive residue from exposed surfaces and patch chipped areas.

3.4 STONE PLUG RESTORATION

A. Remove cylindrical piece of damaged stone by core-drilling perpendicular to stone surface.

B. Prepare a replacement plug by core-drilling replacement stone. Use a drill sized to produce a core that will fit into hole drilled in damaged stone with only minimum gap necessary for adhesive.

C. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of existing stone and plug, completely filling all crevices and voids.

D. Apply plug while adhesive is still tacky and hold securely in place until adhesive has cured.

E. Clean adhesive residue from exposed surfaces.

3.5 CRACK INJECTION

A. General: Comply with cementitious crack-filler manufacturer's written instructions.

B. Drill 1/4-inch-diameter injection holes as follows:

1. Transverse Cracks Less Than 3/8 inch Wide: Drill holes through center of crack at 12 to 18 inches o.c.
2. Transverse Cracks More Than 3/8 inch Wide: Drill holes through center of crack at 18 to 36 inches o.c.

3. Delaminations: Drill holes at approximately 18 inches o.c. both vertically and horizontally.
4. Drill holes 2 inches deep. Where possible drill holes in mortar joints.

C. Clean out drill holes and cracks with compressed air and water. Remove dirt and organic matter, loose material, sealants, and failed crack restoration materials.

D. Place plastic injection ports in drilled holes and seal face of cracks between injection ports with clay or other nonstaining, removable plugging material. Leave openings at upper ends of cracks for air release.

E. Inject cementitious crack filler through ports sequentially, beginning at one end of area and working to opposite end; where possible, begin at lower end of injection area and work upward. Inject filler until it extrudes from adjacent ports. After port has been injected, plug with clay or other suitable material and begin injecting filler at adjacent port, repeating process until all ports have been injected.

F. Clean cementitious crack filler from face of stone before it sets by scrubbing with water.

G. After cementitious crack filler has set, remove injection ports, plugging material, and excess filler. Patch injection holes and surface of cracks.

3.6 FLASHING

A. General: Install embedded flashing in stone at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare stone surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

3.7 CLEANING STONE, GENERAL

A. Proceed with cleaning in an orderly manner; work from bottom to top of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

B. Use only those cleaning methods indicated for each stone material and location.

1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.

2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage stone.

   a. Equip units with pressure gages.

3. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.

4. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.

5. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F at flow rates indicated.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging stone surfaces.

D. Water Application Methods:

1. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches from surface of stone and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

E. Chemical-Cleaner Application Methods: Apply chemical cleaners to stone surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush or spray application. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

F. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.

1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

G. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.8 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from stone surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil or debris from open joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar.

1. Carefully remove heavy accumulations of material from surface of stone with sharp chisel. Do not scratch or chip stone surface.

3.9 CLEANING STONEWORK

A. Hot-Water Wash: Use hot water applied by low-pressure spray.

B. Detergent Cleaning:

1. Wet stone with hot water applied by low-pressure spray.

2. Scrub stone with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that stone surface remains wet.

3. Rinse with hot water applied by low-pressure spray to remove detergent solution and soil.

4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

C. Mold, Mildew, and Algae Removal:

1. Wet stone with hot water applied by low-pressure spray.

2. Apply mold, mildew, and algae remover by brush or low-pressure spray.

3. Scrub stone with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing. Use small brushes for mortar joints and crevices. Dip brush in mold, mildew, and algae remover often to ensure that adequate fresh cleaner is used and that stone surface remains wet.

4. Rinse with hot water applied by low-pressure spray to remove mold, mildew, and algae remover and soil.

5. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

D. Nonacidic Gel Chemical Cleaning:

1. Wet stone with water applied by low-pressure spray, if recommended by manufacturer.

2. Apply nonacidic gel cleaner in 1/8-inch thickness by brush, working into joints and crevices. Apply quickly and do not brush out excessively so area will be uniformly covered with fresh cleaner and dwell time will be uniform throughout area being cleaned.

3. Let cleaner remain on surface for period indicated below:

    a. As recommended by chemical-cleaner manufacturer.
    b. As established by mockup.

4. Remove bulk of nonacidic gel cleaner by squeegeeing into containers for disposal.

5. Rinse with hot water applied by low-pressure spray to remove chemicals and soil.

6. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once.

E. Nonacidic Liquid Chemical Cleaning:

1. Wet stone with hot water applied by low-pressure spray, if recommended by manufacturer.

2. Apply cleaner to stone by brush or low-pressure spray. Let cleaner remain on surface for period indicated below:

    a. As recommended by chemical-cleaner manufacturer.
    b. As established by mockup.

3. Rinse with hot water applied by medium-pressure spray to remove chemicals and soil.

4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once.

3.10 REPOINTING STONEWORK

A. Rake out and repoint joints to the following extent:

1. All joints in areas indicated.
2. Joints where mortar is missing or where they contain holes.
3. Cracked joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.027 inch thick.
4. Cracked joints where cracks are 1/8 inch or more in width and of any depth.
5. Joints where they sound hollow when tapped by metal object.
6. Joints where they are worn back 1/4 inch or more from surface.
7. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
8. Joints where they have been filled with substances other than mortar.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth of joint width plus 1/8 inch, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar.

2. Remove mortar from stone surfaces within raked-out joints to provide reveals with square backs and to expose stone for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.

3. Do not spall edges of stone units or widen joints. Replace or patch damaged stone units as directed by Architect.

    a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders without Architect's written approval.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose stone, rotted wood, rusted metal, and other deteriorated items.

E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.

2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing stone has worn or rounded edges, slightly recess finished mortar surface below face of stone to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed stone surfaces or to featheredge the mortar.

4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.

5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

    a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.

    b. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

F. Where repointing work precedes cleaning of existing stone, allow mortar to harden at least 30 days before beginning cleaning work.

3.11 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed stone surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

B. Wash adjacent woodwork and other nonstone surfaces. Use detergent and soft brushes or cloths.

C. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

END OF SECTION 04 01 40

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Concrete building brick.
3. Decorative concrete masonry units.
4. Building (common) brick.
5. Mortar and grout.
6. Masonry-joint reinforcement.
7. Ties and anchors.
8. Miscellaneous masonry accessories.
9. Water-repellent treatment.

B. Products Installed but not Furnished under This Section:

1. Steel lintels in unit masonry.
2. Cavity wall insulation.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).
B. NRC: Noise Reduction Coefficient.
C. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. CMUs.
2. Concrete building brick.
3. Building (common) brick.
4. Portland cement.
5. Hydrated lime.
6. Portland cement-lime mix.
7. Mortar pigments.
8. Colored cement products.
9. Aggregate for mortar.
10. Aggregate for grout.
11. Uncoated-steel reinforcing bars.
12. Low-alloy steel reinforcing bars.
13. Reinforcing bar positioners.
14. Masonry-joint reinforcement for single-wythe masonry.
15. Masonry-joint reinforcement for multiwythe masonry.
16. Individual wire ties.
17. Anchors for connecting CMU to existing masonry.
18. Anchors for connecting veneer to existing concrete or masonry, spiral type.
19. Joint stabilization anchors.
20. Adjustable masonry-veneer anchors.
21. Top-of-wall wind clips.
22. Top-of-wall concealed wind anchors.
23. Adhesives, primers, and seam tapes for flashings.
24. Proprietary cleaner.
25. Water-repellent treatment.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below, otherwise submit full Product Data for the following:

1. Integral water repellent.
2. Pre-faced CMUs.
3. Sound-absorbing CMUs.
4. Water-repellent admixture.
5. Flexible flashing.
6. Termination bars for flexible flashing.
7. Compressible filler.
8. Preformed control-joint gaskets.
9. Weep/cavity vent products.
10. Cavity drainage material.

C. Shop Drawings: For the following:

1. Concrete Masonry Control Joint Layout Plans: Show all concrete masonry unit control joint locations, at minimum 1/8 inch = 1 ft. scale.

   a. For each joint, indicate type of control joint; i.e., at columns, indicate if joint is provided by the masonry grouted into the column web, or by a joint-stabilization anchor.

   b. Indicate control joint location and type in accordance with the typical masonry plan details shown on the Drawings and as specified.

D. Samples for Initial Selection:

1. Decorative CMUs, in the form of small-scale units.
2. Pre-faced CMUs, in the form of small-scale units.
3. Colored mortar.

E. Samples for Verification: For each type and color of the following:

1. Decorative CMUs.
2. Pre-faced CMUs.
3. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

1.7 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of the following:

1. Masonry units.

   a. Include material test reports substantiating compliance with requirements.
   b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
   c. For exposed brick, include test report for efflorescence according to ASTM C67.
   d. For masonry units, include data and calculations establishing average net-area compressive strength of units.

2. Integral water repellent used in CMUs.

3. Cementitious materials. Include name of manufacturer, brand name, and type.

4. Water-repellent admixture used in mortar.

5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

6. Grout mixes. Include description of type and proportions of ingredients.

7. Reinforcing bars.

8. Low-alloy steel reinforcing bars.

9. Joint reinforcement.

10. Anchors, ties, and metal accessories.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

C. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602.

1.8 QUALITY ASSURANCE

A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 01 Section "Quality Requirements".

1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 48 inches long by 48 inches high.

2. Build sample panels facing south.

3. Where masonry is to match existing, build panels adjacent and parallel to existing surface.

4. Clean one-half of exposed faces of panels with masonry cleaner indicated.

5. Protect approved sample panels from the elements with weather-resistant membrane.

6. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.

a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

7. Demolish and remove sample panels when directed by Architect.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups for typical exterior wall in sizes approximately 96 inches long by 96 inches high by full thickness, including face and backup wythes, air barrier, reinforcement, insulation, cavity drainage material, and weeps.

a. Include a sealant-filled joint at least 16 inches long in mockup.

b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.

c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).

2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.

3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.

4. Apply water-repellent treatment to unpainted exposed CMU, if requested by Architect.

5. Protect accepted mockups from the elements with weather-resistant membrane.

6. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.

a. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.10 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.

2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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.

2.2 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide bullnose units for outside corners unless otherwise indicated.

B. Integral Water Repellent: Provide units made with integral water repellent for exterior exposed units and where indicated.

1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E514/E514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.

a. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

1) GCP Applied Technologies, Inc.; Dry-Block Block Admixture.
2) Master Builders Solutions Admixtures US, LLC; MasterPel 240.

C. CMUs: ASTM C90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
2. Density Classification: Lightweight unless otherwise indicated.
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
4. Exposed Faces: Provide uniform fine texture units suitable for painting.
5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.5 MASONRY LINTELS

A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.

3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.

4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Building (Common) Brick: ASTM C62, Grade SW.

1. Size: Match size of face brick.
2. Application: Use where brick is indicated for concealed locations.

2.7 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.

E. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Formulate blend as required to produce color indicated.

a. Color: As selected from manufacturer's standard colors.

2. Pigments shall not exceed 10 percent of portland cement by weight.

F. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

G. Aggregate for Grout: ASTM C404.

H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

1. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

a. GCP Applied Technologies, Inc.; Dry-Block Mortar Admixture.
b. Master Builders Solutions Admixtures US, LLC; MasterPel 240MA.

I. Water: Potable.

2.8 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

B. Low-Alloy Steel Reinforcing Bars: Where reinforcement is to be welded, provide reinforcing bars meeting ASTM A706/A706M, deformed.

C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (9 gage) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; Wire Rebar Positioner (376).
    b. Hohmann & Barnard, Inc.; RB Rebar Positioners or RB-Twin Rebar Positioners.
    c. Wire-Bond; Figure 8 Rebar Positioners.

D. Masonry-Joint Reinforcement, General: ASTM A951/A951M.

1. Interior Walls: Hot-dip galvanized carbon steel.
2. Exterior Walls: Stainless steel.
3. Wire Size for Side Rods: 0.148-inch diameter (9 gage).
4. Wire Size for Cross Rods: 0.148-inch diameter (9 gage).
5. Wire Size for Veneer Ties: 0.187-inch diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

E. Masonry-Joint Reinforcement for Single-Wythe Masonry: Horizontal ladder or truss type with single pair of side rods.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; Ladder-Type Masonry Wall Reinforcement (1100).
    b. Hohmann & Barnard, Inc.; 220 Ladder Mesh Reinforcement or 120 Truss-Mesh.
    c. Wire-Bond; Series 200 Ladder Mesh or 300 Truss Mesh 2 Wire.

F. Masonry-Joint Reinforcement for Multiwythe Masonry:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Hohmann & Barnard, Inc.; 270 Ladder or 170 Truss Eye-Wire.
    b. Wire-Bond; Series 800 Ladder or 900 Truss Level-Eye (Hook & Eye).

2.9 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
2. Stainless Steel Wire: ASTM A580/A580M, Type 304.
3. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
4. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.
5. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; Double Eye Rod Anchor (262) and Double Pintle Tie (263).
   b. Hohmann & Barnard, Inc.; Adjustable Wall Ties (Pintles & Eyes).

2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.

3. Wire: Fabricate from 3/16-inch-diameter, stainless steel wire.

D. Anchors for Connecting CMU to Existing Masonry: Corrugated strips formed from 0.062-inch-thick (16 gage) stainless-steel sheet, 1-1/4 inch wide, with 1-1/2 inch bend.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; #187 Hole-Type Brick Veneer Anchor.
   b. Wire-Bond; #2501 Veneer Anchor Corrugated.

E. Anchors for Connecting Veneer to Existing Concrete or Masonry, Spiral Type: Stainless steel spiral rods for anchoring veneer to existing walls; driven-in anchors for installation in drilled holes, relying on screw effect, rather than adhesive to secure veneer to backing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; Helix Remedial Tie (391).
   b. Hohmann & Barnard, Inc.; Spira-Lok.

F. Joint Stabilization Anchors: Provide anchors that bond masonry walls across expansion and control joints while allowing lateral movement, made from stainless-steel.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; Control Joint Anchor (353).
b. Hohmann & Barnard, Inc.; Slip-Set Stabilizer.
c. Wire-Bond; #1700 Control Joint Anchor.

G. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.

2. Fabricate wire ties from 0.187-inch- diameter, stainless steel wire unless otherwise indicated.

3. Screw-Attached, Thermally-Isolated, Masonry-Veneer Anchors: Wire tie and a corrosion-resistant, self-drilling, barrel screw designed to receive wire tie. Barrel has gasketed washer head that covers hole in insulation.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; Original Pos-I-Tie Veneer Anchoring Clip (75), Pos-I-Tie ThermalClip (75TC), and Pintle Wire Tie for ThermalClip (282-N).

2) Hohmann & Barnard, Inc.; Thermal 2-Seal Wing Nut Anchor and Adjustable Wall Ties (pintle).

3) Wire-Bond; #4522 SureTie WS, #4590 Thermal Grip Washer, and #4515 SureTie Double Hook.

H. Top-of-Wall Wind Clips: Provide bent, galvanized steel plate clips as detailed on Drawings.

I. Top-of-Wall Concealed Wind Anchors: Provide hot dip galvanized steel anchors with a deflection sleeve as detailed on Drawings.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; #419 Pin Type Stabilizing Wall Anchor (419) with Plastic Tube (421).
b. Hohmann & Barnard, Inc.; Partition Top Anchor, PTA 420 HS with PTA Tube.
c. Wire-Bond; PTA #4301 Partition Top Anchor with PTA tube.

2.10 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing: Use the following unless otherwise indicated:

1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth/polymer fabric; non-asphaltic type. Use only where flashing is fully concealed in masonry.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Advanced Building Products, Inc.; Copper Sealtite 2000.
2) Wire-Bond; Copper Seal (Copper Fabric Flashing) #4140.
3) York Manufacturing, Inc.; Multi-Flash 500.

B. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Mortar Net Solutions; BlockFlash or comparable product.

C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

D. Termination Bars for Flexible Flashing: Stainless steel bars not less than 1/8 inch by 1 inch.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; Termination Bar (1050).
b. Hohmann & Barnard, Inc.; T1 - Termination Bar.
c. Wire-Bond; #4200 Termination Bar.

2.11 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Hohmann & Barnard, Inc.; NS – Closed Cell Neoprene Sponge.
b. Wire-Bond; #3300 Expansion Joint.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Hohmann & Barnard, Inc.; RS Series – Rubber Control Joint.
b. Wire-Bond; Rubber Control Joint.

C. Weep/Cavity Vent Products: Use the following unless otherwise indicated:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Advanced Building Products, Inc.; Mortar Maze Weep Vents.
2) Heckmann Building Products Inc., Div. of Mechanical Plastics Corp.; Cell Vent (85).
3) Hohmann & Barnard, Inc.; QV – Quadro-Vent.
4) Wire-Bond; #3601 Cell Vent.

D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Hohmann & Barnard, Inc.; Mortar Trap or Mortar Web.
b. Mortar Net Solutions; WallDefender.
c. Wire-Bond; Cavity Net DT or Cavity Net.

2. Configuration: Provide one of the following:

a. Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.

b. Strips, not less than 3/4 inch thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.

2.12 MASONRY CLEANERS

A. Proprietary Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Prosoco, Inc.

2.13 WATER-REPELLENT TREATMENTS

A. Water-Repellent Treatment: Clear, penetrating water-repellent treatment compatible with, and intended for use with, CMUs containing integral water repellent and mortar with water-repellent admixture.

2.14 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime mortar unless otherwise indicated.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For concrete masonry unit backup in exterior walls, masonry bearing walls, shear walls and masonry below grade or in contact with earth, use Type S. Not for use in masonry veneer construction.

2. Use Type N mortar in all masonry veneer construction and in all masonry construction other than noted in the requirements for Type S mortar above.

D. Pigmented Mortar: Use colored cement product.

1. Application: Use pigmented mortar for exposed mortar joints with the following units:

    a. Decorative CMUs.
    b. Pre-faced CMUs.

E. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C476, Table 1.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that foundations are within tolerances specified.
2. Verify that reinforcing dowels are properly placed.
3. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten top-of-wall wind clips to structure above. Grout cells of CMUs solidly and space clips four feet on center maximum or as indicated on Drawings.
3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

E. Cut joints flush where indicated to receive air barriers unless otherwise indicated.

3.6 CAVITY WALLS

A. Bond wythes of cavity walls together using one of the following methods:

1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

a. Use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties.

2. Adjustable Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity.

C. Install air barrier system to comply with Division 07 Section “Fluid-Applied Membrane Air Barriers.”

D. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation, air barrier, and masonry.

3.7 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in parapet walls.

3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 2 inches wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry with anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally.

3.9 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

1. Locate joints as indicated on Drawings; if not indicate, locate vertical joints not more than 20 feet o.c. for expansion joints in masonry veneer and 24 feet o.c. for control joints in concrete masonry.

B. Form control joints in concrete masonry as follows:

1. Install preformed control-joint gaskets designed to fit standard sash block.
2. At steel columns, construct control-joint according to Drawings.

C. Form expansion joints in brick as follows:

1. Build in compressible joint fillers where indicated.

2. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.10 LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.11 FLASHING, WEEP HOLES, AND CAVITY VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 12 inches, and at least 6 inches above the top of cavity drainage material or to height as recommended by cavity drainage material manufacturer. Fasten upper edge of flexible flashing to inner wythe through termination bar.

3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 12 inches, and at least 6 inches above the top of the cavity drainage material or to height as recommended by cavity drainage material manufacturer. Fasten upper edge of flexible flashing to sheathing through termination bar.

4. Apply a continuous bead of compatible sealant to the top of the termination bar.

5. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

6. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

D. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/cavity vent products to form weep holes.
2. Space weep holes 24 inches o.c. unless otherwise indicated.

E. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

F. Install cavity vents in head joints in exterior wythes at 24 inches o.c. unless otherwise indicated. Use specified weep/cavity vent products to form cavity vents.

1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.12 REINFORCED UNIT MASONRY

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.13 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections according to Level 2 in TMS 402.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C67 for compressive strength.

F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.

G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.

H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

I. Reinforcement Inspections: Inspect reinforcement for size and placement.

J. Grout and Mortar Inspection: Inspect grout and mortar mixing operations to ensure mix proportions and procedures comply with specified requirements.

K. Tie and Anchor Inspections: Inspect ties and anchors for type, spacing, and proper installation.

L. Flashing and Accessories Inspections: Inspect flashing and accessories for type and proper installation.

M. Cold-Weather and Hot-Weather Inspections: Inspect masonry construction operations for compliance with specified cold-weather and hot-weather procedures.

3.14 CORRECTING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

7. Clean masonry with a proprietary cleaner applied according to manufacturer's written instructions.

3.15 WATER-REPELLENT TREATMENT APPLICATION

A. Preparation: Allow CMU installation to age before application of water-repellent treatment, according to repellent manufacturer's written instructions.

B. Cleaning: Before application of water-repellent treatment, clean substrate of substances that could impair penetration or performance of product according to water-repellent treatment manufacturer's written instructions.

C. Proceed with application only when existing and forecasted weather and substrate conditions permit water-repellent treatments to be applied according to manufacturers' written instructions.

D. Apply water-repellent treatment on surfaces to be treated in accordance with manufacturer’s written instructions for application procedure unless otherwise indicated.

END OF SECTION 04 20 00

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following cold-formed metal framing ("CFMF") elements:

1. Exterior load-bearing wall framing.
2. Exterior non-load-bearing wall framing.
3. Soffit framing.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads and all combinations of these loads, as required by applicable codes and as specified on Drawings, within limits and under conditions indicated.

1. Design Loads: As indicated on Drawings.

   a. Dead Loads: Weights of materials and construction.

2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

   a. Exterior Non-Load-Bearing Framing: Horizontal deflection of the wall height of 1/240 for metal wall panels.
   b. Soffit Framing: Vertical deflection of 1/240 of the span.

3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.

4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

    a. Upward and downward movement of 3/4 inch.

C. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."

1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."
2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

D. Minimum Thickness and Maximum Spacing Requirements: Comply with the requirements of this specification for specific requirements for minimum thickness and maximum spacing for cold-formed metal framing components.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer (licensed in the State of New York) responsible for their preparation certifying that the design is in compliance with the Building Code of New York.

B. Cold-formed Metal Framing Installer Qualifications: At least 5 years' experience in construction of cold-formed metal framing systems similar in scope to application shown on Documents with record of successful in-service performance for prior projects.

C. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

E. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Deliver materials and components to Site in manufacturer's unopened packages, containers, or bundles, fully identified with brand name, type, grade and identification of manufacturer or supplier.

B. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

C. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

1. AllSteel Products, Inc.
2. ClarkWestern Building Systems, Inc.
3. Dietrich Metal Framing; a Worthington Industries Company.
4. MarinoWare; a division of Ware Industries.
5. MBA Building Supplies, Inc.
6. Super Stud Building Products, Inc.
7. United Metal Products, Inc.
8. Telling Industries, LLC.

2.2 MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: As required by structural performance.
2. Coating: G60, A60, AZ50, or GF30.

2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 33 mils standard.
2. Minimum Flange Width: 1-5/8 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 33 mils or at least matching steel studs.
2. Minimum Flange Width: 1-1/4 inches.

C. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: 54 mils.
2. Flange Width: 2 inches plus the design gap for 1-story structures and 2 inches plus twice the design gap for other applications

D. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:

    a. Minimum Base-Metal Thickness: 54 mils.
    b. Flange Width: 1 inch plus the design gap for 1-story structures.

2. Inner Track: Of web depth indicated, and as follows:

    a. Minimum Base-Metal Thickness: 54 mils.
    b. Flange Width: Insert dimension equal to sum of outer deflection track flange width plus 1 inch.

2.4 SOFFIT FRAMING

A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 33 mils.
2. Minimum Flange Width: 2 inches.

2.5 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers, knee braces, and girts.
9. Joist hangers and end closures.
10. Hole reinforcing plates.
11. Backer plates.

2.6 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating weight matching associated member.

B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E1190 conducted by a qualified independent testing agency.

E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A780.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C1107, with fluid consistency and 30-minute working time.

C. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.8 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.

2. Cut framing members by sawing or shearing; do not torch cut.

3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

5. Splices in axially loaded members not acceptable.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

D. Touch-up all welds with galvanizing primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions", manufacturer's written instructions, Drawings, and approved Shop Drawings unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.

2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Install insulation, specified in Division 07 Section "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to bottom track, unless otherwise indicated. Space studs as follows:

1. Maximum Stud Spacing: 16 inches.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deflection tracks and anchor to building structure. Do not fasten studs to deflection track.
2. Install double deep-leg deflection tracks and anchor outer track to building structure. Do not fasten tracks together.

E. Install headers and sills for wall openings wider than stud spacing. Locate headers and sills at openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on approved Shop Drawings. Fasten jamb members together to uniformly distribute loads.

2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

F. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

   a. Install solid blocking at centers indicated on approved Shop Drawings.

2. Bridging may be one of the following types:

   a. Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.

   b. Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

   c. Proprietary bridging bars installed according to manufacturer's written instructions.

G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports. Contractor to provide access to construction for inspections to verify conformance with provisions of Contract Documents and approved Shop Drawings. Inspections to include but not limited to, the following:

1. Verify member sizes, configuration and spacing.
2. Inspect screwed and welded connections.
3. Inspect weld quality.
4. Verify field welder’s certification.
5. Verify galvanizing primer has been applied to all welds and damaged galvanized surfaces.
6. Verify compliance with details shown on approved drawings such as bracing, stiffening, member location, and proper application of joint details at each connection.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 CORECTIONS AND PROTECTION

A. Galvanizing Repairs: Prepare and correct damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
2. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section:

1. Loose steel lintels.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Non-shrink Grout.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 COORDINATION

A. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Steel Channels and Angles: ASTM A 572/A 572M, Grade 50.
B. Steel Plates and Bars: ASTM A36/A36M.
C. W-Shapes: ASTM A 992/A 992M.
D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

2.3 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Primer:

1. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with ASTM A780/A780M and compatible with paints specified to be used over it.

D. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

2.6 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches unless otherwise indicated.

2.7 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.8 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Finish metal fabrications after assembly.
C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.9 STEEL AND IRON FINISHES

A. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to Division 09 Section “High Performance Coatings”.

1. For galvanized surfaces noted to be painted, comply with ASTM D6386, “Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting”.

B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Metal Fabrications: For all iron and steel items (except those noted below), shop prime with alkyd primer.
2. Exterior Wall Metal Fabrications: For all iron and steel items occurring in exterior walls, shop prime with urethane primer.

D. Shop Priming: Immediately after surface preparation, apply one coat of primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness as listed below. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

D. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

F. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
C. Install slotted channel framing with manufacturer recommended fasteners and fittings and follow manufacturer recommended instructions.

3.3 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and restore galvanizing to comply with ASTM A780.

END OF SECTION 05 50 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood-preservative-treated lumber.
2. Fire-retardant-treated materials, including plywood backing panels.
3. Miscellaneous lumber (non-treated).

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Wood-Preservative-Treated Lumber: Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

2. Fire-Retardant-Treated Materials:

a. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

b. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.

c. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5516.

3. Dimension lumber framing (non-treated).

4. Metal framing anchors.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

E. Application: Treat items indicated on Drawings, and the following:

1. Wood nailers, blocking, and similar members in connection with flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
3. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.

2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.

3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.

4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664 and design value adjustment factors shall be calculated according to ASTM D6841.

C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Dimension Lumber Items: Construction or No. 2 grade.

1. Species:

a. Hem-fir (north); NLGA.
b. Southern pine; SPIB.
c. Douglas fir-larch; WCLIB or WWPA.
d. Spruce-pine-fir; NLGA.
e. Douglas fir-south; WWPA.
f. Hem-fir; WCLIB or WWPA.
g. Douglas fir-larch (north); NLGA.
h. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

G. Application: Treat items indicated on Drawings, and the following:

1. Concealed blocking.
2. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER (NON-TREATED)

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Furring.
4. Grounds.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine or southern pine; No. 3 grade; SPIB.
2. Hem-fir or hem-fir (north); Standard or No. 3 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir; Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC193 as appropriate for the substrate.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2.

2.6 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cleveland Steel Specialty Company.
2. Simpson Strong-Tie Company Inc.

B. Allowable design loads, as published by manufacturer, shall meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

E. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.

1. Use for exterior locations and where indicated.

2.7 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

G. Do not splice structural members between supports unless otherwise indicated.

H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

I. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

J. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

K. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.10.1, "Fastening Schedule," in New York State Building Code.
2. ICC-ES evaluation report for fastener.

L. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

1. Provide 1/4-inch vent space between each length of blocking.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 INSTALLATION OF WOOD FURRING

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

END OF SECTION 06 10 00

SECTION 06 20 23 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior trim.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

1. Interior trim.

B. Sustainable Design Submittals:

1. Product Data: For composite wood products, indicating that product contains no urea formaldehyde.
2. Product Data: For installation adhesives, indicating VOC content.

C. Samples:

1. Lumber for Transparent Finish (Stain or Clear Finish): Not less than 5 inches wide by 12 inches long, for each species and cut, finished on one side and one edge.

a. Finish: Comply with Division 09 Section “Painting.”

2. Panel Products with Factory-Applied Finish: 12 by 12 inches.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.

1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
2. Provide for air circulation around stacks and under coverings.

B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber, mark grade stamp on end or back of each piece.

B. Softwood Plywood: DOC PS 1.

2.2 INTERIOR TRIM

A. Lumber Trim for Opaque Finish (Painted Finish):

1. Species and Grade:

a. Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA D Select (Quality).

2. Maximum Moisture Content for Softwoods: with at least 85 percent of shipment at 12 percent or less.

3. Finger Jointing: Not allowed.

4. Face Surface: Surfaced (smooth).

B. Moldings for Opaque Finish (Painted Finish): Made to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."

1. Softwood Moldings: MMPA WM 4, P grade.

a. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
b. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.

2. Finger Jointing: Not allowed.

2.3 MISCELLANEOUS MATERIALS

A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

B. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

1. Verify adhesives have a VOC content of 70 g/L or less.

2.4 FABRICATION

A. Back out or kerf backs of the following members, except those with ends exposed in finished work:

1. Interior standing and running trim, except shoe and crown molds.

B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.

B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.

1. Use concealed shims where necessary for alignment.

2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 INSTALLATION OF INTERIOR TRIM

A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.

1. Do not use pieces less than 24 inches long, except where necessary.
2. Stagger joints in adjacent and related standing and running trim.
3. Cope at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
4. Use scarf joints for end-to-end joints.
5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
6. Install trim after gypsum-board joint finishing operations are completed.
7. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
8. Fasten to prevent movement or warping.
9. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements.

1. Interior finish carpentry may be restored or refinished if work complies with requirements and shows no evidence of restoration or refinishing.

B. Adjust joinery for uniform appearance.

3.6 CLEANING

A. Clean interior finish carpentry on exposed and semiexposed surfaces.
B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

3.7 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 06 20 23

SECTION 07 19 00 - WATER REPELLENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes penetrating water-repellent treatments for the following vertical surfaces:

1. Clay brick masonry.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's printed statement of VOC content. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.

1. Water-based, silane/siloxane-blend, penetrating water repellent.

1.5 INFORMATIONAL SUBMITTALS

A. Preconstruction Test Reports: For water-repellent-treated substrates.

1.6 QUALITY ASSURANCE

A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.

1.7 MOCKUPS

A. Prepare mockups of water repellent on each type of substrate required to demonstrate aesthetic effects, for preconstruction testing, and to set quality standards for materials and execution.

1. Locate mockups on existing surfaces planned to receive water repellent in locations in existing walls where directed by Architect unless otherwise indicated.

    a. Size: Each mockup not smaller than 72 inches wide by 48 inches high.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing: Engage a qualified testing agency to perform preconstruction testing of water repellents on mockups.

1. In addition to verifying performance requirements, use mockups to verify manufacturer's written instructions for application procedure and optimum rates of product application to substrates.

    a. Test water absorption of mockups using the RILEM tube test method.

2. Notify Architect seven days in advance of the dates and times when mockups will be tested.

1.9 FIELD CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions, unless manufacturer’s written instructions require more stringent conditions:

1. Building has been closed in for not less than 30 days before treating wall assemblies.
2. Ambient temperature is above 40 deg F and below 100 deg F and will remain so for 24 hours.
3. Substrate is not frozen and substrate-surface temperature is above 40 deg F and below 100 deg F.
4. Rain or snow is not predicted within 24 hours.
5. Not less than 24 hours have passed since surfaces were last wet.
6. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS

A. Water-Based, Silane/Siloxane-Blend, Penetrating Water Repellent: Clear, water-based, silane and siloxane blend with 350 g/L or less of VOCs.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ChemMasters, Inc.; PowerSeal SS Plus.
b. Master Builders Solutions; MasterProtect H 107.
c. Pecora Corporation; Klere Seal 920-W.
d. Tnemec Company Inc.; Chemprobe Coating Systems, Series 633 Prime-A-Pell H2O.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer.

2. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.

3. Verify that required reconstruction is complete, cured, and dry before applying water repellent.

B. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. New Construction and Reconstruction: Allow cementitious materials to age before application of water repellent, according to repellent manufacturer's written instructions.

B. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions.

C. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live vegetation.

D. Coordination with Mortar Joints: Do not apply water repellent until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.

E. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

A. Apply coating of water repellent on surfaces to be treated using 15 psi-pressure spray with a fan-type spray nozzle to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Coverage Test: In the presence of Architect, hose down a dry, repellent-treated surface to verify complete and uniform product application. A change in surface color will indicate incomplete application.

1. Notify Architect seven days in advance of the dates and times when surfaces will be tested.
2. Reapply water repellent until coverage test indicates complete coverage.

3.5 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application, as approved by Architect.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION 07 19 00

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board.
2. Glass-fiber blanket.
3. Closed-cell spray polyurethane foam.
4. Insulation for miscellaneous voids.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Adhesive for bonding insulation.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below, otherwise submit full Product Data for the following:

1. Extruded polystyrene board, Type IV, 25-psi.
2. Glass-fiber blanket, unfaced.
3. Closed-cell spray polyurethane foam.
4. Insulation for miscellaneous voids.

C. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For closed-cell, spray polyurethane foam insulation.

1.6 QUALITY ASSURANCE

A. Spray Polyurethane Foam Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
B. Identification: Identify product R-values with manufacturer's markings, or certification, in accordance with requirements of building Code in effect for the Project.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Extruded Polystyrene Board, Type IV: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

a. DuPont; Styrofoam Brand Square Edge XPS Foam Insulation (Reduced GWP).
b. Owens Corning; Foamular NGX 250 Extruded Polystyrene (XPS) Insulation (Square Edge).

2. Thermal Resistance: R-value of 5.0 per inch.

3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

B. Extruded Polystyrene Board, Type IV, Geotextile-Faced Drainage Panels: ASTM C 578, Type IV, 25-psi minimum compressive strength; geotextile-faced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with one side having grooved drainage channels.

1. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

a. Owens Corning; Foamular NGX Insul-Drain XPSDrainage Board.
b. T. Clear Corporation; ThermaDry Insulating Drainage Panels Type 750.

2. Thermal Resistance: R-value of 9.4 for 2-inch thickness.

C. Extruded Polystyrene Board, Type VI: ASTM C 578, Type VI, 40-psi minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

a. DuPont; Styrofoam Brand Highload 40 psi Extruded Polystyrene Foam Insulation (Reduced GWP).
b. Owens Corning; Foamular NGX 400 Extruded Polystyrene (XPS) Rigid Foam Insulation (Square Edge).

2. Thermal Resistance: R-value of 5.0 per inch.

D. Extruded Polystyrene Board, Type V: ASTM C 578, Type VI, 100-psi minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

a. DuPont; Styrofoam Brand Highload 100 psi Extruded Polystyrene Foam Insulation (Reduced GWP).
b. Owens Corning; Foamular NGX 1000 Extruded Polystyrene (XPS) Insulation (Square Edge).

2. Thermal Resistance: R-value of 5.0 per inch.

2.2 GLASS-FIBER BLANKET

A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

a. CertainTeed Corporation; Sustainable Insulation Fiber Glass Building.
b. Owens Corning; EcoTouch Pink Fiberglas Insulation.

2.3 CLOSED-CELL SPRAY POLYURETHANE FOAM

A. Closed-Cell Spray Polyurethane Foam: ASTM C 1029, Type II, minimum density of 2 lb/cu. ft. and minimum aged R-value at 1-inch thickness of 6.2 deg F x h x sq. ft./Btu at 75 deg F.

1. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

    a. Gaco Western LLC; GacoWallFoam 183M.
    b. Lapolla Industries, Inc.; Foam-Lok 2000-4G.

2. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

    a. Flame-Spread Index: 25 or less.
    b. Smoke-Developed Index: 450 or less.

B. Miscellaneous Materials:

1. Primer: Material recommended by insulation manufacturer where required for adhesion of insulation to substrates.

2. Membrane at Transitions: Provide membrane at transitions in substrate and connections to adjacent elements acceptable to the spray polyurethane foam manufacturer.

3. Thermal Barrier Intumescent Coating: Intumescent water-based, spray-applied coating that has been tested and approved for use in a building interior as a 15-minute alternative thermal barrier complying with New York State Code and New York State VOC regulations. Use only products that have been tested and approved for use with spray polyurethane foam to be used; provide primer as required.

    a. Basis-of-Design Product: Subject to compliance with requirements, provide International Fireproof Technology, Inc.; DC315, or comparable product.

2.4 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Spray Polyurethane Foam Insulation for Miscellaneous Voids: ASTM C 1029, Type II, closed cell, minimum density of 1.75 lb/cu. ft. and minimum aged R-value at 1-inch thickness of 6.0 deg F x h x sq. ft./Btu at 75 deg F, with maximum flame-spread and smoke-developed indexes of 25 and 400, respectively, per ASTM E 84.

    a. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont; Froth-Pak Foam Insulation, or comparable product.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

1. Adhesives shall have a VOC content of 70 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of the Work.
B. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation, or that interfere with insulation attachment.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

E. Install insulation so that manufacturer’s R-value mark is readily observable, in accordance with requirements of building Code in effect for the Project.

3.3 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge surfaces, set extruded polystyrene board (Type IV, 25-psi) insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

B. On horizontal surfaces, loosely lay extruded polystyrene board (Type VI, 40-psi) insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. Where indicated, install extruded polystyrene board (Type V, 100-psi) insulation units.

3.4 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Spray Polyurethane Insulation for Miscellaneous Voids: Apply according to manufacturer's written instructions.

3.5 INSTALLATION OF SPRAY FOAM INSULATION

A. Verify that substrates are clean, dry, and free of substances that are harmful to insulation.

B. Priming: Prime substrates where recommended by insulation manufacturer. Apply primer to comply with insulation manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

C. Comply with insulation manufacturer's written instructions applicable to products and applications.

D. Prior to application, bridge gaps in construction at changes in substrate plane or changes in adjoining materials as recommended by manufacturer.

E. Spray insulation to envelop entire area to be insulated and fill voids.

F. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 27 26 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Vapor-retarding, fluid-applied air barriers.

1.3 DEFINITIONS

A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.

B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.

C. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.5 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products.

1. Accessory materials.

2. Primers.
3. Stainless-steel sheet.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below, otherwise submit full Product Data for the following:

1. High-build, vapor-retarding air barrier.

C. Shop Drawings: For air-barrier assemblies.

1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.
2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
3. Include details of interfaces with other materials that form part of air barrier.

1.7 INFORMATIONAL SUBMITTALS

A. Product Certificates, Compatibility: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.

B. Product Certificates, Fire Propagation Characteristics: From a qualified testing agency, documenting that air barrier system as a component of the indicated wall assembly has been tested and passed NFPA 285.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
B. Protect stored materials from direct sunlight.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E2357.

2.3 HIGH-BUILD AIR BARRIERS, VAPOR RETARDING

A. High-Build, Vapor-Retarding Air Barrier: Synthetic polymer membrane with an installed dry film thickness, according to manufacturer's written instructions, of 40 mils or thicker over smooth, void-free substrates.

1. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

    a. Carlisle Coatings & Waterproofing; Fire Resist Barritech NP.
    b. Henry Company; Air-Bloc 32MR.
    c. Meadows, W. R., Inc.; Air-Shield LSR.
    d. Tremco, Inc., Commercial Sealants and Waterproofing Division, an RPM company; ExoAir 130.

2. Physical and Performance Properties:

    a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E2178.
    b. Vapor Permeance: Maximum 0.1 perm; ASTM E96/E96M, Desiccant Method.
    c. Ultimate Elongation: Minimum300 percent; ASTM D412, Die C.
    d. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.4 ACCESSORY MATERIALS

A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.

C. Stainless-Steel Sheet: ASTM A240/A240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
3. Verify that substrates are visibly dry and free of moisture. Test concrete substrates for capillary moisture by plastic sheet method according to ASTM D4263.
4. Verify that masonry joints are flush and completely filled with mortar.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

H. Bridge isolation joints, expansion joints, and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 ACCESSORIES INSTALLATION

A. Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.

3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.

B. Connect and seal exterior wall air-barrier material continuously to 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, and other construction used in exterior wall openings, using accessory materials.

C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

1. Transition Strip: Roll firmly to enhance adhesion.

F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.

G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

H. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, transition strip.

I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counter flashings or ending in regrets with termination mastic.

J. Correct punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fish mouths and blisters. Patch with transition strips extending 6 inches beyond corrected areas in strip direction.

3.4 PRIMARY AIR-BARRIER MATERIAL INSTALLATION

A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.

1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.

B. High-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply air-barrier material in full contact around protrusions such as masonry ties.

1. Vapor-Retarding, High-Build Air Barrier: Total dry film thickness not less than 40 mils.

C. Do not cover air barrier until it has been tested and inspected by testing agency.

D. Correct deficiencies in or remove air barrier that does not comply with requirements; correct substrates and reapply air-barrier components.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.

B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.

2. Air-barrier dry film thickness.

3. Continuous structural support of air-barrier system has been provided.

4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.

5. Site conditions for application temperature and dryness of substrates have been maintained.

6. Maximum exposure time of materials to UV deterioration has not been exceeded.

7. Surfaces have been primed, if applicable.

8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.

9. Termination mastic has been applied on cut edges.

10. Strips and transition strips have been firmly adhered to substrate.

11. Compatible materials have been used.

12. Transitions at changes in direction and structural support at gaps have been provided.

13. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.

14. All penetrations have been sealed.

C. Tests: As determined by testing agency from among the following tests:

1. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D4541 for each 600 sq. ftf. of installed air barrier or part thereof.

D. Air barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
2. Remove and replace deficient air-barrier components for retesting as specified above.

E. Correct damage to air barriers caused by testing; follow manufacturer's written instructions.

F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after correcting and preparing the overexposed materials according to air-barrier manufacturer's written instructions.

2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION 07 27 26

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

B. Product Schedule: For each penetration firestopping system. Include type of penetration, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1.6 INFORMATIONAL SUBMITTALS

A. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly developed in accordance with current International Firestop Council (IFC) guidelines.

1.7 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approvals according to FM Approvals 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.10 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain joint firestop systems for each type of joint opening indicated from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.

2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Penetration firestop systems installed with products bearing the classification marking of a qualified product certification agency in accordance with listed system designs published by a qualified testing agency.

1) UL in its online directory "Product iQ."

2.3 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems are to be compatible with one another, with the substrates forming openings, and with penetrating items if any.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. 3M Fire Protection Products.
b. Hilti, Inc.
c. RectorSeal, a CSW Industrials company.

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479.

1. F-Rating: Not less than the fire-resistance rating of the wall penetrated.
2. Membrane Penetrations: Install recessed fixtures such that the required fire resistance will not be reduced.

C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479.

1. F-Rating: At least one hour, but not less than the fire-resistance rating of the floor penetrated.

D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.

E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.

F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

1. Permanent forming/damming/backing materials.
2. Substrate primers.
3. Collars.
4. Steel sleeves.

2.4 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric strips for use around combustible penetrants.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

H. Pillows/Bags: Compressible, removable, and reusable intumescent pillows encased in fire-retardant polyester or glass-fiber cloth. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

K. Fire-Rated Cable Sleeve Kits: Complete kits designed for new or existing cable penetrations through walls to accept standard accessories.

L. Thermal Wrap: Flexible protective wrap tested and listed for up to 2-hour fire ratings in accordance with ASTM E814/UL 1479 for membrane penetrations or ASTM E1725/UL 1724 for thermal barrier and circuit integrity protection.

M. Fire-Rated Cable Pathways: Single or gangable device modules composed of a steel raceway with integral intumescent material and requiring no additional action in the form of plugs, twisting closure, putty, pillows, sealant, or otherwise to achieve fire and air-leakage ratings.

N. Retrofit Device for Cable Bundles: Factory-made, intumescent, collar-like device for firestopping existing over-filled cable sleeves and capable of being installed around projecting sleeves and cable bundles.

O. Wall-Opening Protective Materials: Intumescent, non-curing putty pads or self-adhesive inserts for protection of electrical switch and receptacle boxes.

P. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use around rectangular steel HVAC ducts without fire dampers.

Q. Firestop Plugs: Flexible, re-enterable, intumescent, foam-rubber plug for use in blank round openings and cable sleeves.

R. Fire-Rated Cable Grommet: Molded two-piece grommet made of plenum-grade polymer and foam inner core for sealing small cable penetrations in gypsum walls up to 1/2 inch diameter.

S. Closet Flange Gasket: Molded, single-component, flexible, intumescent gasket for use beneath a water closet (toilet) flange in floor applications.

T. Endothermic Wrap: Flexible, insulating, fire-resistant, endothermic wrap for protecting membrane penetrations of utility boxes, critical electrical circuits, communications lines, and fuel lines.

2.5 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION OF PENETRATION FIRESTOPPING SYSTEMS

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.

5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Special Inspections are required for the work of this Section. Refer to Division 01 Section “Quality Requirements” and its attachments.

1. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to UL system numbers in its online directory "Product iQ” under product Category XHEZ.

B. For each location where a penetration occurs, provide a firestopping system selected from the floor and wall system below that complies with this Section and is suitable for the penetration conditions indicated for the Project.

FLOOR Firestopping Systems Listed Using the Alpha-Alpha-Numeric Identification System Published in UL's *Fire Resistance Directory*, Vols. 2a - 2b				
TYPE OF PENETRANT	FLOOR PENETRATION SYSTEMS (First Alpha Component = C or F)			
	Concrete Floors with a Minimum Thickness Less Than or Equal to 5 Inches (127 MM)	Concrete Floors with a Minimum Thickness OF MORE Than 5 Inches (127 MM)	Framed Floors	Floor-ceiling assemblies consisting of concrete with membrane protection
NO PENETRATING ITEMS	C-AJ-0001-0999 or F-A-0001-0999	C-BJ-0001-0999 or F-B-0001-0999	F-C-1001-1999	
METALLIC PIPE, CONDUIT, OR TUBING	C-AJ-1001-1999 or F-A-1001-1999	C-BJ-1001-1999, C-BK-1001-1999, or F-B-1001-1999	F-C-1001-1999	F-E-1001-1999
NONMETALLIC PIPE, CONDUIT, OR TUBING	C-AJ-2001-2999 or F-A-2001-2999	C-BJ-2001-2999, C-BK-2001-2999, or F-B-2001-2999	F-C-2001-2999	F-E-2001-2999
ELECTRICAL CABLES	C-AJ-3001-3999 or F-A-3001-3999	C-BJ-3001-3999, C-BK-3001-3999, or F-B-3001-3999	F-C-3001-3999	F-E-3001-3999
CABLE TRAYS WITH ELECTRICAL CABLES	C-AJ-4001-4999 or F-A-4001-4999	C-BJ-4001-4999 or F-B-4001-4999		
INSULATED PIPES	C-AJ-5001-5999	C-BJ-5001-5999,	F-C-5001-5999	F-E-5001-5999

FLOOR Firestopping Systems Listed Using the Alpha-Alpha-Numeric Identification System Published in UL's *Fire Resistance Directory*, Vols. 2a - 2b				
	FLOOR PENETRATION SYSTEMS (First Alpha Component = C or F)			
TYPE OF PENETRANT	Concrete Floors with a Minimum Thick-ness Less Than or Equal to 5 Inches (127 MM)	Concrete Floors with a Minimum Thick-ness OF MORE Than 5 Inches (127 MM)	Framed Floors	Floor-ceiling assem-blies consisting of concrete with mem-brane protection
	or F-A-5001-5999	C-BK-5001-5999, or F-B-5001-5999		
MISCELLANEOUS ELECTRICAL PENETRANTS	C-AJ-6001-6999 or F-A-6001-6999	C-BJ-6001-6999		
MISCELLANEOUS MECHANICAL PENETRANTS	C-AJ-7001-7999 or F-A-7001-7999	C-BJ-7001-7999 or F-B-7001-7999	F-C-7001-7999	F-E-7001-7999
GROUPINGS OF PENETRATIONS	C-AJ-8001-8999 or F-A-8001-8999	C-BJ-8001-8999 or F-B-8001-8999	F-C-8001-8999	F-E-8001-8999

WALL Firestopping Systems Listed Using the Alpha-Alpha-Numeric Identification System Published in UL's *Fire Resistance Directory*, Vols. 2a - 2b				
TYPE OF PENETRANT	Wall PENETRATION SYSTEMS (First Alpha Component = C or W)			
	Concrete or Masonry Walls with a Minimum Thickness Less Than or Equal to 8 Inches (203 MM)	Concrete or Masonry Walls with a Minimum Thickness OF MORE Than 8 Inches (203 MM)	Framed Walls	Composite panel walls
NO PENETRATING ITEMS	C-AJ-0001-0999, C-BJ-0001-0999, or W-J-0001-0999		W-L-000-1-0999	
METALLIC PIPE, CONDUIT, OR TUBING	C-AJ-1001-1999, C-BJ-1001-1999, or W-J-1001-1999	C-BK-1001-1999 or W-K-1001-1999	W-L-1001-1999	W-N-1001-1999
NONMETALLIC PIPE, CONDUIT, OR TUBING	C-AJ-2001-2999, C-BJ-2001-2999, or W-J-2001-2999	C-BK-2001-2999 or W-K-2001-2999	W-L-2001-2999	W-N-2001-2999
ELECTRICAL CABLES	C-AJ-3001-3999, C-BJ-3001-3999, or W-J-3001-3999	C-BK-3001-3999 or WK-3001-3999	W-L-3001-3999	
CABLE TRAYS WITH ELECTRICAL CABLES	C-AJ-4001-4999, C-BJ-4001-4999, or W-J-4001-4999	W-K-4001-4999	W-L-4001-4999	

WALL Firestopping Systems Listed Using the Alpha-Alpha-Numeric Identification System Published in UL's *Fire Resistance Directory*, Vols. 2a - 2b				
TYPE OF PENETRANT	Wall PENETRATION SYSTEMS (First Alpha Component = C or W)			
	Concrete or Masonry Walls with a Minimum Thickness Less Than or Equal to 8 Inches (203 MM)	Concrete or Masonry Walls with a Minimum Thickness OF MORE Than 8 Inches (203 MM)	Framed Walls	Composite panel walls
INSULATED PIPES	C-AJ-5001-5999, C-BJ-5001-5999, or W-J-5001-5999	C-BK-5001-5999	W-L-5001-5999	W-N-5001-5999
MISCELLANEOUS ELECTRICAL PENETRANTS	C-AJ-6001-6999, C-BJ-6001-6999, or W-BJ-6001-6999		W-L-6001-6999	
MISCELLANEOUS MECHANICAL PENETRANTS	C-AJ-7001-7999, C-BJ-7001-7999, or W-J-7001-7999		W-L-7001-7999	W-N-7001-7999
GROUPINGS OF PENETRATIONS	C-AJ-8001-8999, C-BJ-8001-8999, or W-J-8001-8999		W-L-8001-8999	

END OF SECTION 07 84 13

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Immersible joint sealants.
4. Mildew-resistant joint sealants.
5. Latex joint sealants.
6. Acoustical joint sealants.
7. Preformed joint seals.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

1. Cylindrical sealant backings.
2. Bond-breaker tape.
3. Primers.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below, otherwise submit full Product Data for the following:

1. Silicone joint sealants.
2. Mildew-resistant joint sealants.
3. Latex joint sealants.

C. Samples: Manufacturer's color charts showing the full range of colors available for each product exposed to view.

D. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

E. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.

1.5 MOCKUPS

A. Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content: Sealants and sealant primers shall comply with the following:

1. Architectural sealants shall have a VOC content of 250 g/L or less.
2. Sealants and sealant primers for nonporous surfaces shall have a VOC content of 250 g/L or less.
3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range. Multiple colors may be selected.

2.2 SILICONE JOINT SEALANTS

A. Silicone Joint Sealants: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Chemical Company (The); DOWSIL790 Silicone Building Sealant.
b. GE/Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
c. Pecora Corporation; 890NST.
d. Tremco Incorporated; Spectrem 1.

2. Joint-Sealant Application: Joints in vertical surfaces.

a. Exterior Joint Locations:

1) Construction joints in cast-in-place concrete.
2) Joints between plant-precast architectural concrete units.
3) Control and expansion joints in unit masonry.
4) Joints in dimension stone cladding.
5) Joints between metal panels.
6) Joints between different materials listed above.
7) Perimeter joints between materials listed above and frames of exterior openings.
8) Other joints as indicated.

b. Interior Joint Locations:

1) Control and expansion joints on exposed interior surfaces of exterior walls.
2) Perimeter joints of exterior openings.
3) Other joints as indicated.

2.3 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone Joint Sealants, Mildew Resistant: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Chemical Company (The); DOWSIL786 Silicone Sealant.
b. GE/Momentive Performance Materials Inc.; SCS1700 Sanitary.

2. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces.

a. Joint Sealant Location:

1) Tile control and expansion joints where indicated.
2) Other joints as indicated.

2.4 LATEX JOINT SEALANTS

A. Acrylic Latex Joint Sealants: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Pecora Corporation; AC-20 +Silicone.
b. Tremco Incorporated; Tremflex 834.

2. Joint-Sealant Application: Interior joints in vertical surfaces not subject to significant movement.

a. Joint Locations:

1) Vertical joints on exposed surfaces of interior unit masonry, concrete, gypsum board, and plaster.
2) Perimeter joints between interior wall surfaces and frames of openings.
3) Other joints as indicated.

2.5 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

2.6 MISCELLANEOUS MATERIALS

A. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

B. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and correct damaged or deteriorated joint sealants immediately so installations with corrected areas are indistinguishable from original work.

END OF SECTION 07 92 00

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to ANSI/SDI A250.8. (Nominal gage equivalents are listed in parentheses.)

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section and by Division 08 Sections “Door Hardware” and “Glazing” concurrently.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.
3. Borrowed lights.
4. Frame anchors.
5. Louvers.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing. Indicate which side of each door or frame has a removable stop.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.7 INFORMATIONAL SUBMITTALS

A. Field quality control reports.

1.8 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ceco Door; ASSA ABLOY.
2. Curries Company; ASSA ABLOY.

3. Pioneer Industries.
4. Steelcraft; an Allegion brand.

B. Source Limitations for Attack-Resistance-Rated Assemblies: Obtain attack-resistance-rated doors and framing from single source from single manufacturer and glazing from single manufacturer acceptable to the attack-resistant-rated door and framing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

C. Attack-Resistance-Rated Assemblies: Assemblies complying with H. P. White Laboratory Inc. 5-aa10 assault test-rated for not less than 4 minutes, as a continuous attack.

1. Withstand a minimum of 5 shots from a military-style assault rifle with a minimum caliber of 7.62 mm.
2. Withstand a minimum of abuse as applied by a single assailant at full force, including strikes with bricks, hammers, baseball bats, and sledgehammers.

D. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.37 deg Btu/F x h x sq. ft. when tested according to ASTM C1363.

E. Air Infiltration: Provide exterior door assemblies with air leakage of not more than 1.00 cfm/sq. ft. when tested according to NFRC 400 or ASTM E283.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At all interior locations.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches.

c. Face: Uncoated steel sheet, minimum thickness of 0.042 inch (18-gage).

d. Edge Construction: Model 2, Seamless, continuously welded seam dressed smooth.

e. Edge Bevel: Bevel lock edge 1/8 inch in 2 inches.

f. Core: Vertical steel stiffener. Fill space between stiffeners with glass- or mineral-fiber insulation.

g. Fire-Rated Core: Manufacturer's vertical steel stiffener, with space between stiffeners filled with glass- or mineral-fiber insulation or laminated mineral board core for fire-rated doors.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (16-gage).
b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
c. Construction: Full profile welded in factory.

3. Exposed Finish: Prime.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A. At exterior locations.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches.

c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (16-gage), with minimum A60 coating.

d. Edge Construction: Model 2, Seamless, continuously welded seam dressed smooth.

e. Edge Bevel: Bevel lock edge 1/8 inch in 2 inches.

f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.

g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.

h. Core: Polyurethane, or polyurethane with vertical steel stiffeners, to comply with required U-factor and attack-resistance-rated requirements.

2. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch (14-gage), with minimum A60 coating.
b. Construction: Full profile welded in factory, thermally broken.

3. Exposed Finish: Prime.

2.5 BORROWED LITES

A. Fabricate of uncoated steel sheet, minimum thickness of 0.053 inch (16-gage).

B. Construction: Full profile welded in factory.

C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.

2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.

3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

2.7 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.

E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

G. Glazing: Comply with requirements in Division 08 Section "Glazing" and with hollow-metal manufacturer's requirements.

1. Glazing for Interior Attack-Resistance-Rated Assemblies (Fire-Resistance-Rated): Fire-resistance-rated laminated-glass security glazing.

a. Technical Glass Products; Pilkington Pyrostop laminated to LTI Smart Glass, Inc., SG5 by School Guard Glass (Glass Type SFRL) as specified in Division 08 Section “Glazing.”

2. Glazing for Exterior Attack-Resistance-Rated Assemblies (Non-Fire-Resistance-Rated): Low-e-coated, laminated-glass security insulating glass (Glass Type FCE/SCL) as specified in Division 08 Section “Glazing.”.

a. Security Glazing Indoor Lite Component: LTI Smart Glass, Inc.; SG5 by School Guard Glass (Glass Type SCL).

H. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.8 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

3. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick (26-gage). Weld guards to frame at back of hardware mortises in frames to be grouted.

4. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

5. Terminated Stops (Hospital Stops): Where indicated, on interior door frames terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
3. Attack-Resistance-Rated Door Assemblies: Comply with hollow-metal manufacturer’s requirements.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.

4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

    a. For attack-resistance-rated door assemblies, provide fasteners spaced in accordance with door and glazing manufacturers' written instructions.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.10 LOUVERS

A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.042-inch-thick (18-gage), cold-rolled steel sheet set into 0.042-inch-thick (18-gage) steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.

B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Remove shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make restored area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

    a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.

    b. Install frames with removable stops located on secure side of opening.

    c. Field apply corrosion-resistant coating to backs of frames that will be filled with grout containing antifreezing agents.

    d. Install door silencers in frames before grouting.

2. Fire-Rated Openings: Install frames according to NFPA 80.

3. Floor Anchors: Secure with postinstalled expansion anchors.

    a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.

5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.

    a. For grouted frames, brace or fasten frames in such a manner that will prevent the pressure of grout from deforming the frame members. Hand trowel grout into place. Grout mixed to a thinner, “pumpable” consistency is not acceptable.

6. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.

7. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

8. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow-metal manufacturer's written instructions.

1. Glaze attack-resistance-rated doors in the factory.
2. Glaze attack-resistance-rated borrowed lites in the field.

3.4 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated door according to NFPA 80, Section 5.2.

C. Correct or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect corrected or replaced installations to determine if replaced or corrected door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.

3.5 RESTORATION

A. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

C. Metallic-Coated Surface Touchup: Clean abraded areas and restore with galvanizing touch-up paint according to manufacturer's written instructions.

END OF SECTION 08 11 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Factory finishing flush wood doors.
2. Factory fitting flush wood doors to frames and factory machining for hardware.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section and by Division 08 Sections "Door Hardware" and "Glazing" concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction.
3. Door face type and characteristics.
4. Door trim for openings.
5. Factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, light and louver cutouts, and glazing thicknesses.
3. Dimensions and locations of blocking for hardware attachment.
4. Dimensions and locations of mortises and holes for hardware.
5. Requirements for veneer matching.
6. Doors to be factory finished and application requirements.

C. Samples:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

D. Sample Warranty: For special warranty.

1.5 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Special warranties.
B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.
B. Package doors individually in plastic bags or cardboard cartons.
C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and temperature and relative humidity are maintained at levels designed for building occupants for the remainder of construction period.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to correct or replace doors that fail in materials or workmanship within specified warranty period.

    1. Failures include, but are not limited to, the following:

        a. Delamination of veneer.
        b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
        c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

    2. Warranty shall also include installation and finishing that may be required due to correction or replacement of defective doors.

    3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.

1. The Contract Documents contain requirements that may be more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

B. Adhesives: Do not use adhesives that contain urea formaldehyde.

C. Composite Wood Products: Products shall be made without urea formaldehyde.

2.3 LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Recessed tapered beads.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated on Drawings. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

C. Metal Frames for Light Openings in Fire-Rated and Non-Fire-Rated Doors: Manufacturer's standard frame formed of 0.036-inch-thick (20 gage), cold-rolled steel sheet; factory primed for paint finish; and for fire-rated doors, approved for use in doors of fire-protection rating indicated on Drawings.

2.4 LIGHT FRAMES AND LOUVERS

A. Metal Frames for Fire-Rated Doors: Manufacturer's standard frame formed of 0.036-inch-thick (20 gage), cold-rolled steel sheet; factory primed for paint finish; and for fire-rated doors, approved for use in doors of fire-protection rating indicated on Drawings.

B. Metal Louvers:

1. Blade Type: Vision-proof, inverted Y.

a. Metal and Finish: Cold-rolled steel, 0.048-inch-thick (18 gage) frame and not less than 0.030-inch thick (22 gage) blades, factory primed for paint finish.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
4. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."

2.6 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Transparent Finish:

1. ANSI/WDMA I.S. 1A Grade: Premium.
2. Finish: ANSI/WDMA I.S. 1A TR-8 UV Cured Acrylated Polyester/Urethane
3. Staining: As selected by Architect from manufacturer's full range.
4. Effect: Open-grain finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors in accordance with NFPA 80.
2. Install smoke- and draft-control doors in accordance with NFPA 105.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.

C. Correct or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect corrected or replaced installations to determine if replaced or corrected door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.

3.4 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be corrected or refinished if Work complies with requirements and shows no evidence of correction or refinishing.

END OF SECTION 08 14 16

SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes access doors and frames for walls and ceilings.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details material descriptions, dimensions of individual components and profiles, and finishes.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Flush access doors with concealed flanges in gypsum board.

C. Product Schedule: For access doors and frames.

1.5 INFORMATIONAL SUBMITTALS

A. Field quality control reports.

1.6 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Concealed Flanges in Gypsum Board:

1. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

    a. Karp Associates, Inc.; Model KDW Flush Drywall Access Door.
    b. Milcor Company; Series DW – Standard Flush Access Door.
    c. Nystrom, Inc.; NW Architectural Access Door.

2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge. Provide edge trim for gypsum panels securely attached to perimeter of frames.

3. Locations: Walls and ceilings, where indicated on Drawings and, if not indicated, as follows:

    a. In painted gypsum board exposed to view.

4. Door Size: 10”x10”, unless otherwise indicated.

5. Uncoated Steel Sheet for Door: Not less than nominal 0.060 inch (16 gage), factory primed.

6. Frame Material: Same material and finish as door; nominal 0.060 inch (16 gage).

7. Latch and Lock: Cam latch, screwdriver operated with interior release.

2.3 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
C. Frame Anchors: Same material as door face.
D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

D. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
2. Keys: Furnish two keys per lock and key all locks alike.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, baked-enamel or powder-coat primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates 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. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
B. Correct or remove and replace installations where inspections indicate that they do not comply with specified requirements.
C. Reinspect corrected or replaced installations to determine if replaced or corrected door assembly installations comply with specified requirements.

3.4 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 08 31 13

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Aluminum-framed storefront systems.
2. Entrance door systems.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and discuss the finishing of aluminum storefront that is required to be coordinated with the finishing of other aluminum work for color and finish matching.

2. Review, discuss, and coordinate the interrelationship of aluminum storefront with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.

3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.

4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section and by Division 08 Sections “Door Hardware” and “Glazing” concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

1. Entrance door hardware.
2. Accessories.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below, otherwise submit full Product Data for the following:

1. Nonthermal framing.
2. Nonthermal entrance doors.
3. Flush entrance doors.

C. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
3. Show provisions for coordination with door hardware, electrically operated door hardware, and access control and security systems.

D. Samples: For each type of exposed finish required, in manufacturer's standard sizes.

E. Sample Warranties: For special warranties.

1.6 INFORMATIONAL SUBMITTALS

A. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.
B. Warranties: Executed special warranties.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to correct or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including, but not limited to, excessive deflection.
b. Noise or vibration created by wind and thermal and structural movements.
c. Deterioration of metals and other materials beyond normal weathering.
d. Water penetration through fixed glazing and framing areas.
e. Failure of operating components.

2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to restore finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested in accordance with ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D 4214.
c. Cracking, peeling, or chipping.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitation: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, and entrance doors when available, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

2. Failure also includes the following:

    a. Thermal stresses transferring to building structure.
    b. Glass breakage.
    c. Noise or vibration created by wind and thermal and structural movements.
    d. Loosening or weakening of fasteners, attachments, and other components.
    e. Failure of operating units.

3. Per 2020 Energy Conservation Construction Code of New York State – Chapter 4 Commercial Energy Efficiency (Climate Zone 5)

    a. Max U-Value of vertical fenestration entrance assembly = 0.77
    b. Max Air Leakage for Storefront glazing assembly = 0.06 CFM/FT^2

B. Structural Loads:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.

C. Deflection of Framing Members Supporting Glass: At design wind load, as follows:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches.

2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.

    a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.

D. Structural: Test in accordance with ASTM E330/E330M as follows:

1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft..

F. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

2.3 STOREFRONT SYSTEMS, GENERAL

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Exterior Framing Construction: Thermally broken.
2. Interior Framing Construction: Thermally broken.
3. Glazing System: Retained mechanically with gaskets on four sides.
4. Glazing Plane: Center.
5. Finish: Color anodic finish.
6. Fabrication Method: Field-fabricated stick system.
7. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
8. Steel Reinforcement: As required by manufacturer.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Insulated Spandrel Panels: Comply with Division 08 Section "Glazing."

2.4 STOREFRONT SYSTEM TYPES

A. Types: Provide the following types in locations indicated on Drawings:

1. Thermally broken framing.
2. Nonthermal framing.

2.5 NONTHERMAL FRAMING

A. Products: Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to:

1. EFCO Corporation; System 401 Flush-Glazed Storefront.
2. Kawneer; Trifab VersaGlaze 450 (1-3/4-inch Sightline) Framing System.
3. Special-Lite, Inc.; SL-45 FG Flush Glazed Tube Framing.
4. YKK AP America Inc.; YES 45 FS Storefront System.

B. Framing Size: 2-inch by 4-1/2-inch.

2.6 ENTRANCE DOOR SYSTEMS, GENERAL

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

B. Door Construction:

1. Thermal Entrance Door Construction: Glazed entrance doors with extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

    a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.

2. Nonthermal Entrance Door Construction: Glazed entrance doors with extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

    a. Provide nonremovable glazing stops on outside of door.

4. Finish: Match adjacent storefront framing finish, unless otherwise indicated.

2.7 ENTRANCE DOOR TYPES

A. Types: Provide the following entrance door types in locations indicated on Drawings:

1. Thermal entrance doors.
2. Nonthermal entrance doors.
3. Flush entrance doors.

2.8 THERMAL ENTRANCE DOORS

A. Products: Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to:

1. EFCO Corporation; Series D302 Medium Stile ThermaStile Entrances.
2. Kawneer; 350T Insulpour Thermal Entrances.
3. YKK AP America Inc.; MegaTherm 35XT Medium Stile Entrances.

B. Depth: 2- to 2-3/8-inch.

C. Door Design: Medium stile, 3-1/2-inch nominal width.

D. Bottom Rail: Height to comply with accessibility requirements.

2.9 NONTHERMAL ENTRANCE DOORS

A. Products: Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to:

1. EFCO Corporation; Series D300 Medium Stile Entrance Door.
2. Kawneer; 350 Medium Stile Standard Entrance.
3. YKK AP America Inc.; Series 35D Medium Stile Swing Doors.

B. Depth: 1-3/4-inch.

C. Door Design: Medium stile, 3-1/2-inch nominal width.

D. Bottom Rail: Height to comply with accessibility requirements.

2.10 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Division 08 Section "Door Hardware."

B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door, to comply with requirements in this Section.

1. Opening-Force Requirements:

a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion and not more than 15 lbf to open the door to its minimum required width.

b. Accessible Interior Doors: Not more than 5 lbf to fully open door.

C. Recessed Pulls: Manufacturer’s standard accessibility-compliant recessed pulls for flush doors.

D. Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.
2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

E. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip integrated into door bottom rail.

F. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.11 SUN CONTROL

A. Sunshades: Comply with Division 10 Section “Exterior Sun Control Devices.”

2.12 GLAZING

A. Glazing: Comply with Division 08 Section "Glazing."
B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
C. Glazing Sealants: As recommended by manufacturer.

2.13 MATERIALS

A. Sheet and Plate: ASTM B209.

B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.

C. Structural Profiles: ASTM B308/B308M.

D. Steel Reinforcement:

1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

E. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.14 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

2.15 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from interior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At interior and exterior doors, provide compression weather stripping at fixed stops. Blade-type stops are not acceptable.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.16 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

1. Color: As selected by Architect from full range of industry colors and color densities.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, 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. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written instructions.

B. Do not install damaged components.

C. Fit joints to produce hairline joints free of burrs and distortion.

D. Rigidly secure nonmovement joints.

E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

F. Seal perimeter and other joints watertight unless otherwise indicated.

G. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.

2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

H. Set continuous sill members and flashing in full sealant bed, as specified in Division 07 Section "Joint Sealants," to produce weathertight installation.

I. Install joint filler behind sealant as recommended by sealant manufacturer.

J. Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF OPERABLE UNITS

A. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

3.4 INSTALLATION OF GLAZING

A. Install glazing as specified in Division 08 Section "Glazing."

3.5 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

A. Install entrance doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.6 ERECTION TOLERANCES

A. Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.

2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.

3. Alignment:

a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.

4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.7 FIELD QUALITY CONTROL

A. Special Inspections: Special Inspections are required for the work of this Section. Refer to Division 01 Section “Quality Requirements” and its attachments.

3.8 MAINTENANCE SERVICE

A. Entrance Door Hardware Maintenance:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

END OF SECTION 08 41 13

SECTION 08 51 13 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Glazed aluminum windows for exterior locations.
2. Glazing louvers installed in aluminum window systems.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and discuss the finishing of aluminum windows that is required to be coordinated with the finishing of other aluminum work for color and finish matching.

2. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.

3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.

4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section and by Division 08 Section “Glazing” concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, and finishes.

1. Hardware.
2. Accessories.
3. Insect screens.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below, otherwise submit full Product Data for the following:

1. Casement windows.
2. Awning windows.
3. Fixed windows.
4. Horizontal sliding windows.

C. Shop Drawings: For aluminum windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
2. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

D. Samples: For each type of exposed finish required, in manufacturer's standard sizes.

E. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

F. Sample Warranties: For special warranties.

1.6 INFORMATIONAL SUBMITTALS

A. Energy Performance Certificates: For aluminum windows, from manufacturer.

1. Basis for Certification: Energy performance values for each aluminum window meeting specified NFRC requirements.

B. Product Certificates: For rescue windows, certifying clear opening complies with specified minimum clear opening requirements.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum windows to include in maintenance manuals.
B. Warranties: Executed special warranties.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

1.9 MOCKUPS

A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical wall area as shown on Drawings.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to correct or replace aluminum windows that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures including excessive deflection, water leakage, condensation, and air infiltration.
c. Faulty operation of movable sash and hardware.
d. Deterioration of materials and finishes beyond normal weathering.
e. Failure of insulating glass.

2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to restore finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

C. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to restore finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, peeling, or chipping.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain all components of aluminum windows, including accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as indicated.

C. Water Infiltration: No uncontrolled water leakage when tested in accordance with ASTM E331 and ASTM E547 at a static air pressure difference of 10 lbf/sq. ft.

D. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:

1. Thermal Transmittance: NFRC 100 maximum whole-window U-factor as follows:

a. For operable windows: 0.43 Btu/sq. ft. x h x deg F.
b. For fixed windows: 0.36 Btu/sq. ft. x h x deg F.

2. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.38.

3. Air Infiltration: Maximum air leakage rate of 0.3 cfm/sq. ft. when tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 at 6.24 psf.

E. Condensation-Resistance Performance: Provide aluminum windows tested for thermal performance according to either of the following:

1. AAMA 1503, showing a minimum Condensation-Resistance Factor (CRF) of 61, or
2. NFRC 500, showing a minimum Condensation Resistance (CR) of 51.

F. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

G. Minimum Clear Opening: Where indicated as “Rescue Window”, provide windows with a minimum clear opening of 6 square feet, and a minimum clear dimension in either direction of 24 inches.

2.3 ALUMINUM WINDOWS, GENERAL

A. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/ I.S.2/A440.

1. Thermally Broken Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

B. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

C. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 ALUMINUM WINDOW TYPES

A. Types: Provide the following aluminum window types in locations indicated on Drawings:

1. Casement: Outswing.
2. Projected, awning.
3. Fixed.
4. Double hung.
5. Horizontal sliding.

2.5 CASEMENT WINDOWS (OUTSWING) **TYPE W1 - W4**

A. Products: Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to:

1. EFCO Corporation; Series PX32 Thermal Casement Out Swing.
2. Kawneer Company, Inc.; Series AA 4325 ltra Thermal Windows – Outswing Casement Windows.
3. YKK AP America Inc.; YOW 350 XT MegaTherm Aluminum Window System.

B. Overall Unit Depth: 7-1/2 to 8-0 inches.

C. Minimum Performance Class and Grade: AW-PG80-C.

2.6 PROJECTED, AWNING WINDOWS **TYPE W14**

A. Products: Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to:

1. EFCO Corporation; Series PX32 Thermal Project-Out.
2. Kawneer Company, Inc.; Series AA 4325 Ultra Thermal Windows – Project-Out Windows.
3. YKK AP America Inc.; YOW 350 XT MegaTherm Aluminum Window System.

B. Overall Unit Depth: 4-1/2 to 5 inches.

C. Minimum Performance Class and Grade: AW-PG80-AP.

2.7 FIXED WINDOWS **TYPE W5 – W9, W12, W14, W15**

A. Products: Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to:

1. EFCO Corporation; Series FX45 Thermal Fixed.
2. Kawneer Company, Inc.; Series AA 5450 Ultra Thermal Fixed.

B. Overall Unit Depth: 4-1/2 to 5 inches.

C. Minimum Performance Class and Grade: AW-PG70-FW.

2.8 FIXED WINDOWS **TYPE W11**

A. Products: Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to:

1. EFCO Corporation; Series FX45 Thermal Fixed.
2. Kawneer Company, Inc.; Series AA 5450 Ultra Thermal Fixed.

B. Overall Unit Depth: 8 inches.

C. Minimum Performance Class and Grade: AW-PG70-FW.

2.9 DOUBLE HUNG WINDOWS **TYPE W10, W13**

A. Products: Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to:

1. EFCO Corporation; Series HX45 Thermal Double Hung.
2. Kawneer Company, Inc.; Series AA 5450 Ultra Thermal Double Hung.

B. Overall Unit Depth: 4-1/2 to 5 inches.

C. Minimum Performance Class and Grade: AW-PG65-H.

2.10 WINDOW HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.

B. Casement and Projected Window Hardware:

1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.

a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.

2. Hinges: Non-friction type, not less than two per sash.

3. Lock: Concealed multipoint lock operated by single lever handle or lift-type throw.

4. Limit Devices: Concealed friction adjustor, adjustable stay bar limit devices designed to restrict sash opening.

a. Limit clear opening to 4 inches for ventilation; with custodial key release.

C. Hung Window Hardware:

1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.

D. Horizontal-Sliding Window Hardware:

1. Sill Cap/Track: Manufacturer's standard of dimensions and profile indicated; designed to comply with performance requirements indicated and to drain to the exterior.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
3. Roller Assemblies: Low-friction design.

2.11 GLAZING

A. Glass: Comply with Division 08 Section "Glazing."
B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.12 ACCESSORIES

A. Dividers (False Muntins): Provide extruded-aluminum divider grilles in designs indicated for each sash lite.

1. Type: Permanently located at exterior lite.
2. Pattern: As indicated on Drawings.
3. Profile: As selected by Architect from manufacturer's full range.

B. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.

C. Column Covers: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

D. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

E. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

F. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

G. Rescue Window Labels: Provide the following labels on the interior side of designated rescue windows in each space of pupil occupancy.

1. Color: Bright yellow background with black letters.

2. Size: 3 inches by 6 inches.

3. Text: “RESCUE WINDOW”, readable from each side of window.

a. Add label with window operating instructions if not readily apparent.

2.13 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

1. Type and Location:

a. Full, inside for outswing casement.
b. Full, inside for projected, awning.
c. Full, outside for double-hung.
d. Half, outside for sliding sashes.

2. At rescue windows, provide hinged screens operable from the interior with one hand and without the use of a key or other device.

a. Provide continuous aluminum piano hinge with finish to match window framing.
b. Provide sill and jamb clips to allow proper closure of screen.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.

C. Aluminum Wire Fabric: 18-by-16 mesh of 0.011-inch-diameter, coated aluminum wire.

1. Wire-Fabric Finish: Charcoal gray.

2.14 LOUVERS

A. Furnish and install louvers as hereinafter specified where shown on plans or as described in schedules. Louvers shall be stationary type glazing louvers.

1. Louvers shall have a minimum of 50% free area based on a 48” wide x 48” high (1219 x 1219) size. Stationary blades shall be contained within a 1 1/2” (38) frame.

2. Louver components (heads, jambs, sills, blades & mullions) shall be factory assembled by the louver manufacturer. Louver sizes too large for shipping shall be built up by the contractor from factory assembled louver sections to provide overall sizes required.

3. Louver design shall incorporate structural supports required to withstand wind loads indicated on drawings.

B. Louvers shall be Ruskin Model ELF15J extruded 6063T6 aluminum alloy construction as follows:

1. Frame: 1 1/2” (38) deep .062” (1.6) wall thickness.
2. Blades: .060” (1.524) nominal wall thickness. Blades are positioned at 45° angle and spaced at approximately 1 7/8” (48) center to center.
3. Screen: 5/8” x .040” (16 x 1) expanded, flattened aluminum in removable frame.

C. Finish: To match type and color of insulated spandrel panels.

D. Published louver performance data derived from testing in accordance with AMCA 500-L for Air Performance must be submitted for approval prior to fabrication and must demonstrate pressure drop equal to or less than the Ruskin model specified.

2.15 FABRICATION

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze aluminum windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

F. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.16 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

1. Color: As selected by Architect from full range of industry colors and color densities.

C. High-Performance Organic Finish, Two-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.

1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Color and Gloss: As selected by Architect from manufacturer's full range.

D. Superior-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.

1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

E. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 08 51 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:

a. Swinging doors.

2. Cylinders for door hardware specified in other Sections.

3. Electrified door hardware.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

1. Hinges.
2. Mortise locks.
3. Electric strikes.
4. Lock cylinders.
5. Construction cores.
6. Keying system/keys.
7. Surface closers.
8. Door gasketing.
9. Metal protective trim units.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: For power, signal, and control wiring and including the following:

a. Details of interface of electrified door hardware and building safety and security systems.

2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

C. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description for coordination with the door hardware schedule.

1. Sample Size: Full-size units or minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.

D. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.

2. Content: Include the following information:

a. Identification number, location, hand, fire rating, size, and material of each door and frame.
b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
e. Fastenings and other pertinent information.
f. Explanation of abbreviations, symbols, and codes contained in schedule.
g. Mounting locations for door hardware.

E. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

F. Warranty: Sample of special warranty specified in this Section.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For electrified door hardware, from the manufacturer.

1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

B. Warranty: Executed special warranty specified in this Section.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.

2. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:

1. For door hardware, an Architectural Hardware Consultant (AHC) who is also an Electrified Hardware Consultant (EHC).

C. Source Limitations: Obtain each type of door hardware from a single manufacturer.

D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.

E. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.

F. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

G. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

H. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines, ICC/ANSI A117.1 and building code in effect for Project.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.

2. Comply with the following maximum opening-force requirements:

a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

I. Preinstallation Conference: Conduct conference at Project site.

1. Inspect and discuss preparatory work performed by other trades.
2. Inspect and discuss electrical roughing-in for electrified door hardware.
3. Review sequence of operation for each type of electrified door hardware.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.9 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

C. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.

a. Hinges: Lifetime
b. Locksets: Lifetime
c. Manual Closers: Lifetime.
d. Auto Operators: Two year.

1.11 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products or products equivalent in function and comparable in quality to named products.

2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

3. Electric Locking Hardware: Exit hardware shall always remain fully operational manually regardless of the status of electric latch.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.

2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Best / Stanley
b. Hager
c. McKinney

2.3 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Mortise Locks: Minimum 3/4-inch latchbolt throw.

C. Lock Backset: 2-3/4 inches, unless otherwise indicated.

D. Lock Trim:

1. Levers:

a. Best #14

E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

F. Mortise Locks: BHMA A156.13; Operational and Security Grade 1; stamped steel case with steel or brass parts; Series 1000.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Best
b. Corbin

2.4 ELECTRIC STRIKES

A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Folger Adams
b. Rutherford.
c. Von Duprin.

2.5 LOCK CYLINDERS

A. Match existing system.

2.6 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.

1. Master Key System: Change keys and a master key operate cylinders.

2. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.

3. Existing System:

a. Master key or grand master key locks to Owner's existing system.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: "DO NOT DUPLICATE."

2. Quantity: In addition to one extra key blank for each lock, provide the following:

a. Cylinder Change Keys: Three.
b. Master Keys: Five.
c. Grand Master Keys: Five.

2.7 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Provide units which are cast iron with a minimum 1-1/2" piston. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Best QDC100 Series
    b. LCN 4010/4110 Series

2.8 MECHANICAL STOPS AND HOLDERS

A. Wall Stops: BHMA A156.16; plated satin chrome.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABH.
    b. Rockwood.
    c. Trimco.

2.9 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABH.
    b. Glynn Johnson.

2.10 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. National Guard Products.
    b. Pemko.
    c. Zero.

2.11 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-thick aluminum; with manufacturer's standard machine or self-tapping screw fasteners.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABH.
    b. Rockwood.
    c. Trimco.

2.12 AUTO OPERATOR

A. Electro-hydraulic unit complete with all power supplies and hard wired single gang junction box mounted.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. LCN 4820 Series
    b. Precision Hardware D4990 Series

2.13 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.

2. Fire-Rated Applications:

   a. Wood or Machine Screws: For the following:

      1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors.
      2) Strike plates to frames.
      3) Closers to doors and frames.

   b. Steel Through Bolts: For the following unless door blocking is provided:

      1) Surface hinges to doors.
      2) Closers to doors and frames.
      3) Surface-mounted exit devices.

3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.

4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.14 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Custom Steel Doors and Frames: HMMA 831.
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as indicated in keying schedule.

E. Stops: Provide wall stops for doors unless other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

F. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.
B. Clean operating items as necessary to restore proper function and finish.
C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

3.7 DOOR HARDWARE SCHEDULE

Hardware Sets

Cornwall Elementary

Set #CE-1

Doors: 132/1

3	Butt Hinge	CB1900R 4.5" x 4.5"	652	ST
1	Lockset	45H-7T14N	630AM	BE
1	Door Closer	QDC111	689	BE
1	Kick Plate	K0050 8"	630	TR
1	Mop Plate	KM050 4"	630	TR
1	Wall Magnet	2100 RS	630	AB
1	Gasketing	2525 C		NA

Set #CE-2

Doors: 133/1, 134/1

3	Butt Hinge	CB1900R 4.5" x 4.5"	652	ST
1	Lock Set	45H-7T14M VIN	630AM	BE
1	Door Closer	QDC112	689	BE
1	Kick Plate	K0050 8"	630	TR
1	Mop Plate	KM050 4"	630	TR
1	Wall Bumper	1270CVSV	626	TR
1	Gasketing	2525 C		NA

Opening List

Opening	Hdw Set
132/1	CE-1
133/1	CE-2
134/1	CE-2

Cornwall-on-Hudson Elementary

Set #CH-1

Doors: B102/1, B103/1, B302/1, B303/1

3	Butt Hinge	CB1900R 4.5" x 4.5"	652	ST
1	Lockset	45H-7T14N	630AM	BE
1	Door Closer	QDC111	689	BE
1	Kick Plate	K0050 8"	630	TR
1	Mop Plate	KM050 4"	630	TR
1	Wall Magnet	2100 RS	630	AB
1	Gasketing	2525 C		NA

Set #CH-2

Doors: A103/1, B201/1

3	Butt Hinge	CB1900R 4.5" x 4.5"	652	ST
1	Lock Set	45H-7T14M VIN	630AM	BE
1	Door Closer	QDC112	689	BE
1	Kick Plate	K0050 8"	630	TR
1	Mop Plate	KM050 4"	630	TR
1	Wall Bumper	1270CVSV	626	TR
1	Gasketing	2525 C		NA

Opening List

Opening	Hdw Set
A103/1	CH-2
B102/1	CH-1
B103/1	CH-1
B201/1	CH-2
B302/1	CH-1
B303-1	CH-1

Cornwall Central Middle School

Set #CM-1

Doors: B103/1

3	Butt Hinge	CB1900R 4.5" x 4.5"	652	ST
1	Lockset	45H-7T14N	630AM	BE
1	Door Closer	QDC111	689	BE
1	Kick Plate	K0050 8"	630	TR
1	Mop Plate	KM050 4"	630	TR
1	Wall Magnet	2100 RS	630	AB
1	Gasketing	2525 C		NA

Set #CM-2

Doors: A201/1, A202/1, B102/1, D17/1, D18/1

3	Butt Hinge	CB1900R 4.5" x 4.5"	652	ST
1	Lock Set	45H-7T14M VIN	630AM	BE
1	Door Closer	QDC112	689	BE
1	Kick Plate	K0050 8"	630	TR
1	Mop Plate	KM050 4"	630	TR
1	Wall Bumper	1270CVSV	626	TR
1	Gasketing	2525 C		NA

Set #CM-3

Doors: D101/1

2	Continuous Hinge	661HD	628	BE
1	Exit Device	ELR 2602 CD DS	630AM	PR
1	Exit Device	ELR 2603 CD DS	630AM	PR
1	Rim Cylinder	TO MATCH EXISTING	626	
2	Mortise Cylinder	TO MATCH EXISTING	626	
2	Door Pull	AP311 24"	630	TR

2	Door Closer	QDC119	689	BE
1	Card Reader	BY OTHERS		BY
2	Power Transfer	PT1000	689	AB
1	Power Supply	ELR152		PR
2	Door Sweep	C627 A		NA
1	Threshold	896 S	628	NA

Set #CM-4

Doors: D101/2, D101/3

2	Continuous Hinge	661HD	628	BE
1	Exit Device	2602 CD	630AM	PR
1	Exit Device	2603 CD	630AM	PR
1	Rim Cylinder	TO MATCH EXISTING	626	
2	Mortise Cylinder	TO MATCH EXISTING	626	
2	Door Pull	AP311 24"	630	TR
2	Door Closer	QDC114 689 BE		
2	Auto Door Bottom	220 SA		NA

Opening List

Opening	**Hdw Set**
A201/1	CM-2
A202/1	CM-2
B102/1	CM-2
B103/1	CM-1
D101/1	CM-3
D101/2	CM-4
D101/3	CM-4
D17/1	CM-2
D18/1	CM-2

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Glass products.
2. Laminated glass.
3. Fire-resistance-rated glazing.
4. Security glazing.
5. Insulating glass.
6. Insulated spandrel panels.

1.3 DEFINITIONS

A. Fire-Resistance-Rated Glazing: Glazing that prevents spread of fire and smoke and radiant heat; used in rated wall and door applications 60 minutes and above without size limitations (generally to maximum size tested).

B. Glazing Manufacturers: Firms that produce primary glazing, fabricated glazing, or both, as defined in referenced glazing publications.

C. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

D. IBC: International Building Code.

E. Interspace: Space between lites of an insulating-glass unit.

F. SHGC: Solar Heat Gain Coefficient.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glazing, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1. Coordinate framing types to provide proper framing fire rating.
2. Coordinate framing types to provide proper framing forced-entry-resistance rating.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress.
2. Review, discuss, and coordinate the interrelationship of glazing with other components, including framing.
3. Review temporary protection requirements for glazing during and after installation.

1.6 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section and by Division 08 Sections “Hollow Metal Doors and Frames”, “Flush Wood Doors”, “Fire-Rated Glazed Opening Assemblies”, “Aluminum-Framed Entrances and Storefronts”, “Aluminum Windows”, and “Sliding Security Windows,” concurrently.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Laminated glass.
2. Insulating glass.
3. Insulated spandrel panels.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the “**As-Specified Verification Form**” (attached to Division 01 Section “Submittal Procedures”) for each item listed below; otherwise submit full Product Data for the following:

1. Glass products.
2. Fire-resistance-rated glazing.
3. Security glazing.

C. Samples: For each type of the following products; 12 inches square.

1. Laminated glass.
2. Fire-resistance-rated glazing.
3. Security glazing.
4. Insulating glass.
5. Insulated spandrel panels.

D. Glazing Schedule: List glazing types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Sample Warranties: For special warranties.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For glazing to include in maintenance manuals.
B. Warranties: Executed special warranties.

1.9 MOCKUPS

A. Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Install glazing in mockups specified in Division 08 Sections "Aluminum-Framed Entrances and Storefronts" and "Aluminum Windows", to match glazing systems required for Project, including glazing methods.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glazing product, tape sealant, gasket, glazing accessory, and framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

2. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glazing, tape sealants, gaskets, and glazing channel substrates.

3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.

4. Schedule enough time for testing and analyzing results.

5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Maintain protective coverings on glazing to avoid exposures to abrasive substances, excessive heat, and other sources of possible deterioration.

1.12 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.13 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer or manufacturer/fabricator, as applicable, agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer or manufacturer/fabricator, as applicable, agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard. “Laminated Glass”, as used in this paragraph, includes clear laminated glass, and fire-resistance-rated laminated glass with intumescent interlayer.

1. Warranty Period: 5 years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Tempered Glazing Units with Clear Intumescent Interlayer: Manufacturer or manufacturer/fabricator, as applicable, agrees to replace units that deteriorate within specified warranty period. Deterioration of tempered glazing units with clear intumescent interlayer is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning glass contrary to manufacturer's written instructions. Evidence of failure is air bubbles within units, or obstruction of vision by contamination or deterioration of intumescent interlayer.

1. Warranty Period: 5 years from date of Substantial Completion.

D. Manufacturer's Special Warranty for Laminated-Glass Security Glazing: Manufacturer or manufacturer/fabricator, as applicable, agrees to replace laminated-glass security glazing units that deteriorate within specified warranty period. Deterioration of laminated glass security glazing is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass security glazing contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard. “Laminated-Glass Security Glazing”, as used in this paragraph, includes fire-resistance-rated laminated-glass security glazing.

1. Warranty Period: 5 years from date of Substantial Completion.

E. Manufacturer's Special Warranty for Insulating Glass: Manufacturer or manufacturer/fabricator, as applicable, agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Where laminated glass is used as a component in an insulating-glass unit, deterioration of the laminated glass itself is covered by the paragraph “Manufacturer’s Special Warranty for Laminated Glass” above, and deterioration of the insulating glass due to failure of hermetic seal is covered by this paragraph “Manufacturer’s Special Warranty for Insulating Glass.”

2. Warranty Period: 10 years from date of Substantial Completion.

F. Manufacturer’s Special Warranty for Glass-Faced Insulated Spandrel Panels: Manufacturer agrees to replace insulated spandrel panels that deteriorate within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

   a. Delamination of components or other failures of bond.
   b. Warping of components.

2. Warranty Period: 10 years from date of Substantial Completion.

G. Manufacturer’s Special Finish Warranty for Insulated Spandrel Panels: Manufacturer agrees to restore finishes or replace insulated spandrel panels that deteriorate within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

   a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glazing: For each glazing type, obtain from single manufacturer.
B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

1. Installed security glazing shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:

1. Wind Loads: As indicated on Drawings.

2. Maximum Lateral Deflection: For glazing supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less. Maintain engagement of the glazing edge with an appropriate margin of safety under all conditions.

3. Thermal Loads: Design glazing to resist thermal stress breakage induced by differential temperature conditions and limited air circulation within individual glass lites and insulated glazing units.

C. Security Glazing: Installed security glazing shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.

D. Thermal and Optical Performance Properties: Provide glazing with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For laminated-glass lites, properties are based on products of construction indicated.

2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

3. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program, expressed as Btu/sq. ft. x h x deg F.

4. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.

2.3 GLAZING PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glazing product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glazing, thickness, and safety glazing standard with which glazing complies.

C. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that glazing is approved for use in walls, and fire-resistance rating in minutes.

D. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the IGCC.

E. Thickness: Where glazing thickness is indicated, it is a minimum. Provide glazing that complies with performance requirements and is not less than thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm.
2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

F. Strength: Where heat-strengthened float glass is indicated, provide heat-strengthened float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.

B. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2. Clear Glass:

a. Type **FC**: Fully tempered clear float glass.

1) Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

a) AGC Glass Company North America, Inc.; Clear Float.
b) Guardian Glass, LLC; Clear Float.
c) Vitro Architectural Glass; Clear.

2) Minimum Thickness: 6 mm.

3) Safety glazing required.

b. Type **FCE**: Fully tempered clear float glass with low-e coating, ASTM C1376.

1) Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

a) AGC Glass Company North America, Inc.; Energy Select 28.
b) Guardian Glass, LLC; SunGuard SNX 62/27 on Clear Float.
c) Vitro Architectural Glass; Solarban 70.

2) Minimum Thickness: 6 mm.

3) Safety glazing required.

C. Tempered Patterned Glass: ASTM C1048, Kind FT (fully tempered), Type II, Class 1 (clear), Form 3; finish, pattern, and quality as indicated.

1. Type **FCP**: Fully tempered clear patterned glass.

a. Products: Subject to compliance with requirements, available products that may be incorporated in the Work, include, but are not limited to:

1) Guardian Glass, LLC; Textures.
2) Pilkington North America; Texture Glass.

b. Minimum Thickness: 6 mm.

c. Pattern: Basis-of-Design Product: Guardian Glass, LLC Texture - Dew

d. Safety glazing required.

D. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.
4. Interspace Content: Argon (90 percent)/air (10 percent) mix.

B. Insulating Vision Glass:

1. Type **FCE/FC**: Low-e-coated, clear insulating glass.

a. Overall Unit Thickness: 1 inch.
b. Outdoor Lite: Fully tempered clear float glass with low-e coating, Type FCE.
c. Low-E Coating: Sputtered on second surface.
d. Interspace Content: Argon.
e. Indoor Lite: Fully tempered clear float glass, Type FC.
f. Winter Nighttime U-Factor: 0.24 Btu/sq. ft. x h x deg F maximum.
g. SHGC: 0.28 maximum.
h. Visible Light Transmittance: 62 percent minimum.

2. Type **UFE/UF**: Low-e-coated, ultraclear (low-iron) insulating glass.

a. Overall Unit Thickness: 1 inch.
b. Outdoor Lite: Ultraclear (low-iron) fully tempered float glass with low-e coating, Type UFE.
c. Low-E Coating: Sputtered on second surface.
d. Interspace Content: Argon.
e. Indoor Lite: Ultraclear (low-iron) fully tempered float glass, Type UF.
f. Winter Nighttime U-Factor: 0.24 Btu/sq. ft. x h x deg F maximum.
g. SHGC: 0.27 maximum.
h. Visible Light Transmittance: 64 percent minimum.

C. Insulating Spandrel Glass:

1. Type **FCE/FCS**: Ceramic-coated, low-e-coated insulating spandrel glass.

a. Overall Unit Thickness: 1 inch.

b. Outdoor Lite: Fully tempered clear float glass with low-e coating, Type FCE.

c. Low-E Coating: Sputtered on second surface.

d. Interspace Content: Argon.

e. Indoor Lite: Fully tempered clear float glass, ceramic-coated spandrel glass; Type FCS.

f. Opaque Coating Location: Fourth surface.

g. Glass Unit Performance Values:

1) Winter Nighttime U-Factor: 0.24 Btu/sq. ft. x h x deg F maximum.

2.6 INSULATED SPANDREL PANELS

A. Insulated Spandrel Panels: Laminated, rabbeted, aluminum-faced flat panels with no deviations in plane exceeding 0.8 percent of panel dimension in width or length.

1. Type **SP:** Basis-of-Design Product: Subject to compliance with requirements, provide Mapes Industries, Inc.; Mapes-R+ 8-ply, or comparable product, including, but not limited to, products by:

a. Nudo Products.

2. Overall Panel Thickness: 2-inch (including 1-inch glazing leg).

3. Exterior Skin: Aluminum.

a. Thickness: 0.032-inch.
b. Finish: Clear anodic finish.
c. Texture: Smooth.
d. Backing Sheet: 0.157-inch-thick, cement board.

4. Glazing Leg Core: Same as thermal insulation core, with smooth aluminum skin.

5. Thermal Insulation Core: Manufacturer's standard rigid, closed-cell, polyisocyanurate board.

6. Interior Skin: Aluminum.

a. Thickness: 0.032-inch.
b. Finish: Color anodic finish.
c. Texture: Smooth.
d. Backing Sheet: 1/2-inch-thick, gypsum board with proprietary fire-resistance-rated core.

7. Overall U-factor: 0.24 Btu/sq. ft. x h x deg F maximum.

8. Surface Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame Spread Index: 25 or less.
b. Smoke-Developed Index: 450 or less.

2.7 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glazing products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glazing manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Sealant shall have a VOC content of 250 g/L or less.

4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.

2.8 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glazing manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, including security applications, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks:

1. Elastomeric material with Shore A durometer hardness of 85, plus or minus 5.
2. Type recommended in writing by sealant or glazing manufacturer.

D. Spacers:

1. Elastomeric blocks or continuous extrusions of hardness required by glazing manufacturer to maintain glazing lites in place for installation indicated.
2. Type recommended in writing by sealant or glazing manufacturer.

E. Edge Blocks:

1. Elastomeric material with Shore A durometer hardness per manufacturer's written instructions.
2. Type recommended in writing by sealant or glazing manufacturer.

F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 GLAZING ACCESSORIES FOR FIRE-RATED GLAZING PRODUCTS

A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-rated glazing products with which products are used for applications and fire ratings indicated.

B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.

1. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

C. Perimeter Insulation for Fire-Rated Glazing: Product that is approved by testing agency that listed and labeled fire-rated glazing product with which it is used for application and fire rating indicated.

2.11 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on framing members and glazing components.

a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.12 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

1. Color: As selected by Architect from full manufacturer's range.

C. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Minimum required bite.
5. Effective sealing between joints of framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glazing immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

C. For fire-rated glazing units, examine glazing units to locate fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed Work.

D. For laminated-glass security glazing, examine glazing units to locate attack or threat side and protected side. Label or mark units as needed so that attack or threat side and protected side are readily identifiable. Do not leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glazing, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glazing edges from damage during handling and installation. Remove damaged glazing from Project site and legally dispose of off Project site. Damaged glazing includes glazing with edge damage or other imperfections that, when installed, could weaken glazing, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glazing manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glazing manufacturers for installing glazing lites.

F. Provide spacers for glazing lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glazing. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch-minimum bite of spacers on glazing and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glazing lites from moving sideways in glazing channel, as recommended in writing by glazing manufacturer and in accordance with requirements in referenced glazing publications.

H. Set glazing lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glazing lites with proper orientation so that coatings face exterior or interior as specified.

J. For fire-resistant glazing, set glass lites with proper orientation so that surfaces face fire side or protected side as specified.

K. For security glazing, set glazing lites with proper orientation so that surfaces face attack or threat side or protected side as specified.

L. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

M. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glazing, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glazing lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glazing and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glazing lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glazing lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glazing lites and glazing stops to maintain glazing face clearances and to prevent sealant from extruding into glazing channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glazing and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glazing.

3.7 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glazing from contact with contaminating substances resulting from construction operations. Examine glazing surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do contact with glazing, remove substances immediately as recommended in writing by glazing manufacturer. Remove and replace glazing that cannot be cleaned without damage to coatings.

C. Remove and replace glazing that is damaged during construction period.

D. Wash glazing on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glazing as recommended in writing by glazing manufacturer.

END OF SECTION 08 80 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Steel studs and tracks.
2. Slip-type head joints.
3. Flat strap and backing plate.
4. Cold-rolled channel bridging.
5. Resilient furring channels.
6. Cold-rolled furring channels.
7. Tie wire.
8. Hanger attachments to concrete.
9. Wire hangers.
10. Flat hangers.
11. Carrying channels (main runners).
12. Furring channels (furring members).
13. Isolation strip at exterior walls.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below, otherwise submit full Product Data for the following:

1. Grid suspension system for gypsum board ceilings.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

1.6 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association or the Steel Framing Industry Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
2. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized unless otherwise indicated.

B. Studs and Tracks: ASTM C645.

1. Steel Studs and Tracks:

    a. Minimum Base-Steel Thickness: 0.0329 inch.
    b. Depth: As indicated on Drawings.
    c. Minimum Track Leg Length: 1-1/4 inches.

C. Slip-Type Head Joints: Where indicated, provide the following:

1. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; with minimum track leg length of 2-1/2 inches; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Steel Thickness: 0.0538 inch.

E. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch-wide flanges.

1. Depth: 1-1/2 inches.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

B. Hanger Attachments to Concrete:

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or AC308 as appropriate for the substrate.

a. Uses: Securing hangers to structure.
b. Type: Torque-controlled, expansion anchor or adhesive anchor.
c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
d. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.

E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.

1. Depth: As indicated on Drawings.

F. Furring Channels (Furring Members):

1. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch deep.

a. Minimum Base-Steel Thickness: 0.0329 inch.

G. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.; Drywall Grid System.

b. CertainTeed Ceilings; 1-1/2” Drywall System.
c. USG Corporation; Drywall Suspension System.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide the following:

1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754.

1. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C1063 that apply to framing installation.
2. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structure, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs for opening widths less than 4 feet; install two tracks and stud head member for opening widths 4 feet and wider.

    a. Install two studs at each jamb unless otherwise indicated.

    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

E. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

5. Do not attach hangers to steel roof deck.

6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.

8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.6 PRE-ENCLOSURE REVIEW

A. Notify Architect prior to installing enclosing construction to allow observation of non-structural metal framing installation, including supplementary framing and blocking.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Interior trim.
2. Aluminum trim.
3. Joint treatment materials.
4. Sound-attenuation blankets.

B. As-Specified Data: If the product to be incorporated into Project is a specified by manufacturer name and product designation in Part 2 of this Specification Section, submit "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Gypsum wallboard.
2. Abuse-resistant gypsum board.
3. Mold-resistant gypsum board.
4. Cementitious backer units.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C1396/C1396M.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. CertainTeed Gypsum, Saint-Gobain; Regular Gypsum Board.
b. National Gypsum Company; Gold Bond Brand Gypsum Board.
c. USG Corporation; Sheetrock Brand Gypsum Panels.

2. Thickness: 1/2 inch.

3. Long Edges: Tapered.

B. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. CertainTeed Gypsum, Saint-Gobain; Extreme Abuse Board.
b. National Gypsum Company; Gold Bond Brand Hi-Abuse XP Gypsum Board.
c. USG Corporation; Sheetrock Brand Mold Tough AR Firecode X Panels.

2. Core: 5/8 inch, Type X.

3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.

4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.

5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.

6. Long Edges: Tapered.

7. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

C. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. CertainTeed Gypsum, Saint-Gobain; M2Tech Moisture and Mold Resistant Gypsum Board Type X.
b. National Gypsum Company; Gold Bond Brand XP Fire-Shield Gypsum Board.
c. USG Corporation; Sheetrock Brand Mold Tough Panels Firecode X.

2. Core: 5/8 inch, Type X.

3. Long Edges: Tapered.

4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.3 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. National Gypsum Company; PermaBase Cement Board.
b. USG Corporation; Durock Brand Cement Board with EdgeGuard.

2. Thickness: 1/2 inch.

3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.

2. Shapes:

a. Cornerbead.

b. LC-Bead: J-shaped; exposed long flange receives joint compound.

c. L-Bead: L-shaped; exposed long flange receives joint compound.

d. Expansion (control) joint.

e. Structural Laminate Corner System: Inside corner Outside corner.

1) Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed Gypsum, Saint-Gobain; No-Coat Structural Laminate Drywall Corner Trim, or comparable product.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Fry Reglet Corporation.
b. Gordon, Inc.
c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221, Alloy 6063-T5.

3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

D. Acoustical Sealant: As specified in Division 07 Section “Joint Sealants.”

E. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PRE-ENCLOSURE REVIEW

A. Notify Architect prior to applying panels to allow observation of framing installation, including supplementary framing and blocking.

3.3 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.

2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Stud Partition Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.4 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on Drawings.
2. Abuse-Resistant Type: As indicated on Drawings.
3. Mold-Resistant Type: As indicated on Drawings.
4. Type C: Where required for specific fire-resistance-rated assembly indicated.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.

2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

   a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
   b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.

2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.5 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use where indicated.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.7 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 5:At panel surfaces that will be exposed to view unless otherwise indicated.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Restore surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 30 13 – CERAMIC TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Ceramic tile.
2. Stone thresholds.
3. Waterproof membrane.

1.3 DEFINITIONS

A. General: Definitions in the current ANSI A108 A118, series of tile installation standards and in the current ANSI A137.1 apply to Work of this Section unless otherwise specified.
B. ISO 13007; Standards for Ceramic Tiles, Grouts and Adhesives.

1.4 PERFORMANCE REQUIREMENTS

A. Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per the DCOF AcuTest in accordance with ANSI A137.1 – 2012 standard.

1. Level Surfaces: Minimum 0.42 wet.
2. Step Treads.
3. Ramp Surfaces.

1.5 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Factory-mounted unglazed ceramic mosaic tile: CFT.
2. Glazed wall tile: CWT.
3. Marble thresholds.

4. Latex-portland cement.
5. Portland cement mortar (thickset) installation materials.
6. Latex-portland cement mortar (thin set).
7. Water-cleanable epoxy grout.
8. Trowelable underlayments and patching compounds.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

1. Show base details.
2. Show locations of floor drains and sloped slabs.
3. Show threshold locations and types.
4. Show all divider strip locations control and expansion joints.

C. Samples for Verification and Initial Color Selection:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of trim and accessory for each color and finish required.
3. Stone thresholds in 6-inch lengths.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.
B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
C. Product Certificates: For each type of product, signed by product manufacturer.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.9 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

1. Stone thresholds.
2. Waterproof membrane.
3. Metal edge strips.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in current ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.11 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with most current ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with most current ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. ISO 13007 Standards for Ceramic Tiles, Grouts and Adhesives: Provide materials complying with ISO 13007-1, 13007-2, 13007-3, 13007-4.

D. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

2.2 TILE PRODUCTS

A. Tile Type CFT1: Factory-Mounted Unglazed Ceramic Mosaic Tile

1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile; Division of Dal-Tile International Inc.; Keystones RYE BLEND MOSAIC or comparable product by one of the following:

    a. American Olean Inc.

2. Composition: ceramic mosaic porcelain.

3. Module Size: 1 x 1 inch.

4. Thickness: 1/4 inch.

5. Face: Plain with cushion edges.

6. Surface: Slip-resistant.

7. Tile Color and Pattern: As selected by Architect, as follows:

    a. Field Tile: Daltile Keystones, price groups 1 and 2.
    b. Accent Tile: Daltile Keystones, all price groups.
    c. Provide accent tile equal to 30 percent of total tile area, with the remainder as field tile.

8. Grout Color: As selected by Architect from manufacturer's full range.

9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as selected from manufacturer's standard shapes.

B. Tile Type CWT 1: Glazed Wall Tile

1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile; Division of Dal-Tile International Inc.; Color Wheel Matte and Semi-Gloss or comparable product by one of the following:

    a. American Olean Inc.

2. Module Size: 4 inches by 12 inches, VERTICAL STACK

3. Thickness: 5/16 inch.

4. Face: Plain with cushion edges.

5. Finish: Matte Semi-gloss glaze.

6. Tile Color and Pattern: As selected by Architect, as follows:

   a. Field Tile: Daltile Color Wheel Classic, price groups 1 and 2.
   b. Accent Tile: Daltile Color Wheel Classic, all price groups.
   c. Provide accent tile equal to 30 percent of total tile area, with the remainder as field tile.

7. Grout Color: As selected by Architect from manufacturer's full range.

8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

   a. Base for Portland Cement Mortar Installations: Coved, module size 4 X 12 inches.
   b. Base for Thin-Set Mortar Installations: Straight, module size 4 X 12 inches.

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

   1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

B. Marble Thresholds: ASTM C 503, with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.

   1. Description: As selected by Architect from manufacturer’s full range.

2.4 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Cement Based Waterproofing and Crack Isolation Membrane: Flexible mortar consisting of cement-based mix and latex additive.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Laticrete Hydro Ban Cementous Waterproof Membrane.
    b. MAPEI Corporation; Mapelastic 315.
    c. TEC; a subsidiary of H. B. Fuller Company; Triple Flex Waterproofing, Crack Isolation Membrane & Mortar.

C. Moisture Control: 2-part liquid coating.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Laticrete Vapor Ban Primer ER.
    b. MAPEI Planiseal MSP.

D. Latex Based Waterproofing and Crack Isolation Membrane: fast setting, flexible, thin, load-bearing, waterproofing membrane system consisting of a premixed, quick-drying liquid latex, for installation under ceramic tile or complying with ANSI A118.10 and ANSI A118.12; and having IAMPO certification as a shower pan liner

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Laticrete International; Hydro ban
    b. MAPEI- Mapelastic Aquadefense
    c. Custom Building Products; Red Gard

2.5 SETTING MATERIALS

A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.

1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils thick.

2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C 847.

    a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.

    b. Configuration over Solid Surfaces: Self furring.

4. Latex Additive: Manufacturer's standard acrylic resin water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete International; Laticrete 3701 Mortar Admix or comparable product by one of the following:

1) MAPEI-Planicrete AC
2) Laticrete 3701 Fortified Mortar Bed or 3701 Admix w/226 Thick Bed Mortar.
3) TEC; a subsidiary of H. B. Fuller Company.
4) Custom Building Products

B. Latex-Portland Cement Mortar (Thin Set): ISO 13007; C2ES2P2 and ANSI A118.4.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete International; Laticrete 254 platinum or comparable product by one of the following:

a. MAPEI- Ultra Flex 3
b. TEC; a subsidiary of H. B. Fuller Company.
c. Custom Building Products

2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.

3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.6 GROUT MATERIALS

A. Water-Cleanable Epoxy Grout: ISO 13007; RG and ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete International; Spectralock Pro Premium Epoxy Grout or comparable product by one of the following:

a. MAPEI-Kerapoxy CQ
b. TEC; a subsidiary of H. B. Fuller Company.
c. Custom Building Products

2.7 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

1. Laticrete NXT Surface Prep Line.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; half-hard brass white zinc alloy nickel silver stainless-steel, ASTM A 666, 300 Series exposed-edge material.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products as shown but not limited to all associated required accessories, that may be incorporated into the Work include, but are not limited to, the following:

    a. Schluter Systems L.P.

2.8 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by current ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with mortar, comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile installed with suitable products made to be trowelable with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with current ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 TILE INSTALLATION

A. Comply with current TCNA's "Handbook for Ceramic Tile Installation" for current TCNA installation methods specified in tile installation schedules. Comply with parts of the current ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in current TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
4. Grout coverage for tile mounted sheets must have a minimum of 2/3, verify in field prior to installation that tile tabs are no more than 1/3 of the tile height.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch.

2. Glass Mosaic Tile 1/16 inch.
3. Glazed Wall Tile: 1/16 inch.

G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated and as per all current TCNA, EJ171 standards. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above and at same width and as per current TCNA EJ171.

I. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.

1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).

2. Do not extend cleavage membrane/waterproofing under thresholds set in latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane/ waterproofing with elastomeric sealant.

3.4 WATERPROOFING INSTALLATION

A. Install ANSI A118.10 waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove all grout residue from tile as soon as possible.

2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Tile Installation F114-11: Cement mortar bed (thickset) with cleavage/waterproof membrane; epoxy grout; TCNA F114, ANSI A108.1B

    a. Tile Type: CFT.
    b. Thin-Set Mortar for Cured-Bed Method: Latex-portland cement mortar.
    c. Grout: Water-cleanable epoxy grout.

2. Tile Installation F122-11: Thin-set mortar on cleavage/waterproof membrane; TCNA F122, ANSI A108.5.

    a. Tile Type: CFT.
    b. Thin-Set Mortar: Latex-portland cement mortar.
    c. Grout: epoxy grout.

B. Interior Wall Installations:

1. Tile Installation W211-11: Cement mortar bed (thickset) bonded to substrate with crack isolation membrane; TCNA W211 and ANSI A108.1C.

    a. Tile Type: CWT.
    b. Bond Coat Mortar for Wet-Set Method: Latex-portland cement mortar.
    c. Thin-Set Mortar for Cured-Bed Method: Latex-portland cement mortar.
    d. Grout: Water-cleanable epoxy grout.

2. Tile Installation W244-11: Thin-set mortar on cementitious backer units over cleavage membrane; TCNA W244.

    a. Tile Type: CWT.
    b. Thin-Set Mortar: Latex-portland cement mortar.
    c. Grout: Water-cleanable epoxy grout.

END OF SECTION 09 30 13

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient molding accessories.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Resilient base: rubber RB.
2. Reducers.
3. Edge guards.
4. Adapters.
5. Trowelable leveling and patching compounds.
6. Concrete slab primer.
7. Adhesives.

B. Samples for Verification and Initial Color Selection:

1. For each type of product indicated, in manufacturer's standard-size Samples but not less than 2-1/2 inches long, of each resilient product color, texture, and pattern required.

1.5 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. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.6 QUALITY ASSURANCE

A. Source Limitations for Resilient Base and Accessories: Obtain each type of resilient base and accessories from a single source with resources to provide materials of consistent quality in appearance and physical properties.

B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 55 deg F or more than 90 deg F.

1.8 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 90 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 90 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE: RUBBER RB

A. Resilient Base:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. Mannington Commercial; Premium Rubber Edge.
b. Johnsonite; Rubber Wall Base.
c. Roppe Corporation, USA; Pinnacle Series Rubber Wall Base

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TP (rubber, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous).
3. Style: Cove (base with toe).

C. Minimum Thickness: 0.125 inch.

D. Height: 4 inches.

E. Lengths: Coils in manufacturer's standard length, not less than 100 feet.

F. Outside Corners: Job formed.

G. Inside Corners: Job formed.

H. Colors and Patterns: As selected by Architect from full range of industry colors.

2.2 RESILIENT MOLDING ACCESSORY

A. Resilient Molding Accessory:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Reducer:

1) Johnsonite; RR-XX Series Reducers.
2) Roppe Corporation, USA; Reducer 1/8 inch.

b. Edge Guards:

1) Johnsonite; EG-XX Series Edge Guard.
2) Roppe Corporation, USA; Carpet Edge 1/4-inch.

c. Adapters:

1) Johnsonite; CTA-XX Series Adapter.
2) Roppe Corporation, USA; Tile and Carpet Joiner.

B. Material: Vinyl or rubber.

C. Profile and Dimensions: As indicated.

D. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

1. Basis-of-Design Products: Subject to compliance with requirements, provide the following Ardex product or a comparable product:

a. Portland Cement-Based Flash Patching and Skim Coating: SD-F Feather Finish.
b. Portland Cement-Based Patching: SD-P Insta Patch.
c. Portland Cement-Based Self-Leveling Underlayment: K-10/K-60 Self-Leveling Underlayment Concrete.

B. Concrete Slab Primer: Non-staining type recommended by resilient accessories manufacturer.

C. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24**)**.

2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners- using manufactures approved methods and tools:

1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible. Use scribing and cutting measures approved by base manufacturer. Inside corners that are not scribed to fit will be rejected.

3. Use Crane #532 top-set gouger tool for all required for tight wrap and curved corners.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.
4. Do not wash floor until after the period recommended by manufacturer.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products until Substantial Completion.

END OF SECTION 09 65 13

SECTION 09 65 19 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Vinyl composition floor tile.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Vinyl composition floor tile VCT1.
2. Trowelable leveling and patching compounds.
3. Concrete slab primer.
4. Adhesives.
5. Floor polish.

B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of patterns.
2. Show base details.
3. Show locations of divider strips, control and expansion joints.
4. Show locations of floor drains and sloped slabs.
5. Show threshold locations and types.

C. Samples for Verification and Initial Color Selection: Full-size units of each color and pattern of floor tile required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.7 MATERIALS MAINTENANCE 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. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation.

1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.

B. Source Limitations for Resilient Tile: Obtain each type of resilient tile from a single source with resources to provide materials of consistent quality in appearance and physical properties.

C. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 55 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.10 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 90 deg F, in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 90 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 VINYL COMPOSITION FLOOR TILE: VCT1

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1. Field Tile:

    a. Armstrong World Industries, Inc.; Standard Excelon Imperial Texture (including Imperial Texture Classics) and Standard Excelon MultiColor.
    b. Johnsonite Flooring – the Azrock collection, (including standard, textile and solids collections).

2. Accent Tile 30%:

    a. Armstrong World Industries, Inc.; Standard Excelon Imperial Texture (including Imperial Texture Classics), Standard Excelon MultiColor, and Standard Excelon Rave.

    b. Johnsonite Flooring – the Azrock collection, (including standard, textile and solids collections).

B. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.

C. Wearing Surface: Smooth.

D. Thickness: 0.125 inch, 1/8inch.

E. Size: 12 by 12 inches.

F. Colors and Patterns: As selected by Architect from full range of industry colors.

1. Provide accent tile equal to 30 percent of total vinyl composition floor tile area, with the remainder as field tile.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

1. Basis-of-Design Products: Subject to compliance with requirements, provide the following Ardex product or a comparable product:

a. Portland Cement-Based Flash Patching and Skim Coating: SD-F Feather Finish.
b. Portland Cement-Based Self-Leveling Underlayment: K-10/K60 Self-Leveling Underlayment Concrete.

B. Concrete Slab Primer: Non-staining type recommended by resilient tile flooring manufacturer.

C. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.

1. Adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

a. VCT Adhesives: Not more than 50 g/L.

2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer, containing not less than 16 to 25 percent solids.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

   a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

      1) At a minimum, test concrete substrates in at least 3 locations in separate parts of the floor for applications of 2000 square feet or less; provide one additional test location for each additional 1000 square feet, or fraction thereof.

   b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.

C. Existing Floors: Condition of existing subfloor is unknown prior to removal of existing flooring. If, after removal of existing flooring, subfloor requires leveling, patching, or filling, notify Architect in writing.

1. Asbestos Abatement Areas: In areas where removal of existing flooring is included in asbestos abatement procedures, coordinate with entity responsible for abatement to ensure patching and repair is compatible with requirements for installation of resilient tile flooring.

D. Comply with resilient tile manufacturer's written instructions to prepare substrates.

1. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

2. Ensure patching and repair materials are compatible with resilient tile.

3. Levelness Tolerances: Apply patching and repair materials to provide levelness of floor substrate within 1/4 inch in 10 feet, unless more stringent levelness is recommended or required by resilient tile manufacturer.

4. Flash Patching and Skim Coating: Apply flash patching material to areas with 1/8 inch or less depression.

5. Patching: Apply patching material to areas with 1/8 inch or greater depression.

6. Self-Leveling Underlayment: Apply self-leveling material to areas where flash patching and patching described above cannot provide smooth, level surface acceptable to receive resilient tile flooring.

E. Do not install floor tiles until they are same temperature as space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in pattern indicated.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles as follows: 12” x 12”

a. Field Tile: With grain direction alternating in adjacent tiles (basket-weave pattern) in pattern of colors and sizes indicated.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, non-staining marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Apply concrete slab primer, if recommended by resilient tile manufacturer, prior to applying adhesive. Apply according to manufacturer’s written instructions.

I. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.
4. Do not wash floor until after the period recommended by resilient tile manufacturer.

C. Protect floor tile products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before applying liquid floor polish.

E. Cover floor tile until Substantial Completion.

F. Perform the following operations in each area of Project upon completion of floor installation and as recommended by manufacturer.

1. Vinyl Composition Floor Tile:

a. Scrub floor with a neutral detergent solution at 4 to 6 oz per gallon. Scrub floor using pads or brushes as recommended by vinyl composition floor tile manufacturer.

b. Use stripping solutions at badly soiled or scratched areas, as recommended by vinyl composition floor tile manufacturer.

c. Thoroughly rinse floor, wet vacuum and dry floor. Floor must be free from all dust, dirt and any particles that may become lodged in final polish application.

d. Apply five coats of commercial floor polish. Apply each coat as recommended by product manufacturer.

END OF SECTION 09 65 19

SECTION 09 66 23 - RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Thin-set, epoxy-resin matrix terrazzo flooring – poured epoxy
2. Epoxy-resin matrix terrazzo base - Precast.

1.3 DEFINITIONS

A. Aggregate: Marble, Glass and Granite chips.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to terrazzo including, but not limited to, the following:

a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress.
c. Review special terrazzo designs and patterns.

1.5 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Thin-set, epoxy-resin matrix terrazzo flooring- poured epoxy.
2. Epoxy- resin matrix terrazzo base- precast.
3. Thin-set divider strips.

4. Anchoring devices.
5. Patching and fill material.
6. Joint compound.
7. Resinous matrix terrazzo cleaner.
8. Sealer.

B. Shop Drawings: Submit set of drawings showing complete floor patterns in all areas indicated on Drawings to receive terrazzo. Submit drawings for Architect review prior to starting installation. Shop drawings are to including but not limited to:

1. Floor plans showing all patterns, precast base locations and details.
2. Layouts showing locations of divider strips, control and expansion joints.
3. Photocopies of Tetra Tech documentation not acceptable.
4. Divider strips.
5. Precast terrazzo jointing and edge configurations.
6. Terrazzo patterns.

C. Samples for Verification and Initial Color Selection: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare Samples of same thickness and from same material to be used for the Work, in size indicated below:

1. Poured Terrazzo: 6-inch-square Samples.
2. Precast Terrazzo: 6-inch-square Samples.
3. Accessories: 6-inch-long Samples of each exposed strip item required.
4. NTMA color plates showing the full range of colors and patterns available for each terrazzo type

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
B. Material Certificates: For each type of terrazzo material or product, from manufacturer.
C. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For terrazzo to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Installer Qualifications:

1. Engage an installer who is a contractor member of NTMA.
2. Engage an installer who is certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.

B. Source Limitations: Obtain primary terrazzo materials from single source from single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.

C. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.

D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for terrazzo including accessories.

a. Size: Minimum 100 sq. ft. of typical poured-in-place flooring condition for each color and pattern in locations directed by Architect.
b. Include base.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.
B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.

B. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.

C. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

D. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

E. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

2.2 EPOXY-RESIN MATRIX TERRAZZO-POURED EPOXY

A. Thin-set, Epoxy-Resin Matrix Terrazzo: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. General Polymers Corporation; Terrazzo 1100.
b. Key Resin Company; Key Epoxy Terrazzo.
c. Master Terrazzo Technologies LLC; Morricite.
d. TEC Specialty Construction Brands, Inc.; Tuff-Lite Epoxy Terrazzo.
e. Terrazzo & Marble Supply Companies; Terroxy Resin Systems.

2. Thickness: 3/8 inch nominal.

3. Formulated Mix Color and Pattern: To match existing

4. Custom Mix Color and Pattern: Match existing.

5. Aggregate and Matrix colors to be selected by architect. Matrix color to be selected from entire line of Sherwin Williams colors.

B. Materials:

1. Crack Isolation Membrane with Scrim: A two component, 100 percent solid flexible epoxy membrane applied at 40 square feet per gallon, yielding 40 mils in thickness. Provide Crack Isolation Membrane over 100% of surface to be covered with epoxy flooring- all floor levels. Provide scrim over all new and existing cracks as per manufactures recommendations. For all second and third floor applications, provide scrim over 100% of surface to be covered with epoxy flooring.

a. Similar to “Epoflex” by General Polymers, Cincinnati Ohio.

2. Primer: Manufacturer's product recommended for substrate and use indicated.

3. Thin-set Epoxy-Resin Matrix-Poured Epoxy: Manufacturer's standard recommended for use indicated and in color required for mix indicated.

a. Physical Properties without Aggregates:

1) Hardness: 60 to 85 per ASTM D 2240, Shore D.

2) Minimum Tensile Strength: 3000 psi per ASTM D 638 for a 2-inch specimen made using a "C" die per ASTM D 412.

3) Minimum Compressive Strength: 10,000 psi per ASTM D 695, Specimen B cylinder.

4) Chemical Resistance: No deleterious effects by contaminants listed below after seven-day immersion at room temperature per ASTM D 1308.

a) Distilled water.
b) Mineral water.
c) Isopropanol.
d) Ethanol.
e) 0.025 percent detergent solution.
f) 1.0 percent soap solution.
g) 10 percent sodium hydroxide.
h) 10 percent hydrochloric acid.
i) 30 percent sulfuric acid.
j) 5 percent acetic acid.

b. Physical Properties with Aggregates: For resin blended with Georgia white marble, ground, grouted, and cured per requirements in NTMA's "Terrazzo Specifications and Design Guide"; comply with the following:

1) Flammability: Self-extinguishing, maximum extent of burning 1/4 inch per ASTM D 635.
2) Thermal Coefficient of Linear Expansion: 0.0025 inch/inch per deg F for temperature range of minus 12 to plus 140 deg F per ASTM D 696.

4. Aggregates: Comply with NTMA gradation standards for mix indicated and contain no deleterious or foreign matter.

a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
b. 24-Hour Absorption Rate: Less than 0.75 percent.
c. Dust Content: Less than 1.0 percent by weight.

5. Finishing Grout: Resin based.

2.3 EPOXY-RESIN MATRIX TERRAZZO BASE- PRECAST

A. Epoxy Resin Matrix Terrazzo Base- Precast: Minimum 3/8-inch-thick, reinforced epoxy resin matrix terrazzo base- precast cast in maximum lengths possible, but not less than 36 inches. Comply with NTMA's written recommendations for fabricating precast terrazzo base units in sizes and profiles indicated.

1. Type: Refer to details.
2. Top Edge: Radius edge with polished top surface.
3. Outside Corner Units: With finished returned edges at outside corner.
4. Aggregate and Matrix colors to be selected by architect. Matrix color to be selected from entire line of Sherwin Williams colors.

2.4 STRIP MATERIALS

A. Thin-Set Divider Strips: L-type angle, 1/4 inch deep.

1. Material: White-zinc, alloy Brass.
2. Top Width: 1/8 inch, 1/4 inch.

B. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:

1. Base-bead strips for exposed top edge of terrazzo base.
2. Edge-bead strips for exposed edges of terrazzo.

2.5 MISCELLANEOUS ACCESSORIES

A. Anchoring Devices:

1. Strips: Provide mechanical anchoring devices or adhesives for strip materials as recommended by manufacturer and required for secure attachment to substrate.

2. Precast Epoxy Resin Matric Terrazzo: Provide mechanical anchoring devices as recommended by fabricator for proper anchorage and support of units for conditions of installation and support.

B. Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.

C. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.

D. Resinous Matrix Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.

E. Sealer: Slip- and stain-resistant, penetrating-type sealer that is chemically neutral; does not affect terrazzo color or physical properties; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.

1. Surface Friction: Not less than 0.6 according to ASTM D 2047.
2. Acid-Base Properties: With pH factor between 7 and 10.
3. Sealers shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and areas, 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, including levelness tolerances, have been corrected.
C. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.

B. Concrete Slabs:

1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.

a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.

b. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written recommendations.

c. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.

C. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

1. Moisture Testing: Perform tests indicated below.

a. Calcium Chloride Test: Perform anhydrous calcium chloride test per ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

1) Perform tests so that each test area does not exceed 200 sq. ft., and perform not less than two tests in each installation area and with test areas evenly spaced in installation areas.

b. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative-humidity-level measurement.

c. Proceed with installation only after substrates pass testing.

D. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.

1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 EPOXY-RESIN MATRIX TERRAZZO INSTALLATION- POURED EPOXY

A. Comply with NTMA's written recommendations for terrazzo and accessory installation.

B. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions and NTMA's "Terrazzo Specifications and Design Guide."

C. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet; noncumulative.

D. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.

E. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.

F. Flexible Reinforcing Membrane:

1. Prepare and prefill substrate cracks with membrane material.
2. Install membrane to produce full substrate coverage in areas to receive terrazzo.
3. Reinforce membrane with fiberglass scrim at substrate cracks and at all slabs other than slabs-on-grade.
4. Prepare membrane according to manufacturer's written instructions before applying substrate primer.

G. Primer: Apply to terrazzo substrates according to manufacturer's written instructions.

H. Strip Materials:

1. Divider and Control-Joint Strips:

a. Locate divider strips in locations indicated.

b. Install control-joint strips back to back directly above concrete-slab control joints.

c. Install control-joint strips with 1/4-inch gap between strips, and install sealant in gap.

d. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.

2. Accessory Strips: Install as required to provide a complete installation and in locations indicated.

3. Abrasive Strips: Install with surface of abrasive strip positioned 1/16 inch higher than terrazzo surface.

3.4 REPAIR

A. Cut out and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

3.5 CLEANING AND PROTECTION

A. Cleaning:

1. Remove grinding dust from installation and adjacent areas.

2. Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.

B. Sealing:

1. Seal surfaces according to NTMA's written recommendations.
2. Apply sealer according to sealer manufacturer's written instructions.

C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 66 23

SECTION 09 91 00 – PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and application of paint systems, for the following:

1. Exterior applications.

2. Interior applications.

a. Painting systems indicated on Drawings and in Schedules applied to new and existing exterior and interior surfaces and related components including but not limited to items such as hollow metal doors frames, doors, access doors, trim pieces, window sash, trim and previously painted cabinet heater/fin tube enclosures, exposed ductwork etc., unless otherwise indicated, including appropriate surface preparation for all new or existing surfaces to be painted including previously painted surfaces and surfaces with existing wall coverings

B. Section includes surface preparation and application of wood finishes.

1. Wood Refinishing as indicated on Drawings and in Schedules applied to new and existing interior surfaces and related components including but not limited to items such as door frames, doors, access doors, trim and molding pieces, window sash and trim, wood panel walls and doors etc., unless otherwise indicated, including appropriate surface preparation for all new or existing surfaces to be refinished including previously painted surfaces and surfaces with existing wall coverings.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product for substrates indicated. Include preparation requirements and application instructions. Include all paint products under one cover sheet.

1. Exterior CMU (painted).
2. Exterior CMU (stained).
3. Exterior steel.

4. Exterior galvanized-metal.
5. Exterior aluminum (where indicated).
6. Exterior wood (bleeding woods and knots).
7. Exterior wood (non-bleeding woods).
8. Exterior fiber cement siding.
9. Exterior portland cement (stucco).
10. Exterior exposed metal trim at portland cement (stucco).
11. Exterior exposed PVC
12. Exterior EFIS
13. Exterior Brick
14. Interior concrete, vertical surfaces.
15. Interior concrete, vertical surfaces (deep tone accent colors).
16. Interior CMU.
17. Interior CMU (deep tone accent colors).
18. Interior steel.
19. Interior steel (deep tone accent colors).
20. Interior previously painted cabinet heater/fin tube enclosures.
21. Interior steel piping, piping supports and hangers.
22. Interior galvanized-metal.
23. Interior galvanized-metal (metal deck).
24. Interior galvanized metal (metal deck, deep tone accent colors).
25. Interior aluminum (where indicated).
26. Interior wood.
27. Interior wood (deep tone accent colors).
28. Interior hardboard (stage floor).
29. Interior fiberglass reinforced polyester (FRP).
30. Interior plaster.
31. Interior plaster (deep tone accent colors).
32. Interior gypsum board.
33. Interior gypsum board (deep tone accent colors).
34. Interior plaster.
35. Interior plaster (deep tone accent colors).
36. Interior gypsum board.
37. Interior gypsum board (deep tone accent colors).
38. Interior plaster.
39. Interior plaster (deep tone accent colors).
40. Interior gypsum board.
41. Interior gypsum board (deep tone accent colors).
42. Interior stained wood (closed or open grain).
43. Interior stained wood (closed or open grain).
44. Interior clear finish wood (closed grain).
45. Interior clear finish wood (closed grain).

B. Samples for Verification and Initial Color Selection: For each type of finish system and in each color and gloss of finish indicated.

1. Submit Samples on rigid backing, 8 inches square.

    a. For wood finishes, submit Samples on representative samples of actual wood substrates, 8 inches square.

2. Step coats on Samples to show each coat required for system.

3. Label each coat of each Sample.

4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:

1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content. Tints and /or colorant shall add no additional VOC to final product. Provide 3rd party certification of VOC content.

D. Coatings Maintenance Manual:

1. Upon conclusion of the project, the contractor or paint manufacture/supplier shall furnish a coatings maintenance manual such as Sherwin Williams "Custodian Project Color and Product Information" report. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions. Touch up procedures and color samples of each color and finish used. All information contained in a self-bound 3 ring hole punched catalog.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For applicator.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 10 percent, but not less than 1 gal. of each material and color applied.
2. Stains and Transparent Finishes: 10 percent, but not less than 1 gal. of each material and color applied.

1.7 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual, experienced in applying finishes specified in this Section, who has successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; familiar with special requirements indicated; and with sufficient trained staff to apply manufacturer's products according to specified requirements.

B. Mockups: Apply mockups of each finish system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each finish system specified in Part 3.

    a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
    b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

    a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.9 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.
B. Do not apply finishes when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
C. Do not apply exterior finishes in snow, rain, fog, or mist.
D. Lighting: Do not install finishes until a lighting level of not less than 80 fc is provided on the surfaces to receive finishing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

1. Benjamin Moore & Co.
2. PPG Architectural Finishes, Inc.
3. Sherwin-Williams Company (The).

B. Submittals containing manufactures other than stated above, will require a product by product comparison for each type of paint. All Comparable equals are to be matched with corresponding Sherwin Williams specified products.

C. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in Part 3 articles for the application indicated.

2.2 MATERIALS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.

3. Provide products of same manufacturer for each coat in a finish system.

4. “All-in-one” paint and primer products are not acceptable.

B. VOC Compliance: All paint products shall meet New York requirements for Volatile Organic Compound (VOC) and Ozone Transport Commission (OTC) regulations, January 2005.

C. Colors: As selected by Architect from manufacturer's full range.

1. 25 percent of surface area will be painted with deep tones.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

a. Concrete: 12 percent.
b. Masonry (Clay and CMU): 12 percent.
c. Wood: 15 percent.
d. Gypsum Board: 12 percent.
e. Plaster: 8 percent.

B. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

C. Plaster Substrates: Verify that plaster is fully cured.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be finished. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.

1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

B. Clean substrates of substances that could impair bond of finishes, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce finish systems indicated.

C. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following**:**

1. SSPC-SP 3, "Power Tool Cleaning."
2. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Galvanized Metal/Galvanized Deck, Factory Primed Surface-Coordinate with approved paint manufacture on compatibility of paint finish coats to factory prime surface.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:

1. Scrape and clean knots. Before applying primer apply coat of knot sealer recommended in writing by topcoat manufacturer for coating system indicated.
2. Apply wood filler paste to open-grain woods to produce smooth, glasslike finish.
3. Sand surfaces that will be exposed to view and dust off.
4. Prime edges, ends, faces, undersides, and back sides of wood.
5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

L. Alteration Work: Comply with applicable surface preparation requirements specified and as recommended by finish materials manufacturer for existing surfaces to receive paint or other finishes, including cleaning, sanding, and roughening as required for proper adherence of new finish material.

1. Existing Woodwork: Strip existing wood finish to bare wood using commercially available solvents compatible with finish. Use in strict accordance with manufacturer's printed instructions. After stripping operation is complete and surface is dry, sand surface with sandpaper, using random orbital sanding machine.

3.3 APPLICATION

A. Apply finishes according to manufacturer's written instructions.

1. Use applicators and techniques suited for finish and substrate indicated.

2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

3. Paint back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4. Do not apply paints over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

E. Alterations: Finish new surfaces adjacent to unaltered existing surfaces with finish of same type and surface texture as corresponding adjacent surfaces, unless otherwise indicated. Finish patched, damaged, or extended surfaces to match existing surfaces.

F. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.
h. Duct, equipment, pipe and insulation having cotton or canvas insulation covering or another paintable jacket material.

2. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or another paintable jacket material.
h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner will engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. CMU Substrates (Painted):

1. First Coat:

    a. Benjamin Moore & Co.; Ultra-Spec Int/Ext Hi Build Block Filler 0609.
    b. PPG Paints; Speedhide Interior/Exterior Latex Block Filler 6-7.
    c. Sherwin-Williams Company (The); Prep Rite Latex Block Filler B25W25.

2. Second and Third Coats:

    a. Benjamin Moore & Co.; N447 Ultra Spec Exterior Flat Acrylic.
    b. PPG Paints; Speedhide Interior/Exterior Flat Acrylic Latex 6-610.
    c. Sherwin-Williams Company (The); A100 Latex Flat House Paint A6.

B. CMU Substrates (Stained):

1. First, Second and Third Coats:

    a. Benjamin Moore & Co.; Insl-X Tuffcrete WB Concrete Stain CST 2XXX.
    b. PPG Paints; Perma-Crete Color Seal Acrylic Concrete Stain 4-4210 Series.
    c. Sherwin-Williams Company (The); H & C ColorTop Concrete Stain Solid Color Water based 111.08 Concrete Stain.

C. Steel Substrates:

1. First Coat:

    a. Benjamin Moore & Co.; Super Spec HP Acrylic Metal Primer P04.
    b. PPG Paints; Inc.; Pitt-Tech Interior/Exterior Industrial DTM Primer/Finish Enamel 90-712.
    c. Sherwin-Williams Company (The); Pro Industrial Pro-Cryl® Universal Primer; B66 Series at 1.9-3.8 mils DFT.

2. Second and Third Coats:

    a. Benjamin Moore & Co.; Ultra Spec HP DTM Acrylic Gloss, HP28 or S/G Enamel HP29.
    b. PPG Paints; Inc.; Pitt-Tech Industrial DTM Acrylic Gloss 90-374.
    c. Sherwin-Williams Company (The); Pro Industrial™ Waterbased Alkyd Urethane Enamel Semi-Gloss; B53 Series at 1.4-1.7 DFT

D. Galvanized-Metal Substrates:

1. First Coat:

    a. Benjamin Moore & Co.; Super Spec HP Acrylic Metal Primer P04.
    b. PPG Paints; Inc.; Pitt-Tech Interior/Exterior Industrial DTM Primer/Finish Enamel 90-712.
    c. Sherwin-Williams Company (The); Pro Industrial Pro-Cryl® Universal Primer; B66 Series at 1.9-3.8 mils DFT.

2. Second and Third Coats:

    a. Benjamin Moore & Co.; Ultra Spec HP DTM Acrylic Low Luster HP29 or Semi-Gloss HP29.
    b. PPG Paints; Speedhide Exterior Acrylic Latex Satin 6-2045XI or Semi-Gloss 6-900XI.
    c. Sherwin-Williams Company (The); Pro Industrial™ Waterbased Alkyd Urethane Enamel Low-Gloss or Semi-Gloss; B53 Series at 1.4-1.7 DFT

E. Aluminum Substrates (Where Indicated):

1. First Coat:

    a. Benjamin Moore & Co.; Super Spec HP Acrylic Metal Primer P04.
    b. PPG Paints; Pitt-Tech Interior/Exterior Industrial DTM Primer/Finish Enamel 90-712.
    c. Sherwin-Williams Company (The); Pro Industrial Pro-Cryl® Universal Primer; B66 Series at 1.9-3.8 mils DFT.

2. Second and Third Coats:

    a. Benjamin Moore & Co.; Ultra Spec HP DTM Acrylic Gloss Enamel HP28 or Semi-Gloss HP29.
    b. PPG Paints; Pitt-Tech Industrial DTM Acrylic Gloss 90-374.
    c. Sherwin-Williams Company (The); Pro Industrial™ Waterbased Alkyd Urethane Enamel Low-Gloss or Semi-Gloss; B53 Series at 1.4-1.7 DFT

F. Wood Substrates (Bleeding Woods and Knots):

1. First Coat:

    a. Benjamin Moore & Co.; Super Spec Alkyd Exterior Primer 176.
    b. PPG Paints; Seal Grip Alkyd Universal Primer 17-941NF.

c. Sherwin-Williams Company (The); Exterior Oil-Based Wood Primer (Y24W8020).

2. Second and Third Coats:

a. Benjamin Moore & Co.; N448 Ultra Spec Exterior Satin Acrylic or Gloss N449.
b. PPG Paints: Speedhide Exterior Acrylic Satin 6-2045XI or Semi-Gloss 6-900XI.
c. Sherwin-Williams Company (The); Resilience Exterior Acrylic with Early Moisture Resistance.

G. Wood and Plywood Substrates (Non-Bleeding Woods):

1. First Coat:

a. Benjamin Moore & Co.; Fresh Start Multi-Purpose Latex Primer 023.
b. PPG Paints: Speedhide Exterior Latex Wood Primer 6-609.
c. Sherwin-Williams Company (The); Exterior Latex Wood Primer (B42W8041).

2. Second and Third Coats:

a. Benjamin Moore & Co.; Ultra Spec Exterior Satin, N448 or Gloss N449.
b. PPG Paints: Speedhide Exterior Acrylic Latex Satin 6-2045XI or Semi-Gloss 6-900XI.
c. Sherwin-Williams Company (The) A100 Exterior Latex Satin (A82) or Gloss (A8).

H. Exposed PVC Substrates:

1. First Coat:

a. Benjamin Moore & Co.; Insl-X Stix Waterborne Bonding Primer SXA-110.
b. PPG Paints: Pitt-tech Int./Ext. Primer DTM Industrial Enamel 90-712.
c. Sherwin-Williams Company (The); Extreme Bond Primer B51W00150.

2. Second and Third Coats:

a. Benjamin Moore & Co.; Ultra Spec Ext, Gloss N449.
b. PPG Paints: Pitt-Tech Plus Int./Ext. Semi-Gloss DTM Industrial Enamel 90-1210.
c. Sherwin-Williams Company (The): Pro Industrial™ Waterbased Alkyd Urethane Enamel Low-Gloss or Semi-Gloss; B53 Series at 1.4-1.7 DFT

3.7 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Vertical Surfaces:

1. First Coat:

a. Benjamin Moore & Co.; Moore’s Acrylic Masonry Primer 066.
b. PPG Paints: Perma-Crete Alkali-Resistant Primer 4-603.
c. Sherwin-Williams Company (The); Loxon Concrete & Masonry Primer (LX02W0050.)

2. Second and Third Coats (Semi-Gloss):

    a. Benjamin Moore & Co.; N539 Ultra Spec 500 Interior Semi-Gloss.
    b. PPG Paints: Speedhide Interior Semi-Gloss Latex 6-500.
    c. Sherwin-Williams Company (The); Pro Mar 200 Zero VOC Interior Latex S/G B31 Series.

B. Concrete Substrates, Vertical Surfaces (Deep Tone Accent Colors):

1. First Coat: Use tinted primer.

    a. Benjamin Moore & Co.; Moore's Acrylic Masonry Primer 066.
    b. PPG Paints: Perma-Crete Alkali-Resistant Primer 4-603.
    c. Sherwin-Williams Company (The); Loxon Concrete & Masonry Primer (LX02W0050.)

2. Second and Third Coats (Semi-Gloss): Additional coats may be required.

    a. Benjamin Moore & Co.; Ultra Spec 500 Interior Semi-Gloss N539.
    b. PPG Paints: Speedhide Interior Semi-Gloss Latex 6-500.
    c. Sherwin-Williams Company (The); ProMar 200 Zero VOC S/G B31-2600.

C. CMU Substrates:

1. First Coat:

    a. Benjamin Moore & Co.; Super Spec Masonry Int-Ext Hi-Build Block Filler 571.
    b. PPG Paints: Speedhide Interior/Exterior Latex Block Filler 6-7.
    c. Sherwin-Williams Company (The); PrepRite Block Filler B25W25

2. Second and Third Coats (Semi-Gloss):

    a. Benjamin Moore & Co.; N539 Ultra Spec 500 Interior Semi-Gloss.
    b. PPG Paints: Speedhide Interior Semi-Gloss Latex 6-500.
    c. Sherwin-Williams Company (The); Pro Mar 200 Zero VOC Interior Latex S/G B31 Series.

D. CMU Substrates (Deep Tone Accent Colors):

1. First Coat: Use tinted primer.

    a. Benjamin Moore & Co.; Super Spec Masonry Int-Ext Hi-Build Block Filler 571.
    b. PPG Paints: Speedhide Interior/Exterior Latex Block Filler 6-7.
    c. Sherwin-Williams Company (The); PrepRite Block Filler B25W25.

2. Second and Third Coats (Semi-Gloss): Additional coats may be required.

    a. Benjamin Moore & Co.; Ultra Spec 500 Interior Semi-Gloss N539.

    b. PPG Paints: Speedhide Interior Semi-Gloss Latex 6-500.

c. Sherwin-Williams Company (The); Pro Industrial DTM Acrylic Coating S/G (B66-20 DTM Acrylic Coating S/G (B66-W01151 Series) or Gloss (B66-W01051 Series).

E. Steel Substrates:

1. First Coat:

a. Benjamin Moore & Co.; Super Spec HP Acrylic Metal Primer P04.
b. PPG Paints: Pitt-Tech Interior/Exterior Industrial DTM Primer/Finish Enamel 90-712.
c. Sherwin-Williams Company (The); Pro Industrial DTM Acrylic Primer Finish B66W1.

2. Second and Third Coats (Semi-Gloss):

a. Benjamin Moore & Co.; Ultra Spec HP DTM Acrylic Semi-Gloss HP29, or Gloss HP28.
b. PPG Paints: Pitt-Tech Industrial DTM Acrylic Satin 90-474.
c. Sherwin-Williams Company (The); Pro Industrial™ Waterbased Alkyd Urethane Enamel Low-Gloss or Semi-Gloss; B53 Series at 1.4-1.7 DFT

F. Steel Substrates (Deep Tone Accent Colors):

1. First Coat: Use tinted primer.

a. Benjamin Moore & Co.; Super Spec HP Acrylic Metal Primer P04.
b. PPG Paints: Pitt-Tech Interior/Exterior Industrial DTM Primer/Finish Enamel 90-712.
c. Sherwin-Williams Company (The); Pro Industrial DTM Acrylic Primer Finish B66W1.

2. Second and Third Coats (Semi-Gloss): Additional coats may be required.

a. Benjamin Moore & Co.; Ultra Spec HP DTM Acrylic Semi-Gloss HP29 or Gloss HP28.

b. PPG Paints: Pitt-Tech Industrial DTM Acrylic Satin 90-474.

c. Sherwin-Williams Company (The); Sherwin-Williams Company (The); Pro Industrial™ Waterbased Alkyd Urethane Enamel Low-Gloss or Semi-Gloss; B53 Series at 1.4-1.7 DFT

G. Steel Piping, Piping Supports and Hangers:

1. First Coat:

a. Benjamin Moore & Co.; Super Spec HP Acrylic Metal Primer P04.
b. PPG Paints: Pitt-Tech Interior/Exterior Industrial DTM Primer/Finish Enamel 90-712.

c. Sherwin-Williams Company (The); Pro Industrial DTM Acrylic Primer Finish B66W1.

2. Second and Third Coats (Semi-Gloss):

a. Benjamin Moore & Co.; N539 Ultra Spec Interior Semi-Gloss.
b. PPG Paints: Speedhide Interior Latex Semi-Gloss 6-500.
c. Sherwin-Williams Company (The); Pro Industrial DTM Acrylic Coating S/G (B66-W01151/B66-W01051).

H. Galvanized-Metal Substrates:

1. First Coat:

a. Benjamin Moore & Co.; Super Spec HP Acrylic Metal Primer P04.
b. PPG Paints: Pitt-Tech Interior/Exterior Industrial DTM Primer/Finish Enamel 90-712.
c. Sherwin-Williams Company (The); Sherwin Williams Pro Industrial Pro Cryl Universal Primer B66-1310

2. Second and Third Coats:

a. Benjamin Moore & Co.; Ultra Spec HP DTM Acrylic Semi-Gloss HP29.
b. PPG Paints: Pitt-Tech Industrial DTM Acrylic Satin 90-474.
c. Sherwin-Williams Company (The); Pro Industrial DTM Acrylic Coating S/G (B6 6-W01151/B66-W01051).

I. Galvanized-Metal Substrates (Metal Deck):

1. First Coat:

a. Benjamin Moore & Co.; Coronado Super Kote 5000 Dry Fall Latex Flat 105 or Semi-Gloss 112.
b. PPG Paints: Speed Super Tech Latex Dry Fog Spray Paint 6-724XI.
c. Sherwin-Williams Company (The); Pro Industrial Waterborne Acrylic Dry Fall Eggshell B42W200082.

2. Second and Third Coats:

a. Benjamin Moore & Co.; Coronado Super Kote 5000 Dry Latex Semi-Gloss 112.
b. PPG Paints: Speed Super Tech Latex Dry Fog Spray Paint 6-724XI.
c. Sherwin-Williams Company (The); Pro Industrial Waterborne Acrylic Dry Fall Eggshell B42W0082.

J. Galvanized-Metal Substrates (Metal Deck, Deep Tone Accent Colors):

1. First Coat: Use tinted primer.

a. Benjamin Moore & Co.; Super Spec HP Acrylic Metal Primer P04.
b. PPG Paints: Pitt-Tech Interior/Exterior Industrial DTM Primer/Finish Enamel 90-712.

c. Sherwin-Williams Company (The); Pro Industrial DTM Acrylic Primer Finish B66 Series.

2. Second and Third Coats (Semi-Gloss):

a. Benjamin Moore & Co.; Ultra Spec HP DTM Acrylic Semi-Gloss HP29 or Gloss HP28.
b. PPG Paints: Pitt-Tech Interior /Exterior Satin DTM Industrial Enamel 90-474.
c. Sherwin-Williams Company (The); Pro Industrial DTM Acrylic Coating S/G or Gloss B66 Series.

K. Aluminum Substrates (Where indicated):

1. First Coat:

a. Benjamin Moore & Co.; Super Spec HP Acrylic Metal Primer P04.
b. PPG Paints: Pitt-Tech Interior/Exterior Industrial DTM Primer/Finish Enamel 90-712.
c. Sherwin-Williams Company (The); DTM Acrylic Primer Finish B66W1.

2. Second and Third Coats (Eggshell):

a. Benjamin Moore & Co.; Ultra Spec 500 Interior Eggshell N538.
b. PPG Paints: Speedhide Interior Latex Eggshell 6-411.
c. Sherwin-Williams Company (The); Pro Industrial DTM B66 Series.

L. Wood Substrates:

1. First Coat:

a. Benjamin Moore & Co.; Fresh Start Multi-Purpose Latex Primer N023.
b. PPG Paints: Seal Grip Latex Primer/Finish 17-951.
c. Sherwin-Williams Company (The); Premium Interior Wall and Wood Primer B28W8111.

2. Second and Third Coats (Semi-Gloss):

a. Benjamin Moore & Co.; N539 Ultra Spec 500 Interior Semi-Gloss.
b. PPG Paints: Speedhide Interior Semi-Gloss Latex 6-500.
c. Sherwin-Williams Company (The); Pro Mar 200 Zero VOC Interior Latex S/G B31 Series.

M. Wood Substrates (Deep Tone Accent Colors):

1. First Coat: Use tinted primer.

a. Benjamin Moore & Co.; Fresh Start Multi-Purpose Latex Primer N023.
b. PPG Paints: Seal Grip Latex Primer/Finish 17-951.
c. Sherwin-Williams Company (The); Premium Interior Wall and Wood Primer B28W8111.

2. Second and Third Coats (Semi-Gloss): Additional coats may be required.

    a. Benjamin Moore & Co.; Ultra Spec 500 Interior Semi-Gloss N539.
    b. PPG Paints: Speedhide Interior Semi-Gloss Latex 6-500.
    c. Sherwin-Williams Company (The); Pro Industrial DTM Acrylic Coating S/G or Gloss B66 Series.

N. Hardboard Substrates (Stage Floor):

1. First Coat:

    a. Benjamin Moore & Co.; Fresh Start Alkyd Primer 0024.
    b. PPG Paints: 3-510 Latex Floor Enamel.
    c. Sherwin-Williams Company (The); All Surface Enamel Interior/Exterior Latex Satin (A41 Series.)

2. Second and Third Coats (Flat):

    a. Benjamin Moore & Co.; Latex Floor and Patio Enamel N122.
    b. PPG Paints: 3-510 Latex Floor Enamel.
    c. Sherwin-Williams Company (The); All Surface Enamel Interior/Exterior Latex Flat (A41 Series.)

O. Plaster Substrates:

1. First Coat:

    a. Benjamin Moore & Co.; Super Spec Int/Ext 100% Acrylic Masonry Sealer N066.
    b. PPG Paints: Perma-Crete Alkali-Resistant Primer 4-603.
    c. Sherwin-Williams Company (The); Loxon Concrete & Masonry Primer LX02W0050.

2. Second and Third Coats (Eggshell):

    a. Benjamin Moore & Co.; N538 Ultra Spec 500 Interior Eggshell.
    b. PPG Paints: Speedhide Zero Interior Latex Eggshell 6-4310.
    c. Sherwin-Williams Company (The); Pro Mar 200 0 VOC Interior Latex Egg Shell (B20-2600 Series.)

P. Plaster Substrates (Deep Tone Accent Colors):

1. First Coat: Use tinted primer.

    a. Benjamin Moore & Co.; Fresh Start Primer 023.
    b. PPG Paints: Perma-Crete Alkali-Resistant Primer 4-603.
    c. Sherwin-Williams Company (The); Loxon Concrete & Masonry Primer LX02W0050.

2. Second and Third Coats (Eggshell): Additional coats may be required.

a. Benjamin Moore & Co.; N538 Ultra Spec 500 Interior Eggshell.
b. PPG Paints: Speedhide Zero Interior Latex Eggshell 6-4310.
c. Sherwin-Williams Company (The); Pro Mar 200 0 VOC Interior Latex Egg Shell (B20-2600 Series.)

Q. Gypsum Board Substrates:

1. First Coat:

a. Benjamin Moore & Co.; Fresh Start Multi-Purpose Latex N023.
b. PPG Paints: Speedhide Interior Latex Primer/Sealer 6-2
c. Sherwin-Williams Company (The); Pro Mar 200 Zero VOC Interior Latex Primer (B28W02600.)

2. Second and Third Coats (Eggshell):

a. Benjamin Moore & Co.; N538 Ultra Spec 500 Interior Eggshell.
b. PPG Paints: Speedhide Interior Latex Eggshell 6-411.
c. Sherwin-Williams Company (The); Pro Mar 200 Zero VOC Interior Latex Low Sheen (B20-Series.)

R. Gypsum Board Substrates (Deep Tone Accent Colors):

1. First Coat: Use tinted primer.

a. Benjamin Moore & Co.; Fresh Start Multi-Purpose Latex N023.
b. PPG Paints: Speedhide Interior Latex Primer/Sealer 6-2.
c. Sherwin-Williams Company (The); Pro Mar 200 Zero VOC Interior Latex Primer (B28W02600.)

2. Second and Third Coats (Eggshell): Additional coats may be required.

a. Benjamin Moore & Co.; N538 Ultra Spec 500 Interior Eggshell.
b. PPG Paints: Speedhide Interior Latex Eggshell 6-411.
c. Sherwin-Williams Company (The); Pro Mar 200 0 VOC Interior Latex Low Sheen (B24-2600 Series).

3.8 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Stained Wood (Closed or Open Grain):

1. First Coat:

a. Benjamin Moore & Co.; Lenmar Interior Waterborne Stain.
b. PPG Paints: Olympic Interior Low VOC Oil Stain 44500.
c. Sherwin-Williams Company (The); Minwax Wood Finish 250 VOC Compliant Stain (7107 Series).

2. Second and Third Coats (Eggshell/Low Lustre):

    a. Benjamin Moore & Co.; Benwood Stays Clear Stain Acrylic Polyurethane N423.
    b. PPG Paints: Olympic Interior Satin Polyurethane 43886.
    c. Sherwin-Williams Company (The); Minwax High Build Polyurethane Satin (009919945)

B. Stained Wood (Closed or Open Grain): Apply wood grain filler to open grain wood.

1. First Coat:

    a. Benjamin Moore & Co.; Lenmar Interior Waterborne Stain.
    b. PPG Paints: Olympic Interior Low VOC Oil Stain 44500.
    c. Sherwin-Williams Company (The); Minwax Wood Finish 250 VOC Compliant Stain (7107 Series)

2. Second and Third Coats (Semi-Gloss/High Gloss):

    a. Benjamin Moore & Co.; Benwood Stays Clear Semi-Gloss Acrylic Polyurethane N422.
    b. PPG Paints: Olympic Interior Semi-Gloss Satin Polyurethane 43886.
    c. Sherwin-Williams Company (The); Minwax High Build Polyurethane Semi-Gloss (009919937) or Gloss (009919929)

C. Clear Finish Wood (Closed Grain):

1. First Coat:

    a. Benjamin Moore & Co.; Benwood Stays Clear Acrylic Polyurethane N423.
    b. PPG Paints: Olympic Interior Gloss Polyurethane 43886 (Quart size only-OTC).
    c. Sherwin-Williams Company (The); Minwax High Build Polyurethane Satin (009919945).

2. Second and Third Coats (Satin/Low Lustre):

    a. Benjamin Moore & Co.; Benwood Stays Clear Satin Acrylic Polyurethane N423.
    b. PPG Paints: Olympic Interior Satin Polyurethane 43884 thinned (Quart size only – OTC).
    c. Sherwin-Williams Company (The); Minwax High Build Polyurethane Satin (009919945).

D. Clear Finish Wood (Closed Grain):

1. First Coat:

    a. Benjamin Moore & Co.; Benwood Stays Clear Acrylic Polyurethane N422.
    b. PPG Paints: Olympic Interior Gloss Polyurethane 43884 thinned (Quart size only – OTC).
    c. Sherwin-Williams Company (The); Minwax High Build Polyurethane Satin (009919945)

2. Second and Third Coats (Semi-Gloss/High Gloss):

    a. Benjamin Moore & Co.; Benwood Stays Clear Semi-Gloss Acrylic Polyurethane N422.
    b. PPG Paints: Olympic Interior Semi-Gloss Polyurethane 43884 (Quart size only – OTC).
    c. Sherwin-Williams Company (The); Minwax High Build Polyurethane Semi-gloss (009919945).

END OF SECTION 09 91 00

SECTION 09 96 00 – HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and application of high-performance coating systems, for the following:

1. Exterior applications.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product for substrates indicated. Include preparation requirements and application instructions. Include all paint products under one cover sheet.

1. Exterior steel.
2. Exterior Steel – Gas Piping
3. Exterior galvanized metal.
4. Exterior wood.
5. Exterior aluminum.
6. Exterior urethane.
7. Exterior CMU.
8. Exterior Cement Board.

B. Samples for Verification and Initial Selection: For each type of coating system and in each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

D. Coatings Maintenance Manual:

1. Upon conclusion of the project, the contractor or paint manufacture/supplier shall furnish a coatings maintenance manual such as Sherwin Williams “Custodian Project Color and Product Information” report. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions. Touch up procedures and color samples of each color and finish used. All information contained in a self-bound 3 ring hole punched catalog.

1.5 QUALITY ASSURANCE

A. Qualification Data: For applicator.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Coatings: 10 percent, but not less than 1 gal. of each material and color applied.

1.7 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual, experienced in applying high performance coatings specified in this Section, who has successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; familiar with special requirements indicated; and with sufficient trained staff to apply manufacturer's products according to specified requirements.

B. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each coating system specified in Part 3.

a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.9 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.
B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
C. Do not apply exterior coatings in snow, rain, fog, or mist.
D. Lighting: Do not install high-performance coatings until a lighting level of not less than 80 fc is provided on the surfaces to receive coating.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

   1. Benjamin Moore & Co.
   2. Sherwin-Williams Company (The).
   3. Tnemec Inc.

B. Submittals containing manufactures other than stated above, will require a product by product comparison for each type of paint. All Comparable equals are to be matched with corresponding Sherwin Williams’s specified products.

C. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include but are not limited to products listed in Part 3 articles for the application indicated.

2.2 HIGH PERFORMANCE COATINGS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.

3. Provide products of same manufacturer for each coat in a coating system.

4. "All-in-one" paint and primer products are not acceptable.

B. VOC Compliance: Provide exterior coating products complying with New York requirements for Volatile Organic Compound (VOC) and Ozone Transport Commission (OTC) regulations, January 2005.

C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

a. Concrete: 12 percent.
b. Masonry (Clay and CMU): 12 percent.
c. Wood: 15 percent.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

B. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

C. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

D. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal using bio-degradable detergent. Then abrasive blast with fine abrasive to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

H. Aluminum Substrates: Remove loose surface oxidation by scarification.

I. Wood Substrates:

1. Scrape and clean knots. Before applying primer apply coat of knot sealer recommended in writing by topcoat manufacturer for coating system indicated.
2. Sand surfaces that will be exposed to view and dust off.
3. Prime edges, ends, faces, undersides, and back sides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

J. Galvanized Metal/Galvanized Deck- Factory Primed Surface: Coordinate with approved paint manufacturer on compatibility of paint finish coats to factory prime surface.

K. After removing all surface contamination, the surface should be scuff sanded or scrubbed with an abrasive cleaner to dull the surface for best adhesion.

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions.

1. Use applicators and techniques suited for coating and substrate indicated.

2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.

3. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner will engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.

1. Contractor shall touch up and restore coated surfaces damaged by testing.

2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Steel Substrates:

1. First Coat:

    a. Benjamin Moore & Co. (No Zinc primers) suggest Corotech V160 Epoxy Mastic Coating @4.6-7.2 DFT.
    b. Sherwin-Williams Company (The); Corothane 1 Gal-Va-Pac Zinc Primer B65G00010 at 3.0-4.0 mils DFT.
    c. Tnemec Inc.; Series 90-97 Tneme-Zinc at 2.5 to 3.5 mils DFT.

2. Second Coat:

    a. Benjamin Moore & Co. Corotech V160 Epoxy Mastic Coating @4.6-7.2 DFT
    b. Sherwin-Williams Company (The); Macropoxy 646 B58 series 7.0-5.0 mils DFT
    c. Tnemec Inc.; Series 66HS Hi-Build Epoxoline at 3.0 to 5.0 mils DFT.

3. Third Coat:

    a. Benjamin Moore & Co. Corotech V500 Acrylic Aliphatic Urethane Coating Gloss or V510 Acrylic Aliphatic Urethane Coating Semi-Gloss at 3.2-4.6 mils DFT
    b. Sherwin-Williams Company (The); Hi Solids Polyurethane B65 series 4.5-3.0 mils DFT
    c. Tnemec Inc.; Series 1074 or 1095 Endura-Shield II at 2.0 to 5.0 mils DFT.

B. Galvanized-Metal Substrates:

1. First Coat:

    a. Benjamin Moore & Co. Corotech V160 Epoxy Mastic Coating @4.6-7.2 DFT
    b. Sherwin-Williams Company (The); Macropoxy 646 B58 series 7.0-5.0 mils DFT
    c. Tnemec Inc.; Series 66HS Hi-Build Epoxoline at 3.0 to 5.0 mils DFT.

2. Second Coat:

    a. Benjamin Moore & Co. Corotech V500 Acrylic Aliphatic Urethane Coating Gloss or V510 Acrylic Aliphatic Urethane Coating Semi-Gloss at 3.2-4.6 DFT
    b. Sherwin-Williams Company (The); Hi Solids Polyurethane B65 series 4.5-3.0 mils DFT
    c. Tnemec Inc.; Series 1074 or 1095 Endura-Shield II at 2.0 to 5.0 mils DFT.

C. Wood Substrates:

1. First Coat:

a. Benjamin Moore & Co. Insul-X Aqua Lock Plus Primer
b. Sherwin-Williams Company (The); Exterior Oil-Based Wood Primer Y24W8020 at 2.3 mils DFT
c. Tnemec Inc.; Series V10-99W Primer

2. Second and Third Coat:

a. Benjamin Moore & Co. Corotech V331 Acrylic DTM Enamel Semi-Gloss at 2-2.2 DFT (third coat of same)
b. Sherwin-Williams Company (The); Sher-Cryl HPA High Performance Acrylic Semi-Gloss B66W350 at 2.5-4.0 mils DFT.
c. Tnemec Inc.; Series 1029 Enduratone

D. Aluminum Substrates:

1. First Coat:

a. Benjamin Moore & Co. Corotech V160 Epoxy Mastic Coating @4.6-7.2 DFT
b. Sherwin-Williams Company (The); Macropoxy 646 Fast Cure Epoxy B58W610 at 5.0-10.0 mils DFT
c. Tnemec Inc.; Series 66HS Hi-Build Epoxoline at 4.0-6.0 mils DFT

2. Second Coat:

a. Benjamin Moore & Co. Corotech V500 Acrylic Aliphatic Urethane Coating Gloss or V510 Acrylic Aliphatic Urethane Coating Semi-Gloss at 3.2-4.6 DFT
b. Sherwin-Williams Company (The); Hi Solids Polyurethane B65 series 4.5-3.0 mils DFT
c. Tnemec Inc.; Series 1074 or 1095 Endura-Shield II at 2.0-5.0 mils DFT

E. Urethane Substrates:

1. First Coat:

a. Benjamin Moore & Co. Insl-X Stix XSA 110 Bonding Primer
b. Sherwin-Williams Company (The); Multi-Purpose Interior/Exterior Latex Primer/Sealer B51-450 Series at 1.4 mils DFT.
c. Tnemec Inc.; Series 151-1051 Elasto-Grip F.C. at 1.0 to 2.0 mils DFT.

2. Second and Third Coat:

a. Benjamin Moore & Co. Corotech V331 Acrylic DTM Enamel Semi-Gloss at 2-2.2 DFT (third coat of same)
b. Sherwin-Williams Company (The); Sher-Cryl HPA High Performance Acrylic Semi-Gloss B66W350 at 2.5-4.0 mils DFT.
c. Tnemec Inc.; Series 1029 Enduratone.

F. CMU:

1. First Coat:

    a. Benjamin Moore & Co. Ultra-Spec Masonry 100% Acrylic Masonry 608 Flat @9. DFT
    b. Sherwin-Williams Company (The) Con-Flex XL High Build Coating A05W451 at 6.0-7.5 mils DFT.
    c. Tnemec Inc.; Series 156 Color Enviro-Crete @4.0-8.0 mils DFT (use Tnemec-Tape for cracks larger than 1/64" wide)

2. Second Coat:

    a. Benjamin Moore & Co. Super Spec Masonry 100% Acrylic Elastomeric 360.
    b. Sherwin-Williams Company (The); Con-Flex XL High Build Coating A05W451 at 6.0-7.5 mils DFT.
    c. Tnemec Inc.; Series 156 Color Enviro-Crete @4.0-8.0 mils DFT

G. Cement Siding:

1. First Coat:

    a. Benjamin Moore & Co. Ultra-Spec Int/Ext Acrylic Masonry 609 -Series, (1.0-4.3) DFT.
    b. Sherwin-Williams Company (The) Loxon Concrete & Masonry Primer, LX 02W0050, (2.1-3.2 mils) DFT.
    c. Tnemec Inc.; Series 27WB Low VOC Water Base Epoxy (6.0 – 12.0 mils) DFT.

2. Second Coat:

    a. Benjamin Moore & Co. Ben Acrylic Exterior, 541/542/543 Series, (1.3 mils) DFT.
    b. Sherwin-Williams Company (The); Resilience Acrylic Exterior, K43 Series, (1.6 mils) DFT.
    c. Tnemec Inc.; Series 1029 HDP Acrylic Water Based Polymer, (2.5 mils) DFT

END OF SECTION 09 96 00

SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior unframed signs.

B. Scope: Provide room identification signs at all permanent rooms. Room identification signs to contain room names, room numbers, and graphics as indicated on Drawings and in Signage Schedule attached to this Section. Provide other signs as indicated on Drawings and in Signage Schedule attached to this Section.

1. Provide barrier-free and tactile signage at all locations required by Code and as indicated on Drawings.

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner and signage Installer.

2. Review requirements for signage including, but not limited to, the following:

a. Size, configuration, and location of each sign.
b. Text, room name, room number, and graphics selections.
c. Color selections.
d. Sign Samples.
e. Sign quantities.

3. Review requirements for accessible signage.

4. Review requirements for mounting locations, heights, and types.

1.5 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for signs.

1. Interior unframed signs.

B. Shop Drawings: For signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements including raised characters and Braille and layout for each sign.
4. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), and as follows:

1. Signs: Full-size Sample of interior unframed sign.

E. Product Schedule: For signs. Use same designations indicated on Drawings or specified.

F. Sample Warranty: For special warranty.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.
B. Warranty: Executed special warranty.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to correct or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design", ICC A117.1, and building Code in effect for Project.

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 200 or less.
2. Smoke-Developed Index: 450 or less.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, unless otherwise indicated, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ASI Sign Systems, Inc., dba ASI.
2. Best Sign Systems, Inc.
3. Mohawk Sign Systems.

B. Source Limitations: Obtain signs from single source from single manufacturer.

2.3 INTERIOR UNFRAMED SIGNS

A. Interior Unframed Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; for interior use, and as follows:

1. Basis-of-Design Product: Subject to compliance with requirements, provide ASI; EmBoss ADA-Ready Sign System, or comparable product.

2. Sign Materials:

a. Mounting Panel: 0.125-inch-thick acrylic.
b. Face: 0.0015-inch-thick PVC/vinyl acetate bonded to mounting panel.

3. Fabrication:

a. Graphics and Text: Accessible tactile copy and Grade 2 Braille (except as otherwise indicated). Color as selected by Architect from manufacturer's full range. Finish raised characters to contrast with background color, and finish Braille to match background color.

1) Where "(#)" appears in Sign Type paragraph below, verify with Architect number to be used in place of "(#)".
2) Where "(room name)" appears in Sign Type paragraph below, verify with Architect room name to be used in place of "(room name)".

b. Typeface: As selected by Architect from manufacturer's full range.

c. Background: Finish and color as selected by Architect from manufacturer's full range.

4. Mounting: Manufacturer's standard method for substrates indicated with adhesive two-face tape.

B. Sign Types:

1. Type 7: Room Sign:

a. Size: 6 inches wide by 2 inches high.
b. Text Size and Content: 5/8-inch-high (minimum) lettering: (room name).

2. Type 7a: Unisex/Gender Neutral Room Sign:

a. Size: 6 inches wide by 2 inches high.
b. Text Size: 5/8-inch-high (minimum) lettering.

3. Type 8: Girls/Women's Restroom Sign:

a. Size: 6 inches by 6 inches.
b. Graphics: Female symbol, and wheelchair accessibility symbol if applicable.
c. Use with Type 7 Room Sign.

4. Type 9: Boys/Men’s Restroom Sign:

    a. Size: 6 inches by 6 inches.
    b. Graphics: Male symbol, and wheelchair accessibility symbol if applicable.
    c. Use with Type 7 Room Sign.

5. Type 10: Restroom Sign:

    a. Size: 6 inches by 6 inches.
    b. Graphics: Male/female symbol, and wheelchair accessibility symbol if applicable.
    c. Use with Type 7 Room Sign.

6. Type 10a: Restroom Sign:

    a. Size: 6 inches by 6 inches.
    b. Graphics: Wheelchair accessibility symbol if applicable.
    c. Use with Type 7a Room Sign.

2.4 SIGN MATERIALS

A. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.5 ACCESSORIES

A. Adhesive: As recommended by sign manufacturer.
B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.6 FABRICATION

A. Tactile and Braille Characters: In compliance with listed accessibility standard in “Performance Requirements” Article, raised 1/32-inch minimum above background.

2.7 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
C. Verify that anchorage devices embedded in permanent construction are correctly sized and located to accommodate signs.
D. Proceed with installation only after unsatisfactory conditions have been corrected.
E. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Accessibility: Install signs in locations as indicated on Drawings and according to the accessibility standard.

C. Mounting Locations: Locate on wall adjacent to latch side of door 60 inches from center of sign to finished floor, and 2 inches from edge of door frame. Where adequate wall space adjacent to latch side of door is not available, and at double-leaf doors, place sign on nearest adjacent wall.

D. Mounting Methods:

1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

2. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully corrected by finish touchup or similar minor corrective procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

Attachment: Signage Schedule

END OF SECTION 10 14 00

SIGNAGE SCHEDULE

COLOR	ROOM NO.	SIGNAGE TYPE	SIGNAGE TEXT	REMARKS
			Cornwall	
			Cornwall Elementary School	
	133	7/9	NAME BY DISTRICT	
	134	7/8	NAME BY DISTRICT	
			Cornwall-On-Hudson Elementary School	
	B102	7/9	NAME BY DISTRICT	
	A103B	7	NAME BY DISTRICT	
	B103	7/8	NAME BY DISTRICT	
	B201	7A/10A	NAME BY DISTRICT	
	B302	7/9	NAME BY DISTRICT	
	B303	7/8	NAME BY DISTRICT	
			Cornwall Middle School	
	A201	7A/10A	NAME BY DISTRICT	
	A202	7A/10A	NAME BY DISTRICT	
	B102	7/9	NAME BY DISTRICT	
	B103	7/8	NAME BY DISTRICT	
	D17	7A/10A	NAME BY DISTRICT	
	D18	7A/10A	NAME BY DISTRICT	

PLEASE REFER TO PARAGRAPH 1.4 – PREINSTALLATION MEETINGS IN REGARDS TO SIGNAGE REQUIREMENTS.

END OF SECTION 10 14 01

SECTION 10 14 16 - PLAQUES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast plaques.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For plaques.

1. Include fabrication and installation details and attachments to other work.
2. Show plaque mounting heights, locations of supplementary supports, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each plaque at full size.

C. Samples for Verification and Initial Color Selection: For each type of plaque, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For plaques to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 PLAQUES

A. Cast Plaque: Plaque with background texture, border, and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Ace Sign Systems, Inc.
    b. A. R. K. Ramos Signage Systems.
    c. Gemini Incorporated.
    d. Metallic Arts.

2. Plaque Material: Cast bronze.

3. Finishes:

    a. Integral Metal Finish: As selected by Architect from full range of industry finishes.
    b. Overcoat: Manufacturer's standard baked-on clear coating.

4. Background Texture: As selected by Architect from manufacturer's full range.

5. Integrally Cast Border Style: Square single line, polished.

6. Mounting: Concealed studs.

7. Text and Typeface: Typeface as selected by Architect from manufacturer's full range. Finish raised characters to contrast with background color.

2.2 MATERIALS

A. Bronze Castings: ASTM B 584, alloy recommended by manufacturer and finisher for finish indicated.

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of plaques, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.

2. Plaque Mounting Fasteners:

a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of plaque, screwed into back of plaque, or screwed into tapped lugs cast integrally into back of plaque, unless otherwise indicated.

2.4 FABRICATION

A. General: Provide manufacturer's standard plaques according to requirements indicated.

1. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

2.5 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 CLEAR ORGANIC COATING FOR COPPER-ALLOY FINISHES

A. Clear Organic Coating: Clear, waterborne, air-drying, acrylic lacquer called "Incralac"; specially developed for coating copper-alloy products; consisting of a solution of methyl methacrylate copolymer with benzotriazole to prevent breakdown of the film in UV light; shop applied in two uniform coats per manufacturer's written instructions, with interim drying between coats and without runs or other surface imperfections, to a total dry film thickness of 1 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of plaque work.

B. Verify that plaque-support surfaces are within tolerances to accommodate plaques without gaps or irregularities between backs of plaques and support surfaces unless otherwise indicated.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. General: Install plaques using mounting methods indicated and according to manufacturer's written instructions.

1. Install plaques level, plumb, true to line, and at locations and heights indicated, with plaque surfaces free of distortion and other defects in appearance.
2. Before installation, verify that plaque surfaces are clean and free of materials or debris that would impair installation.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of plaque. Remove loose debris from hole and substrate surface.

a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place plaque in position and push until flush to surface, embedding studs in holes. Temporarily support plaque in position until adhesive fully sets.

b. Thin or Hollow Surfaces: Place plaque in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed plaques and plaques that do not comply with specified requirements. Replace plaques with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as plaques are installed.

C. On completion of installation, clean exposed surfaces of plaques according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain plaques in a clean condition during construction and protect from damage until acceptance by Owner.

3.4 SCHEDULE

A. Plaque Schedule:

Building:	**Qty.:**	**Location:**	**Text:**
Cornwall-on-Hudson Elementary School	1	To be determined	To be determined by Owner

END OF SECTION 10 14 16

SECTION 10 14 53 - TRAFFIC SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Traffic signs. Related Sections:

1. Section 03 30 00 “Cast-In-Place Concrete”

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Traffic signs.
2. Traffic sign posts.

B. Shop Drawings: For traffic signage.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.
2. Include color samples.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Comply with all applicable state and local requirements for traffic signs, including (but not limited to) reflectivity, foundation construction, and wind resistance.

1. Comply with U.S. Department of Transportation's Manual on Uniform Traffic Control Devices (MUTCD), AASHTO M268 and NYSDOT standard specifications and regulations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard:

1. Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities, ICC A117.1, and building code in effect for Project for signs.

2. Comply with applicable provisions in the New York State Department of State Division of Administrative Rules, Part 300 Universal Symbol of Access, Part 300.4 Accessible Wording, Part 300.5 Accessible Symbol, Part 300.6 Accessibility Graphic and Components, and building code in effect for Project for signs.

2.2 TRAFFIC SIGNS

A. Traffic Sign: Sign of single-panel configuration; with smooth, uniform surfaces and support assembly; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or comparable product.

1. Allstate Sign & Plaque Corporation; Aluminum Traffic & Parking Signs.

C. Materials:

1. Solid-Sheet Sign Panels: Aluminum sheet and as follows:

a. Thickness: 0.080 inch.
b. Surface-Applied Graphics: Applied vinyl film.

2. Posts: Steel.

a. Description: Hot-dipped galvanized round steel post with vandal-proof cap and U-channel with baked enamel or powder coated.
b. Installation Method: Direct burial in concrete or driven.

3. Text and Typeface: Typeface as selected by Architect from manufacturer's full range and content as scheduled.

4. Reflectivity:

   a. Traffic control, directional and guide signage: Provide high intensity prismatic reflective sheeting (Federal DOT Type III and IV Reflective).
   b. Parking and informational signage: Provide engineer grade prismatic reflective sheeting (Federal DOT Type 1 Reflective).

2.3 MATERIALS

A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

C. Steel Materials:

1. U-Channel posts: Powdercoated U-channel steel.

   a. Strength: 3 lbs. per foot
   b. Length: 8-ft minimum

2. Galvanized Steel Pipe: Group IC, SS40, round steel electric-resistance-welded pipe.

   a. Diameter: 3.000-inches
   b. Steel Cap for Round Post: Galvanized steel with vandal-resistant secure fit to pipe.
   c. Length: 8-ft minimum

3. Steel Tubing: ASTM A 500, Grade B.

4. Bolts for Steel Framing: ASTM A 307 or ASTM A 325 as necessary for design loads and connection details.

5. For steel exposed to view on completion, provide materials having flat, smooth surfaces without blemishes. Do not use materials whose surfaces exhibit pitting, seam marks, roller marks, rolled trade names, or roughness.

D. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3,000 psi.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:

1. Furnish nonferrous-metal, stainless-steel, or hot-dip galvanized devices unless otherwise indicated.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

B. Sign Message Panels: Construct sign-panel surfaces to be smooth and to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.

1. Increase panel thickness or reinforce with backing materials as needed to produce surfaces without distortion, buckles, warp, or other surface deformations.

C. Post Fabrication: Fabricate posts designed to withstand wind pressure indicated for Project location and of lengths required for installation method indicated for each sign.

1. Steel Posts: Fabricate from steel tubing unless otherwise indicated. Include post caps, reinforcement where required for loading conditions, and related accessories required for complete installation.

2. Direct Burial: Fabricate posts 36 inches longer than height of sign to permit direct burial or embedment in concrete-filled postholes.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 METALLIC-COATED STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: Provide factory-applied manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils.

B. Galvanized Finish: Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. General: Install signs using installation methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to accessibility standard.
3. Before installation, verify that sign components are clean and free of materials or debris that would impair installation.

3.3 INSTALLING POSTS

A. Vertical Tolerance: Set posts plumb within a tolerance of 1/16 inch in 3 feet.

B. Direct-Burial Method:

1. Excavation: Excavate posthole to dimensions indicated. Reconstruct subgrade that is not firm, undisturbed, or compacted soil, or that is damaged by freezing temperatures, frost, rain, accumulated water, or construction activities by excavating an additional 12 inches, backfilling with satisfactory soil or well-graded aggregate, and compacting to original subgrade elevation.

2. Setting in Cast-in-Place Concrete: Set post in position, support to prevent movement, and place concrete in posthole as indicated.

3.4 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 10 14 53

SECTION 10 21 13.19 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-plastic toilet compartments.

1.3 COORDINATION

A. Coordinate requirements for blocking, reinforcing, and other supports concealed within wall to ensure that toilet compartments can be supported and installed as indicated.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

1. Door hardware and accessories.
2. Overhead bracing.
3. Stiffener.
4. Anchorage and fasteners.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for item listed below; otherwise submit full Product Data for the following:

1. Solid-plastic toilet compartments:

C. Shop Drawings:

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of centerlines of plumbing fixtures.
3. Show locations of floor drains.

D. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of toilet compartment.

E. Samples for Verification: Actual sample of finished products for each type of toilet compartment.

1. Size: Manufacturer's standard size.

F. Delegated Design Submittals: For grab bars mounted on toilet compartment panels, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Include structural design calculations indicating compliance with specified structural-performance requirements.

G. Sample Warranty: For special warranty.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of toilet compartment by manufacturer indicating compliance with performance requirements.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For toilet compartments.
B. Warranty: Executed special warranty

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of plumbing fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to correct or replace components of plastic toilet compartments that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Not less than 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain plastic toilet compartments from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.

B. Fire-Test-Response Characteristics:

1. Burning extent of 1 inch or less when tested according to ASTM D635 on plastic sheets in thicknesses indicated for the Work.
2. Self-ignition temperature of 650 deg F or higher when tested according to ASTM D1929 on plastic sheets in thicknesses indicated for the Work.
3. Smoke density of 75 or less when tested according to ASTM D2843 on plastic sheets in thicknesses indicated for the Work.

C. Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:

1. Panels are able to withstand a concentrated load on grab bar of at least 250 lbf applied at any direction and at any point, without deformation of panel.

D. Regulatory Requirements: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design," ICC A117.1, and building Code in effect for Project for toilet compartments designated as accessible.

2.3 SOLID-PLASTIC TOILET COMPARTMENTS

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1. ASI Global Partitions; Solid Plastic (HDPE), standard type Floor Mounted Overhead Braced.
2. General Partitions Mfg. Corp.; High Density Polymer (HDPE), Series 40-7 Floor Supported - Headrail.
3. Scranton Products; Hiny Hiders Toilet Partitions 60 door and panel height, floor mounted overhead-braced.

B. Toilet-Enclosure Style: Overhead braced, floor anchored.

C. Urinal-Screen Style: Overhead braced, floor anchored.

D. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color throughout thickness of material. Provide with no-sightline system consisting of door and pilaster lapped edges on strike side of door.

1. Door and Panel Height: Not less than 60 inches.

2. Door and Panel Mounting Height: As standard with manufacturer for privacy level specified.

3. Pilaster Height: Not less than 70 inches.

4. Integral Hinges: Configure doors and pilasters to receive integral hinges.

5. Heat-Sink Strip: Manufacturer's continuous, extruded-aluminum or stainless steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.

6. Color: One color in each room as selected by Architect from manufacturer's full range.

E. Urinal-Screen Construction: Matching panel construction.

F. Pilaster Shoes: Manufacturer's standard design; stainless steel.

G. Urinal-Screen Post: Manufacturer's standard post design of material matching the thickness and construction of pilasters; with shoe matching that on the pilaster.

H. Brackets (Fittings):

1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum or stainless steel.

2.4 HARDWARE AND ACCESSORIES

A. Door Hardware and Accessories, Heavy Duty: Manufacturer's heavy-duty institutional operating hardware and accessories.

1. Hinges: Manufacturer's minimum 0.062-inch-thick, stainless steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door. Mount with through bolts.

2. Latch and Keeper: Manufacturer's heavy-duty, surface-mounted, cast stainless steel latch unit, designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible. Mount with through bolts.

3. Coat Hook: Manufacturer's heavy-duty, combination cast stainless steel hook and rubber-tipped bumper, sized to prevent in swinging door from hitting compartment-mounted accessories. Mount with through bolts.

4. Door Bumper: Manufacturer's heavy-duty, rubber-tipped, cast stainless steel bumper at out swinging doors. Mount with through bolts.

5. Door Pull: Manufacturer's heavy-duty, cast stainless steel pull at out swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible. Mount with through bolts.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.

C. Stiffener: Manufacturer's standard continuous, aluminum stiffener in manufacturer's standard finish, where recommended by manufacturer for bracing hinge-side pilasters.

D. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel.

2.5 MATERIALS

A. Aluminum Castings: ASTM B26/B26M.
B. Aluminum Extrusions: ASTM B221.
C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
D. Stainless Steel Castings: ASTM A743/A743M.

2.6 FABRICATION

A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements for attachment of toilet accessories.

B. Overhead-Braced, Floor-Anchored Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism. Provide with continuous head rail.

1. Overhead-Braced, Floor-Anchored Urinal-Screen Posts: Manufacturer's standard corrosion-resistant anchoring assemblies at posts and walls, with leveling adjustment nuts at bottoms of posts. Provide shoes at posts to conceal anchorage.

C. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, in-swinging doors for standard toilet enclosures (centered between compartment side walls) and 36-inch-wide, out-swinging doors with a minimum 32-inch-wide, clear opening for toilet enclosures designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

1. Confirm location and adequacy of blocking and supports required for installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels or Screens: 1/2 inch.
b. Panels or Screens and Walls: 1 inch.

2. Full-Height (Continuous) Brackets: Secure panels or screens to walls and to pilasters with full-height brackets.

a. Locate bracket fasteners, so holes for wall anchors occur in masonry or tile joints.
b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced, Floor-Anchored Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels and adjust, so tops of doors are parallel with overhead brace when doors are in closed position.

1. Overhead-Braced, Floor-Anchored Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and doors for compartments designated as accessible to return doors to fully closed position.

END OF SECTION 10 21 13.19

SECTION 10 28 00 - TOILET AND SHOWER ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Toilet accessories.
2. Electric hand dryers.
3. Custodial accessories.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below, otherwise submit full Product Data for the following:

1. Soap dispenser, vertical type.

2. Grab bar.
3. Sanitary-napkin disposer.
4. Mirror, glass.
5. Electric hand dryer.
6. Shelf, metal, heavy-duty.
7. Mop and broom holder.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

D. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.
B. Warranty: Executed special warranty.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to correct or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 15 years from date of Substantial Completion.

B. Manufacturer’s Special Warranty for Electric Hand Dryers: Manufacturer agrees to correct or replace hand dryers that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Not less than 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials for Installation by Contractor:

1. Toilet tissue dispenser.
2. Paper towel dispenser.

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

2.3 TOILET ACCESSORIES

A. Source Limitations: Obtain toilet accessories from single source from single manufacturer unless manufacturer does not offer product listed.

B. Soap Dispenser SD:

1. Vertical Type:

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) American Specialties, Inc.; 0347.
2) Bobrick Washroom Equipment, Inc.; B-2111.
3) Bradley Corporation; 6562.

b. Description: Designed for dispensing soap in liquid or lotion form.

c. Mounting: Vertically oriented, surface mounted.

d. Capacity: 40 oz.

e. Materials: Stainless steel, ASTM A480/A480M No. 4 finish (satin), with corrosion-resistant valve.

f. Lockset: Tumbler type.

g. Refill Indicator: Window type.

C. Grab Bar GB:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. American Specialties, Inc.; 3800-P Series.
b. Bobrick Washroom Equipment, Inc.; B-6806.99 Series.
c. Bradley Corporation; 812-2 Series.

2. Mounting: Flanges with concealed fasteners.

3. Material: Stainless steel, 0.05 inch thick.

a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin) on ends and slip-resistant texture in grip area.

4. Outside Diameter: 1-1/2 inches.

5. Configuration and Length: As indicated on Drawings.

D. Mirror, Glass MG:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. American Specialties, Inc.; 0620-B.
b. Bobrick Washroom Equipment, Inc.; B-1658.
c. Bradley Corporation; 781-2.

2. Frame: Stainless-steel channel.

a. Corners: Manufacturer's standard.

3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.

a. Wall bracket of steel, equipped with concealed locking devices requiring a special tool to remove.

4. Mirror Glazing: Tempered clear glass.

5. Size: As indicated on Drawings.

2.4 ELECTRIC HAND DRYERS

A. Source Limitations: Obtain warm-air dryers from single source from single manufacturer unless manufacturer does not offer product listed.

B. Electric Hand Dryer EHD:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Stainless Steel, with Satin Finish:

1) American Specialties, Inc.; 0185-93.
2) Bradley Corporation; 2902-287400.
3) World Dryer; SLIMdri L-973.

2. Description: Standard-speed, electric hand dryer.

3. Mounting: Surface mounted, with low-profile design.

4. Operation: Electronic-sensor activated with timed power cut-off switch.

5. Electrical Requirements: 100-120 V, 3.3-10.0 A, 400-1200 W.

2.5 CUSTODIAL ACCESSORIES

A. Shelf, Metal, Heavy-Duty SMHD:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Specialties, Inc.; 0692-524.
    b. Bobrick Washroom Equipment, Inc.; B-295 x24.
    c. Bradley Corporation; 755-18.

2. Description: With exposed edges turned down not less than 1/2 inch and supported by two triangular brackets welded to shelf underside.

3. Size: 18 inches long by 5 inches deep.

4. Material and Finish: Not less than nominal 0.05-inch-thick stainless steel, ASTM A480/A480M No. 4 finish (satin).

B. Mop and Broom Holder MBH:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Specialties, Inc.; 1315-4.
    b. Bobrick Washroom Equipment, Inc.; B-224 x 36.
    c. Bradley Corporation; 9984.

2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.

3. Length: 36 inches.

4. Hooks: Three.

5. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.

6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

    a. Shelf: Not less than nominal 0.05-inch-thick stainless steel.
    b. Rod: Approximately 1/4-inch-diameter stainless steel.

2.6 MATERIALS

A. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper-and-theft resistant where exposed, and of stainless or galvanized steel where concealed.

B. Tempered Clear Glass Mirrors: Mirror Glazing Quality, for blemish requirements; and comply with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied; nominal 6.0 mm thick.

2.7 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of accessories.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to comply with specified structural-performance requirements.

C. Shower Seats: Install to comply with specified structural-performance requirements.

3.3 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
B. Remove temporary labels and protective coatings.
C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 10 28 00

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Manually operated roller shades with single rollers.
2. Roller shade fabrics.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations, all dimensions and clearances for each shade installation.

1. Include typical elevation layout showing separation between shade units and meeting edges at corners with sections and details at head and sill between blind units and corners.
2. Provide verified in field details showing all types of shade installation conditions.
3. Components and conditions not fully dimensioned or detailed in manufacturers product data indicating relationship to adjoining construction.
4. Manufactures specification instructions and details specific to components and conditions not fully dimensioned or detailed in manufactures product data.
5. Provide data for all components required for installation.

C. Samples for Verification and Initial Color Selection: For each type and color of shadeband material.

1. Include Samples of accessories involving color selection.
2. Actual color samples of manufactures full range – no color copies will be accepted.

3. Shadeband Material: Not less than 10 inches square. Mark inside face of material if applicable.
4. Roller Shade: Full-size operating unit, not less than 16 inches wide by 36 inches long for each type of roller shade indicated.
5. Installation Accessories: Full-size unit, not less than 10 inches long.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of shadeband material, signed by product manufacturer.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roller shades to include in maintenance manuals.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.8 WARRANTY

A. Manufacturer's Warranty - Provide manufacturer's warranty including coverage of at least following components:

1. Corrosion of all metal parts.
2. Sagging, creasing, or breaking of slats.
3. Sagging, creasing or ripping of shadeband material.
4. Smoothly performing mechanism without slippage or jams.
5. Finish of all components matching in color, uniform, and against fading or discoloration.
6. Defects in materials and installation workmanship.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Draper Inc.; Manual FlexShade Systems or comparable product by one of the following:

1. Hunter Douglas Contract.
2. MechoShade Systems, Inc.

B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated; with chain retainer.

1. Bead Chains: Manufacturer's standard.

a. Limit Stops: Provide upper and lower ball stops.

C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Drive-End Location: Right or left side as require per shade layout.

2. Direction of Shadeband Roll: Regular, from back of roller and or back to front to clear window handles, extrusions etc.

3. Shadeband-to-Roller Attachment: Manufacturer's standard method- no double-side tape will be accepted. Provide adequate brackets on multiple sash windows to hold roller pin ends no more than 1/8 inch apart over centerline of mullion.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade, not to exceed manufactures recommendation that is operated by one roller drive-end assembly.

E. Shadebands:

1. Shadeband Material: Light-filtering fabric similar to “Sheer-weave Series” fabric by Draper Inc.

F. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

1. Type: Enclosed in sealed pocket of shadeband material.

G. Fabrication:

1. Cut shades perfectly square and true and mount on rollers using suitable fasteners. Provide all material used in shade manufacture new, commercially perfect and of first quality. Provide material in one piece.

2. Provide one finished length of each single hung shade after hemming 14 inches longer than portion of sash covered by shade. Provide finished shade width to cover adequately, but not more than 1/4 inch of barrel exposed at each end of roller.

    a. Where necessary, increase diameter of roller from 1-1/4 inches to correspond with size of shade.
    b. Provide hems of proper width for slat, double turn hems, and sew with straight stitch. Neatly backstitch all hems at the ends.
    c. Hem at top and bottom of shade.

3. Fabrication Tolerances:

    a. Size shades to fit openings head – including but not limited to wall, door, window head etc., to sill including but not limited to window sill, floor sill etc. (allowing for 6 to 10 inches in additional length) and between mullions, unless otherwise indicated on Drawings.

    b. Provide single sets of shades no greater in width than distance between 2 mullions at openings up to 15 ft. wide.

    c. Provide minimum clearances for appropriate operation of shades.

H. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.

    a. Shape: L-shaped.
    b. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open.
    c. Provide full range of manufactures colors.

2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.

    a. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open.
    b. Provide full range of manufactures colors.

3. Endcap Covers: To cover exposed endcaps.

4. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Filtering Fabric (Same Color Both Sides): Woven fabric, stain and fade resistant.

1. Source: Roller-shade manufacturer.

2. Type: Woven polyester and PVC-coated polyester.

3. Weave: Basketweave.

4. Color: As selected by Architect from manufacturer's full range.

5. Basis-of-Design Product: Subject to compliance with requirements, provide the following Draper Inc. product or comparable product:

a. Light-Filtering Fabric (Same Color Both Sides) Openness Factor 5 percent: SheerWeave Series PW3500.

1) Thickness: 0.036 inches.
2) Weight: 19.2 oz./sq. yd.
3) Locations: North-facing windows with clear view; east-, west- and south-facing windows with obstructed view.

C. Rescue Window Labels: Provide and install on window shade in every space of pupil occupancy opaque labels with words "RESCUE WINDOW" Install labels on shades associated with rescue window coordinate with Architect for location.

1. Color: Opaque, bright yellow background with black letters.
2. Size: 2 inches by 1 inches, 3/8” wide lines to form letters.
3. Text: “RESCUE WINDOW”, readable from room side of window.

2.4 ROLLER-SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.

2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible.

D. Rescue Window Labels: Provide and install on window shade in every space of pupil occupancy opaque labels with words "RESCUE WINDOW" Install labels on shades associated with rescue window coordinate with Architect for location.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 ROLLER-SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

2. Hang shades at window to fit opening properly and operate smoothly and efficiently. Hang each shade perfectly level and with spring tension of roller properly adjusted. Locate tips of adjoining shades no further than 3/8 inch apart when two or more are mounted back to back.

3. Install each shade on brackets securely fastened to ceiling or wall as shown on Drawings. Furnish and install new brackets and other hardware required for proper installation of shades.

B. Prior to installation of roller-shade units, coordinate installation locations and method of installation with window manufacturer, do not secure roller-shade units to window frame.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 12 24 13

SECTION 21 13 13 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sprinkler piping specialties.
2. Sprinklers.

1.3 DEFINITIONS

A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

1.4 SYSTEM DESCRIPTIONS

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.5 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.

1. Sprinkler Occupancy Hazard Classifications:

a. Light Hazard Occupancy:

1) All the existing building, unless noted otherwise.

2. Minimum Density for Automatic-Sprinkler Piping Design:

a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.

3. Maximum Protection Area per Sprinkler:

a. Office Spaces: 120 sq. ft.
b. Storage Areas: 130 sq. ft.
c. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.7 INFORMATIONAL SUBMITTALS

A. Field Test Reports:

1. Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.
B. Field quality-control reports.

1.9 QUALITY ASSURANCE

A. Applicable Standards: Sprinkler system equipment, specialties, accessories, design, installation, and testing shall comply with the following:

1. Fire Code of New York State.
2. NFPA 13 Standard for the Installation of Sprinkler Systems - 2013 edition.
3. Materials and devices essential for successful system operation shall be UL listed and FM approved.

B. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility.

1.10 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

PART 2 - PRODUCTS

2.1 STEEL PIPE AND FITTINGS

A. Standard Weight, Black-Steel Pipe: ASTM A 53/A 53M, Schedule 40, Type F or Type S, Grade A. Pipe ends may be factory or field formed to match joining method.
B. Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.
C. Steel Couplings: ASTM A 865, threaded.
D. Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
E. Malleable- or Ductile-Iron Unions: UL 860.
F. Cast-Iron Flanges: ASME 16.1, Class 125.
G. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.
H. Steel Welding Fittings: ASTM A 234/A 234M and ASME B16.9.

2.2 SPRINKLER PIPING SPECIALTIES

A. Flexible Sprinkler Hose Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Fivalco Inc.
b. FlexHead Industries, Inc.
c. Gateway Tubing, Inc.

2. Standard: UL 1474.

3. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.

4. Pressure Rating: 175-psig minimum.

5. Size: Same as connected piping, for sprinkler.

2.3 RECESSED SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFAC Inc.
2. Globe Fire Sprinkler Corporation.
3. Reliable Automatic Sprinkler Co., Inc.
4. Tyco Fire & Building Products LP.
5. Venus Fire Protection Ltd.
6. Victaulic Company.
7. Viking Corporation.

B. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."

C. Pressure Rating for Automatic Sprinklers: 175-psig minimum.

D. Automatic Sprinklers with Heat-Responsive Element:

1. Early-Suppression, Fast-Response Applications: UL 1767.

2. Nonresidential Applications: UL 199.

3. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

E. Sprinkler Finishes: Chrome plated.

F. Sprinkler Type: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Recessed, chrome-plated steel, one piece, flat.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.

C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.

E. Fill sprinkler system piping with water.

3.2 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

E. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.3 SPRINKLER INSTALLATION

A. Install sprinklers in ceiling system. Secure to ceiling structure as recommended by sprinkler manufacturer. In general, head layout to be in centered in spaces and/or center of acoustical ceiling panels.

B. Install sprinklers into flexible, sprinkler hose fittings and install hose into bracket on ceiling grid.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
3. Energize circuits to electrical equipment and devices.

C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.5 CLEANING

A. Clean dirt and debris from sprinklers.
B. Remove and replace sprinklers with paint other than factory finish.

3.6 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Rooms with Suspended Ceilings: Recessed sprinklers.

END OF SECTION 21 13 13

SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Definitions, references, and abbreviations.
2. General regulatory requirements.
3. General requirements regarding site/field conditions including existing conditions and field measurements.
4. Sequencing and scheduling including coordination.
5. Definition of design equipment and procedures for consideration of specified equivalents, proposed equivalents, or substitutions.
6. Transition fittings.
7. Grout.
8. Plumbing demolition.
9. Supports and anchorages.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. Potable Water Outlets: Includes external outlets (hose bibs) and any internal outlets that may be used for drinking or cooking (including food preparation) or potentially used for drinking or cooking. Outlets include:

1. Bubblers/drinking fountains/water coolers/bottle fillers.
2. Classroom sinks.
3. Classroom combination sinks and bubblers.
4. Kitchen sinks.
5. Kitchen kettle filler outlets.
6. Ice machines.
7. Toilet room lavatories.
8. Teachers' lounge sinks.
9. Nurse's office sinks.
10. Hose bibbs.
11. Athletic field outlets.

1.4 SYSTEM DESCRIPTION

A. Provide complete systems, properly connected, tested, balanced, adjusted, and ready for operation, including all necessary and required controls, safeties, details and accessories, including (but not limited to):

1. Sanitary drainage and vent systems.
2. Water distribution systems.
3. Plumbing fixtures.
4. Miscellaneous items.

1.5 COORDINATION PROCEDURES

A. Coordinate construction operations and construction schedule of plumbing work with other contractors in accordance with Section 01 31 00 "Project Management and Coordination" and as modified below.

1. Pre-Installation Conference:

    a. Attend pre-installation conference. Arrange for all subcontractors to be in attendance.

2. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

3. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Section 08 31 13 "Access Doors and Frames."

4. Coordinate Plumbing Work with HVAC systems, lighting fixtures, ceiling mounted devices, ceiling heights, materials, structural work, maintenance clearances, and electric code clearance and building systems.

5. Notify Owner's Project Representative and Architect in case of unresolved interferences prior to installation of Plumbing Work.

6. Adjust exact size, location and offsets of pipes to achieve reasonable appearance objectives in open areas without ceilings without increase in Contract Sum.

1.6 SUBMITTALS, GENERAL

A. Comply with requirements of SECTION 01 33 00 “Submittal Procedures” for each individual Section and as modified below.

B. Submit all action submittals required by individual Section concurrently.

1. As-Specified Products: If product to be incorporated into Project is as specified by name and product designation in Part 2 of product specification, and will be installed as specified in Part 3, and only where allowed as such in submittal portion of product specification, then submit “**As-Specified Verification Form**” (attached to SECTION 01 33 00 “Submittal Procedures”) in lieu of “Product Data” identified in the Action Submittal.

2. Do not use “**As Specified Verification Form**” unless specifically indicated in detailed product specification.

3. Equivalent Products or Substitutions: If product to be incorporated into Project is <u>not</u> specified by name and product designation in Part 2 below, comply with all Product Data requirements specified.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sleeves and sleeve seals. Include rated capacities, and furnished specialties and accessories.

1. Penetration firestopping materials.

1.8 INFORMATIONAL SUBMITTALS

A. Lab results for lead testing prior to commencing work.
B. Contract Closeout Submittals: Comply with requirements of Section 01 77 00 “Closeout Procedures”.

1.9 QUALITY ASSURANCE.

A. Provide installation, testing and materials in accordance with Federal, State and Local Building, Health, Plumbing and Electrical Codes, Laws, Ordinances, and Regulations that apply to Plumbing Work.

1. Comply with applicable requirements of following documents:

a. New York State Uniform Fire Prevention and Building Code.
b. 2020 Building Code of New York State.

c. 2020 Fire Code of New York State.
d. 2020 Plumbing Code of New York State.
e. 2020 Mechanical Code of New York State.
f. 2020 Energy Conservation Construction Code of New York State.
g. New York State Education Department Manual of Planning Standards.
h. In event of a conflict between the Codes identified above and Contract Documents, comply with more stringent requirement.

2. Obtain and pay for necessary inspections, certificates, and permits from applicable agencies. Perform required tests in accordance with regulation of agency having jurisdiction. Submit certificates of approval prior to the date of Substantial Completion as defined in Section 01 77 00 "Closeout Procedures".

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes 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.

B. Packing and Shipping: Ship materials in manufacturer's containers, fully identified with manufacture's name, trade name, type, class, style, model, grade, size and color.

C. Storage and Protection:

1. Store materials, equipment, fixtures, pipe, fittings, and attachments, under cover, off ground in original containers as applicable, and protect from physical and weather damage while in storage and during construction.

2. Furnish extra materials identified in technical sections, in original manufacturers' containers and packaging, to Owner at location identified during prebid conference. Obtain receipt from Owner upon delivery of extra materials and send copy of receipt to Architect.

3. Replace or repair damaged, rusted, corroded or otherwise unusable materials physically damaged or weather damaged equipment as determined by Architect, at no change in Contract Sum.

1.11 PROJECT/SITE CONDITIONS

A. Existing Conditions:

1. Potable water testing for lead prior to commencing any work: A baseline for lead testing must be set. Coordinate with Owner to schedule potable water lead testing in each building where modifications to the potable water outlets are to take place.

2. Engage a qualified laboratory to test water samples from all potable water outlets scheduled for replacement in accordance with NYS Law 10 CRR-NY 67-4.

B. Take note of any existing potable water outlets scheduled for replacement that exceed the action level (5 micrograms per liter) according to NYS Law 10 CRR-NY 67-4.

C. Reuse equipment only as indicated on Drawings.

1. All usable material and equipment not being reused is to be offered to the Owner. If accepted by Owner the Contractor shall deliver to a location on District grounds designated by the Owner.

2. All other material and equipment to be removed, shall be removed from the site and legally disposed of by the Contractor.

D. Rodent Proofing:

1. Strainer Plates: All strainer plates on drain inlets shall be designed and installed so that all openings are not greater than a 1/2 inch in least dimension. Refer to Section 22 13 19 "Sanitary Waste Piping Specialties" for additional requirements.

2. Openings for Pipes: In or on structures where openings have been made in walls, floors or ceilings for the passage of pipes, such openings shall be closed and protected by the installation of approved metal collars that are securely fastened to the adjoining structure. Refer to Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing piping" and 22 05 18 "Escutcheons for Plumbing Piping" for additional requirements.

E. Protection of Plumbing Systems:

1. Corrosion: Provide corrosion protection for pipes passing through concrete or cinder walls and floors or buried in corrosive soil conditions.

a. Provide oversized sleeves or core drilled holes to eliminate rubbing on above grade piping installations. Refer to Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping" for pipe sleeve and core drilling requirements.

b. Refer to individual Division 22 piping Sections for corrosion protection on buried piping installations in corrosive soil conditions.

2. Stress and Strain: Install plumbing systems in a manner that prevents stresses and strains that exceed the structural strength of the pipe. Install piping systems to accommodate expansion, contraction and structural settlement.

3. Freezing: Do not install water, soil, waste or storm piping outside of a building, in attics or crawlspaces, conceal in outside walls or in any other place subjected to freezing temperatures without providing measures to keep the contents of the piping system from freezing.

F. Field Measurements:

1. Layout of equipment, piping, and similar components in Drawings is diagrammatic. Review Drawings to identify interference with other construction and verify dimensions at Site prior to beginning installation.

a. Obtain exact location of all items and openings and confirm all existing conditions in field.

b. Obtain exact location and roughing requirements for all equipment furnished by others, but installed by this Contractor before roughing. Owner reserves right to make reasonable changes prior to "roughing-in" without increase in Contract Sum.

2. Report any conflicts to Architect in writing before beginning installation.

3. Provide fittings, horizontal and vertical offsets, elevation changes, etc. required to install Plumbing Work. Do not infer that Drawings show level of detail indicating every offset, elbow, union, fitting, elevation changes, or other aspect required for complete installation.

4. Install Plumbing Work with proper provisions for removal and/or access to valves, traps, cleanouts, etc.

1.12 SEQUENCING AND SCHEDULING

A. Perform Plumbing Work in cooperation with Owner, Architect, Construction Manager, and all Contractors on this Project, and other separate Contractors at the Site.

1. Coordinate Plumbing Work with construction schedule requirements in Division 01
2. Coordinate all submittals with the construction schedule and with requirements and schedules contained in Section 01 33 00 “Submittals Procedures.”
3. Immediately report any delays in receipt of materials required for Plumbing Work including circumstances causing delays.

B. Refer to Division 01 for cooperation between Contractors. Prior to start of construction:

1. Obtain from Contract Drawings or Architect, exact location of items and openings in construction. Conform to existing conditions in field.

2. Review applicable Shop Drawings of all Contracts.

3. If conflict occurs between Contract Drawings, advise Architect in writing before beginning installation and comply with Architect's directions.

4. Obtain exact location and roughing requirements for equipment furnished by other Contractor or by Owner, but installed by Contractor responsible for Plumbing Work before beginning roughing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Minimum Material Requirements:

1. Construct potable water systems and equipment according to AWWA standards.

2. Provide UL label on all equipment and material with listing service.

3. Material Flammability:

   a. Flame spread rating of 25 or less.
   b. Smoke developed rating of 50 or less.

4. Equipment Verification: Carefully check manufacturer's drawings and specifications as they affect their equipment; follow factory instructions for roughing, installation, connection, filling, lubrication, testing, balancing, adjusting, alignment, wiring, and start-up operation.

2.2 GROUT

A. Description: ASTM C 1107, Grade B, non-shrink, non-metallic, high strength grout, suitable for interior and exterior, above and below grade applications.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

2.3 SEALANTS

A. Comply with requirements for sealants in non-fire rated penetrations specified in Section 07 92 00 "Joint Sealants."

B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. BASF Building Systems; Omniplus.
   b. Dow Corning Corporation; 786 Mildew Resistant.
   c. GE Advanced Materials - Silicones; Sanitary SCS1700.

2.4 PENETRATION FIRESTOPPING

A. Comply with requirements for sealants in fire rated penetrations specified in Section 07 84 13 “Penetration Firestopping”.

B. Submit Manufacturers Product Data Sheets for each type of product selected. Certify that Firestop Material is free of asbestos and lead paint, and complies with local regulations.

1. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

C. Submit system design listings, including illustrations from qualified testing and inspection agency that is applicable to each firestop configuration.

D. Submit a project specific Penetration Firestopping Schedule indicating where each firestop configuration will be used.

2.5 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. Insulating Material: Suitable for system fluid, pressure, and temperature.

1. Dielectric Unions:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Capitol Manufacturing Company.
2) Central Plastics Company.
3) Hart Industries International, Inc.
4) Jomar International Ltd.
5) Matco-Norca, Inc.
6) McDonald, A. Y. Mfg. Co.
7) Watts Regulator Co.; a division of Watts Water Technologies, Inc.
8) Wilkins; a Zurn company.

b. Description:

1) Standard: ASSE 1079.
2) Pressure Rating: 125 psig minimum at 180 deg F.
3) End Connections: Solder-joint copper alloy and threaded ferrous.

2.6 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

C. Sleeve-Type Transition Coupling: AWWA C219.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Cascade Waterworks Manufacturing.
b. Dresser, Inc.; Piping Specialties Products.
c. Ford Meter Box Company, Inc. (The).
d. JCM Industries.
e. Romac Industries, Inc.
f. Smith-Blair, Inc.; a Sensus company.
g. Viking Johnson.

2. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners, and with ends of same sizes as piping to be joined.

3. Standard: AWWA C219.

4. Center-Sleeve Material: Manufacturer's standard.

5. Gasket Material: Natural or synthetic rubber.

6. Pressure Rating: 150 psig minimum.

7. Metal Component Finish: Corrosion-resistant coating or material.

PART 3 - EXECUTION

3.1 PROJECT/SITE CONDITIONS

A. Perform the following tests and inspections:

1. Lead Testing Prior to Commencing Construction:

a. Engage a qualified laboratory to collect and test water samples from all potable water outlets scheduled for replacement in accordance with NYS Law 10 CRR-NY 67-4.

b. Collect a first-draw sample from a cold-water outlet at each potable water outlet in the building where outlets are scheduled to be replaced as a part of this Contract.

c. Have samples analyzed for lead content by a State Certified testing lab approved to perform such analyses by the Department’s Laboratory Approval Program (ELAP). Submit copy of results to Owner and Architect/Engineer as a base line of water quality in the building before construction.

1) Notify Owner and Architect in writing of any potable water outlets that exceed the lead action level (5 micrograms per liter).

2. Lead Testing After Construction is Complete:

a. Engage a qualified laboratory to collect and test water samples in accordance with NYS Law 10 CRR-NY 67-4.

b. Collect a first-draw sample from all potable water outlets in the building where outlets were replaced or added as a part of this Contract.

c. Have samples analyzed for lead content by a State Certified testing lab approved to perform such analyses by the Department's Laboratory Approval Program (ELAP). Submit copy of results to Owner and Architect/Engineer.

1) Notify Owner and Architect in writing of any potable water outlets that exceed the lead action level (5 micrograms per liter).

d. Potable water outlets replaced under this contract that exceed the lead action level (5 micrograms per liter):

1) Compare to the levels recorded prior to construction. If levels are increased from pre-construction levels, replace faucets and/or supply stops with new materials, and retest portion thereof until sample results are at or below the preconstruction level.

2) Notify Owner and Architect in writing of any potable water outlets that continue to exceed the lead action level (5 micrograms per liter).

3) Coordinate with the Owner and Architect to implement a Remedial Action Plan to mitigate the lead level at the outlet. Such additional efforts will be performed under the Plumbing Allowance No. PC-02.

e. Newly installed potable water outlets that exceed the lead action level (5 micrograms per liter):

1) Replace faucets and/or supply stops with new materials, and retest portion thereof until sample results are below the lead action level (5 micrograms per liter).

2) Notify Owner and Architect in writing of any potable water outlets that continue to exceed the lead action level (5 micrograms per liter).

3) Coordinate with the Owner and Architect to implement a Remedial Action Plan to mitigate the lead level at the outlet.

3.2 PLUMBING DEMOLITION

A. Refer to Section 02 41 19 "Selective Structure Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.

1. Remove Piping: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Abandon Piping in Place: Drain piping and cap or plug piping with same or compatible piping material.

3. Remove Equipment: Disconnect and cap services and remove equipment.
4. Remove and Reinstall Equipment: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
5. Remove and Salvage Equipment: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is rendered unserviceable during the process of demolition, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.3 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Unless specific mounting heights are indicated, install equipment to allow maximum possible headroom.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.4 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Sections, Section 22 05 29 “Hangers and Supports for Plumbing Piping and Equipment”, for detailed additional requirements.
B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

3.5 GROUTING

A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
B. Clean surfaces that will come into contact with grout.
C. Provide forms as required for placement of grout.
D. Avoid air entrapment during placement of grout.
E. Place grout, completely filling equipment bases.
F. Place grout on concrete bases and provide smooth bearing surface for equipment.
G. Place grout around anchors.
H. Cure placed grout.

3.6 SEALANTS

A. Install sealants according to the requirements specified in Section 07 92 00 "Joint Sealants.”
B. Refer to individual Division 22 plumbing fixture and equipment Sections for specific sealant and caulking requirements.

3.7 FIRESTOPPING

A. Install firestopping according to the requirements specified in Section 07 84 13 “Penetration Firestopping.”

B. Applied Fireproofing:

1. Coordinate the installation of hangers, supports and accessories from the structural steel with the fireproofing installation. Install all hangers and supports prior to installation of fireproofing.

2. Repair or replace existing fireproofing removed as a part of Plumbing Work installation.

a. Employ the services of an approved fireproofing contractor to repair or replace the fireproofing by patching any areas that have been removed or damaged due to the installation of work after the completion of the fireproofing.

b. Repaired or replacement fireproofing shall match the fireproofing adjacent to the repaired area. All warranties shall be maintained.

3.8 DIELECTRIC FITTINGS

A. Install dielectric fittings according to the specific requirements in the Division 22 Sections specifying piping systems.

3.9 TRANSITION FITTINGS

A. Install transition fittings according to the specific requirements in the Division 22 Sections specifying piping systems.

END OF SECTION 22 05 00

SECTION 22 05 17 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeve-seal systems.
2. Grout.
3. Silicone sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sleeves seals.

1. Sleeve-seal systems.
2. Firestopping.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES WITHOUT WATERSTOP

A. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, hot-dip galvanized, with plain ends.

B. Steel Sheet Sleeves: ASTM A653/A653M, 0.0239-inch minimum thickness; hot-dip galvanized, round tube closed with welded longitudinal joint.

2.2 SLEEVES WITH WATERSTOP

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, LLC.
2. CALPICO, Inc.
3. GPT; an EnPro Industries company.
4. Metraflex Company (The).

B. Description: Manufactured galvanized steel, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.

2.3 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, LLC.
2. CALPICO, Inc.
3. GPT; an EnPro Industries company.
4. Metraflex Company (The).
5. Proco Products, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Designed to form a hydrostatic seal of 20 psig minimum.
2. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel, Type 316.
4. Connecting Bolts and Nuts: Stainless steel, Type 316 of length required to secure pressure plates to sealing elements.

2.4 PENETRATION FIRESTOPPING

A. Comply with requirements for sealants in fire rated penetrations specified in Section 07 84 13 “Penetration Firestopping” and Section 22 05 00 “Common Work Results for Plumbing.”

2.5 GROUT

A. Refer to grout product requirements specified in Section 22 05 00 “Common Work Results for Plumbing.”

2.6 SILICONE SEALANTS

A. Comply with requirements for silicone sealants specified in Section 07 92 00 "Joint Sealants" and Section 22 05 00 “Common Work Results for Plumbing.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.
C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION OF SLEEVES - GENERAL

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. 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.

1. Sleeves are not required for core-drilled holes.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.

2. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.

E. 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 078413 "Penetration Firestopping."

3.3 INSTALLATION OF SLEEVES WITH WATERSTOP

A. Install sleeve with waterstop as new walls and slabs are constructed.
B. 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.
C. Secure nailing flanges to concrete forms.
D. Using grout, seal the space around outside of sleeves.

3.4 INSTALLATION OF SLEEVE-SEAL SYSTEMS

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building, and passing through exterior walls.

B. 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.

3.5 FIELD 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.
2. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.

B. Prepare test and inspection reports.

3.6 SLEEVE SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above and below Grade:

    a. Sleeves with waterstops: Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

2. Concrete Slabs-on-Grade:

    a. Sleeves with waterstops: Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

3. Concrete Slabs above Grade:

    a. Sleeves with waterstops.

4. Interior Partitions:

    a. Sleeves without waterstops.

END OF SECTION 22 05 17

SECTION 22 05 18 - ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes escutcheons and floor plates.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.
D. Split-Casting Brass Type: With polished, chrome-plated finish and with concealed hinge and setscrew.
E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.
F. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.

2.2 FLOOR PLATES

A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.
C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install escutcheons for exposed piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

   a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern type with polished, chrome-plated finish and spring clip fastener.
   b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
   c. Insulated Piping: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
   d. Bare Piping at Wall, Floor or Ceiling Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
   e. Bare or Insulated Piping in Unfinished Service Spaces and Equipment Rooms: No escutcheons required.

2. Escutcheons for Existing Piping (only required where impacted by new walls, floors or ceilings):

   a. Chrome-Plated Piping: Split-casting brass type with polished, chrome-plated finish.
   b. Insulated Piping: Split-plate, stamped-steel type with concealed hinge.
   c. Bare Piping at Wall, Floor or Ceiling Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.
   d. Bare or Insulated Piping in Unfinished Service Spaces and Equipment Rooms: No escutcheons required.

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor-plate type.
2. Existing Piping: Split-casting, floor-plate type.

3.3 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 22 05 18

SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Ball valves.
2. Check valves.

1.3 DEFINITIONS

A. CWP: Cold working pressure.
B. EPDM: Ethylene propylene copolymer rubber.
C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
D. RPTFE: Reinforced polytetrafluoroethylene.
E. SWP: Steam working pressure.
F. WOG: Water, oil, gas.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of valve indicated.

1. Ball valves.
2. Check valves.

1.6 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.1 for flanges on iron valves.

3. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
4. ASME B16.18 for solder-joint connections.
5. ASME B31.9 for building services piping valves.

C. NSF Compliance:

1. NSF/ANSI-61- Drinking Water System Components - Health Effects.
2. NSF/ANSI-61-8 Commercial Hot 180°F (includes Annex F and G).
3. NSF/ANSI-372 for lead-free valve materials for potable-water service.

D. 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.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set ball valves open to minimize exposure of functional surfaces.
4. Block check valves in either closed or open position.

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.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of valve from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Standards:

1. Domestic water valves intended to convey or dispense water for human consumption must comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or must be certified to be in compliance with NSF 61 and NSF 372 (by an 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. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.18 for cast copper solder-joint connections.

3. ASME B16.22 for wrought copper and copper alloy solder-joint connections.
4. ASME B16.34 for flanged and threaded end connections.
5. ASME B16.51 for press joint.
6. ASME B31.9 for building services piping valves.

C. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.

D. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

F. Valve Sizes: Same as upstream piping unless otherwise indicated.

G. Valves in Insulated Piping:

1. Ball Valves: Provide 2-inch extended neck stems.
2. Extended operating handles with nonthermal-conductive covering material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
3. Memory stops that are fully adjustable after insulation is applied.
4. Butterfly Valves: With extended neck.
5. Gate Valves: With rising stem.

H. Refer to valve schedule articles for applications of valves.

I. Valve Bypass and Drain Connections: MSS SP-45.

2.3 BRONZE BALL VALVES

A. Bronze Ball Valves, Lead-Free, Two-Piece with Full Port, and Stainless-Steel Trim, Solder or Threaded Ends (NPS 2 and smaller):

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO INC.; Model S/T-585-66-LF-NS or a comparable product by one of the following:

a. Conbraco Industries, Inc.; Apollo Valves; 70LF-140, 70LF-240.
b. Hammond Valve.
c. Milwaukee Valve Company.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc; LFB6000-SS, LFB6001-SS.

2. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig.
c. CWP Rating: 600 psig.
d. Body Design: Two piece.
e. Body Material: Bronze.
f. Ends: Soldered or threaded.

g. Seats: PTFE or TFE.
h. Stem: Type 316 stainless steel.
i. Ball: Type 316 stainless steel, vented.
j. Port: Full.
k. Handle: Insulated extension handle.

B. Bronze Ball Valves, Lead-Free, Two-Piece with Full Port, and Stainless-Steel Trim, Press Ends (NPS 2 and smaller):

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO INC.; Model PC-585-80-LF-NS or a comparable product by one of the following:

a. Apollo Flow Controls; Conbraco Industries, Inc.
b. Hammond Valve.
c. Milwaukee Valve Company.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

a. Standard: MSS SP-110 or MSS-145.
b. CWP Rating: Minimum 200 psig.
c. Body Design: Two piece.
d. Body Material: Bronze.
e. Ends: Press.
f. Press Ends Connections Rating: Minimum 200 psig.
g. Seats: Reinforced PTFE.
h. Stem: Bronze or brass.
i. Ball: Stainless steel.
j. Port: Full.
k. O-Ring Seal: EPDM.
l. Handle: Insulated extension handle.

C. Three-Piece, Lead-Free, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO INC.; Model S/T-595-Y-66-LF-NS or a comparable product by one of the following:

a. Conbraco Industries, Inc.; Apollo Valves.
b. Hammond Valve.
c. Milwaukee Valve Company.

2. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig.
c. CWP Rating: 600 psig.
d. Body Design: Three piece.
e. Body Material: Bronze.
f. Ends: Soldered or threaded.
g. Seats: PTFE or TFE.
h. Stem: Type 316 stainless steel.

i. Ball: Type 316 stainless steel, vented.
j. Port: Full.
k. Handle: Insulated extension handle.

2.4 SILICON BRONZE SWING CHECK VALVES

A. Bronze Swing Check Valves with Nonmetallic Disc, Class 125:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO INC.; T/S/PC-413-Y-LF or comparable product by one of the following:

a. Hammond Valve.
b. Milwaukee Valve Company.
c. WATTS.

2. Description:

a. Standard: MSS SP-139.
b. CWP Rating: 200 psig (1380 kPa).
c. Body Design: Horizontal or vertical (flow in upward direction) flow.
d. Body Material: Silicon bronze (ASTM listed), corrosion resistant.
e. Ends: Threaded, soldered, or press. See valve schedule articles.
f. Disc: PTFE.

PART 3 - EXECUTION

3.1 EXAMINATION

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.

F. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION OF VALVES

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install check valves for proper direction of flow and as follows:

1. Swing Check Valves: In horizontal position with hinge pin level.

F. Valve Tags: Comply with requirements in Section 22 05 53 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Water Service Entry: Gate valve.
2. Shutoff Service: Ball or butterfly valves.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:

1. 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.
2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
4. For Grooved-End Copper Tubing: Valve ends may be grooved.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze Ball Valves: Two-piece with full port and stainless-steel trim. Provide with threaded, solder or press connection-joint ends.

3. Bronze Ball Valves: Three-piece with full port and stainless-steel trim.
4. Bronze Swing Check Valves: Class 125, nonmetallic disc.

END OF SECTION 22 05 23

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Thermal hanger-shield inserts.
3. Fastener systems.
4. Pipe-positioning systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sleeves and sleeve seals. Include rated capacities, and furnished specialties and accessories.

1. Insulation shields.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Threaded rod.
2. Adjustable clevis hanger.
3. Adjustable swing-ring band hangers.
4. Adjustable swivel-ring band hangers.
5. Hinged pipe clamps.
6. Riser clamps.
7. Beam Clamps.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Anvil International; a subsidiary of Mueller Water Products Inc.
2. Cooper B-Line, Inc.
3. ERICO International Corporation.
4. PHD Manufacturing, Inc.

2.3 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe and Tube Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel or stainless steel.

2.4 THERMAL HANGER-SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Buckaroos, Inc.
2. CADDY; brand of nVent Electrical plc.
3. Carpenter & Paterson, Inc.
4. Pipe Shields Inc.

B. Insulation-Insert Material for Type "B" and “E” Insulated Piping Support Assemblies: ASTM C552, Type II cellular glass with 100-psig or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.

C. Insulation-Insert Material for Type "C" and “F” Insulated Piping Support Assemblies: Water-repellent-treated, ASTM C533, Type I calcium silicate with 100-psig minimum compressive strength.

D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

F. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hilti, Inc.
b. ITW Ramset/Red Head; Illinois Tool Works, Inc.
c. MKT Fastening, LLC.
d. Simpson Strong-Tie Co., Inc.

B. Mechanical-Expansion Anchors: Insert-wedge-type anchors, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Cooper B-line; brand of Eaton, Electrical Sector.
b. Empire Tool and Manufacturing Co., Inc.
c. Hilti, Inc.
d. ITW Ramset/Red Head; Illinois Tool Works, Inc.
e. MKT Fastening, LLC.

2. Indoor Applications: Zinc-coated or stainless steel.

2.6 PIPE-POSITIONING SYSTEMS

A. Description: IAPMO PS 42 positioning system composed of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.7 MATERIALS

A. Carbon Steel: ASTM A1011/A1011M.

B. Structural Steel: ASTM A36/A36M carbon-steel plates, shapes, and bars; black and galvanized.

C. Stainless Steel: ASTM A240/A240M.

D. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with requirements in Section 07 84 13 "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.

3.2 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.

C. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.

2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

D. Pipe-Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.

E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

G. Install lateral bracing with pipe hangers and supports to prevent swaying.

H. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

I. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

K. Insulated Piping:

1. Attach clamps and spacers to piping.

    a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

    a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

    a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

    a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    b. NPS 4: 12 inches long and 0.06 inch thick.

5. Thermal Hanger Shields: Install with insulation of same thickness as piping insulation.

3.3 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.4 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports and attachments for general service applications.

F. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal hanger-shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Piping in general service applications:

a. Bare Copper Piping Systems:

1) NPS 1-1/4 and Smaller: Adjustable, plastic coated copper swivel loop hanger for suspension of non-insulated stationary pipes.
2) NPS 1-1/2 and Larger: Copper plated clevis hanger for suspension of non-insulated stationary pipes. Hanger sized on outside pipe diameter.

b. Bare Ferrous Piping Systems:

1) NPS 1-1/4 and Smaller: Heavy duty electro-galvanized steel swivel loop hanger for suspension of non-insulated stationary pipes.
2) NPS 1-1/2 and Larger: Electro-galvanized clevis hanger for suspension of non-insulated stationary pipes. Hanger sized on outside pipe diameter.

c. Insulated Piping Systems:

1) NPS 2 and Smaller: Electro-galvanized clevis hanger with galvanized steel thermal-hanger shield insert for suspension of insulated stationary pipes. Hanger sized on outside insulation diameter.

2) NPS 2-1/2 and Larger: Electro-galvanized clevis hanger with separate or integral galvanized steel thermal-hanger shield insert for suspension of insulated stationary pipes. Hanger sized on outside insulation diameter.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. C-Clamps (MSS Type 23): For structural shapes.
6. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
7. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.

2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.

3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.

O. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

P. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 22 05 29

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Piping labels.
2. Valve tags and signage.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Valve function signage.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Pipe labels.

C. Samples: For color, letter style, and graphic representation required for each identification material and device.

D. Valve-numbering scheme.

E. Valve Schedules: For each piping system. Include in operation and maintenance manuals.

1.5 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.
C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPE LABELS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Brady, Inc.
2. Craftmark Pipe Markers.
3. Seton, Inc.

B. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

E. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing and separate self-adhesive direction arrow tape on each end fully wrapped around pipe.

F. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include:

1. Pipe size.
2. Flow-Direction Arrows: Include flow-direction arrows on main distribution piping. Arrows may be either integral with label or applied separately.
3. Lettering Size: At least 1/2 inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances.

2.2 VALVE TAGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Brady Corporation.
2. Craftmark Pipe Markers.
3. Kolbi Pipe Marker Co.
4. Marking Services Inc.
5. Pipemarker.com; Brimar Industries, Inc.
6. Seton Identification Products; a Brady Corporation company.

B. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.04-inch minimum thickness, with predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass link chain or S-hook.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Include valve-tag schedule in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION, GENERAL REQUIREMENTS

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
B. Coordinate installation of identifying devices with locations of access panels and doors.
C. Install identifying devices before installing acoustical ceilings and similar concealment.
D. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF PIPE LABELS

A. Install pipe labels showing service and flow direction with permanent adhesive on pipes.

B. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Within 3 ft. of each valve and control device.
2. At access doors, manholes, and similar access points that permit view of concealed piping.
3. Within 3 ft. of equipment items and other points of origination and termination.
4. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping and equipment.

C. Do not apply plastic pipe labels or plastic tapes directly to bare pipes conveying fluids at temperatures of 125 deg F or higher. Where these pipes are to remain uninsulated, use a short section of insulation or use stenciled labels.

D. Flow-Direction Flow Arrows: Use arrows, in compliance with ASME A13.1, to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

E. Pipe-Label Color Schedule:

1. Domestic Cold-Water Piping: Black letters on an ANSI Z535.1 safety-green background.
2. Domestic Hot-Water Piping: Black letters on an ANSI Z535.1 safety-green background.
3. Domestic Hot-Water Return Piping Black letters on an ANSI Z535.1 safety-green background.
4. Sanitary Waste and Storm Drainage Piping: Black letters on an ANSI Z535.1 safety-green background.

3.4 INSTALLATION OF VALVE TAGS

A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, faucets, convenience and lawn-watering hose connections, and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule in the operating and maintenance manual.

B. Valve-Tag Application Schedule: : Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Color: Natural.
2. Letter Color: Black.

C. Provide valve tag for each piping systems valve located above grade.

1. Valve Directory: Provide neat typewritten directory listing valve function, location and identification number.
2. Valve Numbering System: Extension of and compatible with existing valve numbering system, where valves are installed in existing building or in addition to existing building.
3. Verification: Verify existing valve numbers in field and provide valve numbering avoiding duplication of existing numbers.

END OF SECTION 22 05 53

SECTION 22 07 19 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic cold-water piping.
2. Domestic hot-water piping.
3. Domestic recirculating hot-water piping.
4. Supplies and drains for handicap-accessible lavatories and sinks.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

1. Mineral-fiber, preformed pipe insulation.
2. Mineral-fiber, hydraulic-setting insulating and finishing cement.
3. Vapor-barrier mastic.
4. Field applied jackets.
5. Protective shielding pipe covers.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Provide insulation system installation by qualified Installers who are trained in installation of each proposed insulation material and product with at least one of the following qualifications:

1. Have successfully completed a Mechanical Insulation Apprenticeship program by the Department of Labor, Bureau of Apprenticeship and Training,
2. Have successfully completed an ASHRAE / NIA 8-hour Mechanical Insulation Training course or equal, or
3. Have five years documented experience as a mechanical insulation specialist with references attesting to successful completion of at least three comparable projects.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

C. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," and "Indoor Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Fibrex Insulations Inc.; Coreplus 1200.
b. Johns Manville; Micro-Lok.
c. Knauf Insulation; 1000-Degree Pipe Insulation.
d. Manson Insulation Inc.; Alley-K.
e. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Ramco Insulation, Inc.; Ramcote 1200 and Quik-Cote.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 739, Dow Silicone.
b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
c. P.I.C. Plastics, Inc.; Welding Adhesive.
d. Speedline Corporation; Polyco VP Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below-ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-30.
b. Eagle Bridges - Marathon Industries; 501.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-35.
d. Mon-Eco Industries, Inc.; 55-10.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.

3. Service Temperature Range: 0 to 180 deg F.

4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.

5. Color: White.

2.5 SEALANTS

A. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.

3. Fire- and water-resistant, flexible, elastomeric sealant.

4. Service Temperature Range: Minus 40 to plus 250 deg F.

5. Color: White.

6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ-SSL: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing, self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.

2.7 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Johns Manville; Zeston.
b. P.I.C. Plastics, Inc.; FG Series.
c. Proto Corporation; LoSmoke.
d. Speedline Corporation; SmokeSafe.

2. Adhesive: As recommended by jacket material manufacturer.

3. Color: White.

4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and roof drain bodies.

2.8 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABI, Ideal Tape Division; 428 AWF ASJ.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
c. Compac Corporation; 104 and 105.
d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.

3. Thickness: 11.5 mils.

4. Adhesion: 90 ounces force/inch in width.

5. Elongation: 2 percent.

6. Tensile Strength: 40 lbf/inch in width.

7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABI, Ideal Tape Division; 370 White PVC tape.
b. Compac Corporation; 130.
c. Venture Tape; 1506 CW NS.

2. Width: 2 inches.

3. Thickness: 6 mils.

4. Adhesion: 64 ounces force/inch in width.

5. Elongation: 500 percent.

6. Tensile Strength: 18 lbf/inch in width.

2.9 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Engineered Brass Company.
   b. Insul-Tect Products Co.; a subsidiary of MVG Molded Products.
   c. McGuire Manufacturing.
   d. Plumberex.
   e. Truebro; a brand of IPS Corporation.
   f. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.

2. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

3. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch-wide strips of same material as insulation jacket. Secure strips with adhesive along both edges of strip.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Section 07 84 13 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

C. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies.
3. Comply with requirements in Section 07 84 13 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.

2. Insulate pipe elbows using preformed fitting insulation made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.

3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.

4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.

5. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.

6. Install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

7. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. Secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.

2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.8 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.9 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water (General Building Areas):

1. Mineral-Fiber, Preformed Pipe Insulation with factory applied jacket, Type I:1-inch thickness.

B. Domestic Hot and Recirculation Water (General Building Areas):

1. Mineral-Fiber, Preformed Pipe Insulation with factory applied jacket, Type I:

a. Pipes size 1 1/4" or smaller: 1-inch thickness.
b. Pipes size 1 1/2" or larger: 1-1/2-inch thickness.

C. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:

1. Protective Shielding Pipe Covers.

D. Sanitary Vent Piping within 10 Feet of a Roof Penetration:

1. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
2. Mineral Wool, Preformed Pipe Insulation, Type II: 1 inch thick.

E. Sanitary Waste Piping Where Heat Tracing Is Installed:

1. All Pipe Sizes: Insulation is one of the following:

a. Glass-Fiber, Preformed Pipe Insulation, Type I: 1-1/2 inches thick.
b. Mineral Wool, Preformed Pipe Insulation, Type II: 1-1/2 inches thick.

3.10 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. Piping, Exposed:

1. PVC: 30 mils thick.

END OF SECTION 22 07 19

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Copper tube and fittings.
2. Piping joining materials.
3. Transition fittings.
4. Dielectric fittings.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Copper tube and fittings.
2. Piping joining materials.
3. Transition fittings.
4. Dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.
B. Lab results for lead testing upon completion of work.

1.5 CLOSEOUT SUBMITTALS

A. Field quality-control reports.
B. Lab results for biological testing showing samples negative for coliform bacteria.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installers of pressure-sealed joints are to be certified by pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

B. Refer to the “Project/Site Conditions” article for lead testing requirements prior to commencing any work in Section 22 05 00 “Common Work Results for Plumbing.”

C. Coordinate potable water lead testing with Owner prior to starting any construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Domestic water piping, tubing, fittings, joints, and appurtenances intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act, with requirements of authorities having jurisdiction, and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 PIPING MATERIALS

A. Potable-water piping and components are to comply with NSF 14, NSF 61, and NSF 372.

2.3 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tube: ASTM B88, Type L.

B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.

C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.

D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Do not use solder joints on pipe sizes greater than NPS 4.

E. Cast Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends. Do not use solder joints on pipe sizes greater than NPS 4.

F. Wrought Copper Unions: ASME B16.22. Do not use solder joints on pipe sizes greater than NPS 4.

G. Pressure-Seal-Joint Fittings, Copper or Bronze - Domestic Water:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Viega LLC ; ProPress Copper. or a comparable product by one of the following:

    a. Elkhart Brass Mfg. Co., Inc.
    b. Mueller Streamline Co.; a company of Mueller Industries.
    c. NIBCO INC.

2. Source Limitations: Obtain pressure-seal-joint fittings, copper or bronze, from single manufacturer.

3. Housing: Copper.

4. O-Rings and Pipe Stops: EPDM.

5. Tools: Manufacturer's special tools.

6. Minimum 200 psig working-pressure rating at 250 deg F.

2.4 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B32, lead-free alloys.

D. Flux: ASTM B813, water flushable.

E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.5 TRANSITION FITTINGS

A. Install transition couplings at joints of piping with small differences in OD's. Refer to transition fitting products specified in Section 22 05 00 “Common Work Results for Plumbing”.

2.6 DIELECTRIC FITTINGS

A. Dielectric Unions and Flanges: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined. Comply with requirements in Section 22 05 00 "Common Work Results for Plumbing."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before proceeding with water piping installation, examine conditions existing at Site and notify affected Contractors and Architect of any construction or any other conditions prevailing which prevent, inhibit, or otherwise interfere with water piping installation.

B. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PIPING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Aboveground domestic water piping, NPS 2 (DN 50) and smaller is to be the following:

1. Drawn-temper copper tube, ASTM B88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
2. Drawn-temper copper tube, ASTM B88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.

D. Aboveground domestic water piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100) is to be the following:

1. Drawn-temper copper tube, ASTM B88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
2. CPVC, Schedule 80; socket fittings; and solvent-cemented joints.

3.3 INSTALLATION OF PIPING

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install copper tubing under building slab in accordance with CDA's "Copper Tube Handbook."

C. Install valves in accordance with Section 22 05 23 "General Duty Valves for Plumbing Piping."

D. Install domestic water piping level without pitch and plumb.

E. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

F. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

G. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

H. Install piping to permit valve servicing.

I. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

J. Install piping free of sags and bends.

K. Install fittings for changes in direction and branch connections.

L. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

M. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

N. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

O. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Soldered Joints for Copper Tubing: Apply ASTM B813, water-flushable flux to end of tube. Join copper tube and fittings in accordance with ASTM B828 or CDA's "Copper Tube Handbook."

E. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools and procedure recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.

F. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts in accordance with ASME B31.9.

G. Joint Construction for Solvent-Cemented Plastic Piping: Clean and dry joining surfaces. Join pipe and fittings in accordance with the following:

1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
2. CPVC Piping: Join in accordance with ASTM D2846/D2846M.

H. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.5 INSTALLATION OF TRANSITION FITTINGS

A. Install transition couplings at joints of dissimilar piping.
B. Transition Fittings in Aboveground Domestic Water Piping NPS 2 (DN 50) and Smaller: Plastic-to-metal transition fittings or unions.

3.6 INSTALLATION OF DIELECTRIC FITTINGS

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
B. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric couplings.
C. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric flanges.

3.7 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for hangers, supports, and anchor devices in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

B. Install hangers for copper tube and pipe, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Install vinyl-coated hangers for CPVC pipe, 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.

D. Support horizontal piping within 12 inches of each fitting.

E. Support vertical runs of copper tube and pipe to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

F. Support vertical runs of CPVC pipe to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.8 PIPING CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.
B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

3.9 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

3.10 FIELD QUALITY CONTROL

A. Perform the following tests:

1. Comply with “Field Quality Control” article in Part 3 of Section 22 05 00 “Common Work Results for Plumbing” for lead testing requirements prior to commencing any work.

2. Piping Inspections:

a. Do not enclose, cover, or put piping into operation until it has been tested and inspected by the Owner’s Representative.

b. During installation, notify Owner’s Representative at least two days before inspection must be made. Perform tests specified below in presence of Owner’s Representative:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.

2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Reinspection: If Owner’s Representative finds that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

d. Reports: Prepare inspection reports and have them signed by the Owner’s Representative.

3. Above Grade Piping Tests:

a. Initial Test:

1) Do not connect fixtures, equipment and solenoid valves into system during this test.

2) Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

3) Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

4) Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

5) Cap and subject piping to static water pressure of 150 psig, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

6) Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.

7) Prepare reports for tests and for corrective action required.

b. Test After Fixtures are Connected:

1) Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

2) Test system again for 2 hours at 75 psigor prevailing water pressure, whichever is higher.

3) Repair leaks and defects at fixture and equipment connections or at solenoid valves, and retest piping or portion thereof until satisfactory results are obtained.

4) Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.11 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.

2. Open shutoff valves to fully open position.

3. Open throttling valves to proper setting.

4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.

6. Remove and clean strainer screens. Close drain valves and replace drain plugs.

7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.

8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.12 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.

b. Fill and isolate system in accordance with either of the following:

1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.

d. Repeat procedures if biological examination shows contamination.

e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION 22 11 16

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Temperature-actuated, water mixing valves.
2. Wall hydrants.
3. Drain valves.
4. Water-hammer arresters.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for domestic water piping specialties. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Individual-fixture, water tempering valves.
2. Moderate-climate wall hydrants.
3. Water hammer arresters.

1.4 INFORMATIONAL SUBMITTALS

A. Test and inspection reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.
B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. 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 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.

2.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Water-Temperature Limiting Devices (TMV "A"):

1. Basis-of-Design Product: Subject to compliance with requirements, provide POWERS; A WATTS Brand; Model LFUSG-B or comparable product by one of the following:

   a. Cash Acme; a division of Reliance Worldwide Corporation; Heatguard 145 LF.
   b. Lawler Manufacturing Co. Inc.; Model 570.
   c. Leonard Valve Company; 170A-LF with mounting bracket.
   d. Watts; a Watts Water Technologies Company;
   e. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products; 38-ZW3870XLT.

2. Standard: ASSE 1070.

3. Pressure Rating: 125 psig.

4. Type: Thermostatically controlled, water mixing valve.

5. Material: Bronze body with corrosion-resistant interior components.

6. Connections: Threaded union inlets and outlet.

7. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.

8. Valve Finish: Rough bronze.

9. Capacities and Characteristics: Refer to Schedule on Drawings.

2.4 WALL HYDRANTS

A. Moderate-Climate Wall Hydrants (INT WH "A"):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; Model No. 5509-QT-SAP-CP or comparable product by one of the following:

    a. Josam Company.
    b. MIFAB, Inc.
    c. Prier Products, Inc.
    d. WATTS.
    e. Woodford Manufacturing Company.
    f. Zurn Industries, LLC.

2. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.

3. Pressure Rating: 125 psig.

4. Operation: Loose key.

5. Inlet: NPS 3/4 or NPS 1.

6. Outlet:

    a. Concealed, with integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.

    b. Garden-hose thread complying with ASME B1.20.7.

7. Box: Deep, flush mounted with cover.

8. Box and Cover Finish: Chrome plated.

9. Operating Keys(s): One with each wall hydrant.

2.5 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Inc; Model T-585-70-HC or comparable product by one of the following:

    a. Conbraco Industries, Inc.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Jenkins Valves.
    d. Crane Co.; Crane Valve Group; Stockham Div.
    e. Hammond Valve.
    f. Milwaukee Valve Company.
    g. Red-White Valve Corp.

2. Standard: MSS SP-110 for standard-port, two-piece ball valves.

3. Pressure Rating: 400-psig minimum CWP.

4. Size: NPS 3/4.

5. Body: Copper alloy.

6. Ball: Chrome-plated brass.

7. Seats and Seals: Replaceable.

8. Handle: Vinyl-covered steel.

9. Inlet: Threaded or solder joint.

10. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.6 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters (WHA "A" through "F"):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; 5200 series "Hydrotrol Junior" or comparable product by one of the following:

   a. AMTROL, Inc.
   b. Josam Company.
   c. MIFAB, Inc.
   d. Precision Plumbing Products.
   e. Sioux Chief Manufacturing Company, Inc.
   f. WATTS.
   g. Zurn Industries, LLC.

2. Standard: ASSE 1010 or PDI-WH 201.

3. Type: Copper tube with multiple "O" ring pistons.

4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING SPECIALTIES

A. Temperature-Actuated, Water Mixing Valves: Install with check stops or shutoff valves on inlets and with shutoff valve on outlet.

1. Install cabinet-type units recessed in or surface mounted on wall as specified.

B. Water-Hammer Arresters: Install in water piping in accordance with PDI-WH 201.

3.2 PIPING CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.
B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

3.3 ADJUSTING

A. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform the following 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 unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 22 11 19

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Hub-and-spigot, cast-iron soil pipe and fittings.
2. Hubless, cast-iron soil pipe and fittings.
3. Heavy-duty, high torque hubless-piping couplings.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. CISPI, low torque hubless-piping couplings.
2. Transition couplings.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Components and installation are capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10 ft. head of water.

2.2 PIPING MATERIALS

A. Piping materials to bear label, stamp, or other markings of specified testing agency.
B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AB & I Foundry; a part of the McWane family of companies.
2. Charlotte Pipe and Foundry Company.
3. Tyler Pipe; a part of McWane family of companies.

B. Pipe and Fittings: Centrifugally cast gray cast iron pipe and static cast fittings conforming to requirements of ASTM Standard A 74, service weight (SV) type. Pipe and fittings marked with the collective trademark of the Cast Iron Soil Institute and listed by NSF® International.

C. Gaskets: ASTM C564, rubber.

D. Caulking Materials: ASTM B29, pure lead and oakum or hemp fiber.

2.4 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AB & I Foundry; a part of the McWane family of companies.
2. Charlotte Pipe and Foundry Company.
3. Tyler Pipe; a part of McWane family of companies.

B. Pipe and Fittings: Centrifugally cast gray cast iron pipe and static cast fittings conforming to requirements of ASTM A 888 or CISPI 301. Pipe and fittings marked with the collective trademark of the Cast Iron Soil Institute and listed by NSF® International.

C. CISPI, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ANACO.
b. Ideal Tridon Group.
c. Mission Rubber Company, LLC; a division of MCP Industries.
d. Tyler Pipe; a subsidiary of McWane Inc.

2. Standards: ASTM C1277 or CISPI 310.

3. Description: Standard stainless steel corrugated shield with stainless steel bands and tightening devices; and ASTM C564, neoprene sleeve with integral, center pipe stop.

D. Heavy-Duty, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Husky SD4000.
   b. Clamp All 125.
   c. MG Products.

2. Standards: ASTM C1540.

3. Description: Type 304 stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, neoprene sleeve with integral, center pipe stop.

2.5 COPPER TUBE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Apollo Valves; a part of Aalberts Integrated Piping Systems.
2. Cambridge-Lee Industries, LLC.
3. Cerro Flow Products, LLC.
4. Wieland Copper Products, LLC.

B. Copper Type DWV Tube: ASTM B306, drainage tube, drawn temper.

C. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

D. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.

1. Flange Gasket Materials: ASME B16.21, full-face, flat, nonmetallic, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
2. Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

E. Solder: ASTM B32, lead free with ASTM B813, water-flushable flux.

2.6 TRANSITION FITTINGS

A. Install transition couplings at joints of piping with small differences in OD's. Refer to transition fitting products specified in Section 22 05 00 “Common Work Results for Plumbing”.

2.7 DIELECTRIC FITTINGS

A. Dielectric Unions and Flanges: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined. Comply with requirements in Section 22 05 00 "Common Work Results for Plumbing."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine conditions under which drainage and vent systems, e.g., storm drainage, sanitary sewer, laboratory waste, etc., are to be installed in coordination with Installer of materials and components specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

1. Verify invert elevation of existing piping when new connections are indicated. Do not install buried sewer work until existing sewer invert elevation has been verified to meet required slope and bury depth requirements of new sewer piping.

2. Determine inverts and routing of piping systems and interferences with other building piping systems, building structure, lights, ductwork, foundations prior to installation.

B. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.

1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
2. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Install vent piping to allow application of insulation within 10 feet of a roof penetration.

I. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.

1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.

2. Use long-turn, double Y-branch, and 1/8-bend fittings if two fixtures are installed back-to-back or side-by-side with common drainpipe.

    a. Straight tees, elbows, and crosses may be used on vent lines.

3. Do not change direction of flow more than 90 degrees.

4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.

    a. Reducing size of waste piping in direction of flow is prohibited.

J. Lay buried building waste piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
3. Maintain swab in piping and pull past each joint as completed.

K. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Waste: Two percent downward in direction of flow for piping NPS 2 and smaller; 1 percent downward in direction of flow for piping NPS 3 and larger.
2. Horizontal Sanitary Waste Piping: Two percent downward in direction of flow.
3. Vent Piping: One percent down toward vertical fixture vent or toward vent stack.

L. Install cast-iron soil piping in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

M. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

N. Plumbing Specialties:

1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.

    a. Comply with requirements for cleanouts specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

2. Install drains in sanitary waste gravity-flow piping.

    a. Comply with requirements for drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

P. Insulate vent piping within 10 feet of roof penetrations, all directions.

Q. Install sleeves for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

R. Install sleeve seals for piping penetrations of concrete walls and slabs.

1. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

S. Install escutcheons for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Hub-and-Spigot, Cast-Iron Soil Piping Caulked Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum caulked joints.

C. Hubless, Cast-Iron Soil Piping Coupled Joints:

1. Join hubless, cast-iron soil piping in accordance with CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

D. Join copper tube and fittings with soldered joints in accordance with ASTM B828. Use ASTM B813, water-flushable, lead-free flux and ASTM B32, lead-free-alloy solder.

E. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.

3.4 SPECIALTY PIPE FITTING INSTALLATION

A. Comply with requirements for transition and dielectric fittings specified in Section 22 05 00 "Common Work Results for Plumbing."

B. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in ODs.

2. In Waste Drainage Piping: Shielded, nonpressure transition couplings.

C. Dielectric Fittings:

1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges or flange kits.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for pipe hanger and support devices and installation specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment".

1. Install galvanized carbon-steel pipe hangers for horizontal piping in noncorrosive environments.

2. Install galvanized carbon-steel pipe support clamps for vertical piping in noncorrosive environments.

3. Vertical Piping: MSS Type 8 or Type 42 clamps.

4. Install individual, straight, horizontal piping runs:

   a. 100 Ft. and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer Than 100 Ft.: MSS Type 43, adjustable roller hangers.
   c. Longer Than 100 Ft. if Indicated: MSS Type 49, spring cushion rolls.

5. Multiple, Straight, Horizontal Piping Runs 100 Ft. or Longer: MSS Type 44 pipe rolls. Support pipe rolls on trapeze.

6. Base of Vertical Piping: MSS Type 52 spring hangers.

B. Install hangers for cast-iron and copper soil piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

D. Support vertical runs of cast-iron and copper soil piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect waste and vent piping to the following:

1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
3. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
4. Comply with requirements for cleanouts and drains specified in Section 221319 "Sanitary Waste Piping Specialties."

C. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

3.7 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping.
B. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.8 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary waste and vent piping in accordance with procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.

    a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.

    a. Expose work that was covered or concealed before it was tested.

3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.

    a. Close openings in piping system and fill with water to point of overflow, but not less than 10 ft. head of water.
    b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
    c. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.

    a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1 inch wg.
    b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
    c. Air pressure must remain constant without introducing additional air throughout period of inspection.
    d. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

6. Prepare reports for tests and required corrective action.

3.9 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.
B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
C. Place plugs in ends of uncompleted piping at end of day and when work stops.
D. Repair damage to adjacent materials caused by waste and vent piping installation.

3.10 PIPING SCHEDULE

A. Aboveground, soil, waste and vent piping NPS 3 and smaller are to be any of the following:

    1. Service cast-iron soil pipe and fittings; gaskets; and gasketed joints.
    2. Hubless, cast-iron soil pipe and fittings; CISPI 310, standard hubless-piping couplings; and coupled joints.
    3. Copper Type DWV tube, copper drainage fittings, and soldered joints.
    4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

B. Aboveground, soil, waste and vent piping NPS 4 and larger are to be any of the following:

    1. Service cast iron, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
    2. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
    3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

C. Underground, soil, waste, and vent piping NPS 12 and smaller are to be the following:

    1. Service cast-iron soil piping; gaskets; and gasketed joints.
    2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

END OF SECTION 22 13 16

SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cleanouts.
2. Floor drains.
3. Miscellaneous sanitary drainage piping specialties.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:

1. Floor cleanouts, general building areas.
2. Wall cleanouts.
3. Floor drain "A".
4. Vent caps.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Deep-seal traps.
2. Inline trap seal device

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sanitary waste piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS

A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.
B. Comply with NSF 14 for plastic sanitary waste piping specialty components.

2.2 CLEANOUTS

A. Cast-Iron Exposed Cleanouts (CO):

1. Standard: ASME A112.36.2M.
2. Size: Same as connected drainage piping
3. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch or hubless, cast-iron soil pipe test tee as required to match connected piping.
4. Closure: Countersunk or raised-head, brass plug.
5. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Floor Cleanouts, General Building Areas (CODP):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; No. 4021-U Series or a comparable product by one of the following:

a. Josam Company.
b. MIFAB, Inc.
c. WATTS; A Watts Water Technologies Company.
d. Zurn Industries, LLC.

2. Standard: ASME A112.36.2M for adjustable housing cleanout.

3. Size: Same as connected branch.

4. Type: Adjustable threaded housing.

5. Body or Ferrule: Cast iron.

6. Outlet Connection: Spigot.

7. Closure: Brass plug with tapered threads or plastic plug and gasket.

8. Adjustable Housing Material: Nickel bronze with threads.

9. Frame and Cover Material and Finish: Nickel-bronze, copper alloy with scoriated, vandal resistant top.

10. Frame and Cover Shape: Square.

11. Top-Loading Classification: Medium Duty.

12. Riser: ASTM A74, Service Class, cast-iron drainage pipe fitting and riser to cleanout.

C. Wall Cleanouts (COWP):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; No. 4531-U Series or a comparable product by one of the following:

   a. Josam Company.
   b. MIFAB, Inc.
   c. WATTS; A Watts Water Technologies Company.
   d. Zurn Industries, LLC.

2. Standard: ASME A112.36.2M, for cleanouts. Include wall access.

3. Size: Same as connected drainage piping.

4. Body Material: Hubless, cast-iron soil-pipe test tee as required to match connected piping.

5. Closure: Countersunk, drilled-and-threaded bronze plug and gasket.

6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with vandal resistant screw.

2.3 FLOOR DRAINS

A. Cast-Iron Floor Drains (FD "A"):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; No. 2005 or a comparable product by one of the following:

   a. Josam Company.
   b. MIFAB, Inc.
   c. WATTS; A Watts Water Technologies Company.
   d. Zurn Industries, LLC.

2. Standard: ASME A112.6.3.

3. Pattern: Floor drain.

4. Body Material: Gray iron.

5. Outlet: Bottom.

6. Backwater Valve: Not required.

7. Top of Body and Strainer Finish: Nickel bronze.

8. Top Shape: Square.

9. Dimensions of Top or Strainer: 7-inch square.

10. Top Loading Classification: Light Duty.

11. Trap Material: Cast iron.

12. Trap Pattern: Deep-seal P-trap.

13. Trap Features: Inline Trap Seal.

2.4 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.

2. Size: Same as connected waste piping.

a. NPS 2: 4-inch-minimum water seal.
b. NPS 2-1/2 and Larger: 5-inch-minimum water seal.

B. Floor-Drain, Inline Trap Seal:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; Quad Close Trap Seal No. 2962or a comparable product by one of the following:

a. Green Drain, Inc.
b. Josam Company.
c. MIFAB, Inc.
d. RectorSeal Plumbing; A CSW Industrials Company.

2. Description: Inline floor drain trap seal, forming a physical barrier to slow trap evaporation while not impeding flow from drain.

3. Material: Polymer.

4. Standard: Tested and certified in accordance with ASSE 1072.

5. Listing: ICC-ES or IAPMO listed.

6. Size: Same as floor drain outlet or strainer throat.

C. Vent Caps:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Thaler Metal Industries Ltd; Model VPC Vandalproof Vent Stack Cap with perforated collar or comparable product by one of the following:

   a. Josam Company; Josam Div.
   b. MIFAB, Inc.
   c. Watts Drainage Products Inc.
   d. Zurn Plumbing Products Group; Specification Drainage Operation

2. Description: Vandal-proof, .064" mill finish 1100 0T alloy aluminum vent stack cap with perforated collar, supporting cross member secured with vandal resistant stainless steel mounting screws.

3. Size: Same as connected stack vent or vent stack.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

D. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.

2. Set floor drains below elevation of surrounding finished floor to allow floor drainage.

3. Set with grates depressed according to the following drainage area radii:

   a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
   b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.

c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.

4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

E. Install deep-seal traps on floor drains and other waste outlets, if indicated.

F. Install sleeve and sleeve seals with each riser and stack passing through floors with waterproof membrane.

G. Install vent caps on each vent pipe passing through roof.

H. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 PIPING CONNECTIONS

A. Comply with requirements in Section 22 13 16 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment, to allow service and maintenance.

3.3 LABELING AND IDENTIFYING

A. 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.

1. Nameplates and signs are specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.4 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19

SECTION 22 42 13.13 - COMMERCIAL WATER CLOSETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Water closets.
2. Flushometer valves.
3. Toilet seats.

1.3 DEFINITIONS

A. Effective Flush Volume: Average of two reduced flushes and one full flush per fixture.
B. WaterSense Fixture: Water closet and/or flushometer valve/tank certified by the EPA to meet the WaterSense performance criteria.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for water closets. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Water Closet “A” flushometer valves.
2. Water Closet “B” flushometer valves.
3. Water Closet “D” flushometer valves.
4. Water Closet “E” flushometer valves.
5. Transformer for Hard-Wired Flushometer Valves.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the “**As-Specified Verification Form**” (attached to Section 01 33 00 “Submittal Procedures”) for each item listed below; otherwise submit full Product Data for the following:

1. Water Closet “A” bowl.

2. Water Closet “B” bowl.
3. Water Closet “C” bowl.
4. Water Closet “D” bowl.
5. Water Closet “E” bowl.
6. Supports.
7. Toilet seats.
8. Supply fittings.

C. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves and electronic sensors to include in operation and maintenance manuals.

1.7 MAINTENANCE MATERIALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than six of each type.

1.8 QUALITY ASSURANCE

A. Water Conservation:

1. Provide plumbing fixtures complying with applicable provisions of Section 604.4 of the Plumbing Code of New York State.

B. Regulatory Requirements: Comply with requirements in 36 CFR Part 1191 – “Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines"; for plumbing fixtures for people with disabilities.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards:

1. Comply with ASME A112.19.2/CSA B45.1 for water closets.
2. Comply with ASME A112.19.5/CSA B45.15 for flush valves and spuds for water closets and tanks.
3. Comply with ASSE 1037/ASME A112.1037/CSA B125.37 for flush valves.
4. Comply with IAMPO/ANSI Z124.5 for water-closet (toilet) seats.
5. Comply with ASME A112.6.1M for water-closet supports.
6. Comply with ICC A117.1 for ADA-compliant water closets.

7. Comply with ASTM A1045 for flexible PVC gaskets used in connection of vitreous china water closets to sanitary drainage systems.
8. Comply with ASME A112.4.3 for plastic fittings used in connection of vitreous china water closets to sanitary drainage systems.
9. Comply with ASME A112.18.6 for braided or corrugated stainless-steel flexible hose.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Source Limitations: Obtain water closet fixtures, flushometers and accessoriess from single source from single manufacturer.

2.2 GENERAL CHARACTERISTICS

A. Vitreous China: Unmarked, true and level, clear, smooth and bright. Warranted not to craze, color or scale.
B. Trap ways no less than 2-1/8 inches in diameter and fully glazed.
C. Water surface area no less than 10 inches x 12 inches.
D. 100 percent factory tested for hydraulic performance, and trap seal depth, meeting or exceeding ANSI/ASME Standard A112.19.6, CSA B45 and a minimum ball pass diameter of 2 inches.

2.3 FLOOR-MOUNTED WATER CLOSETS

A. Water Closets (WC “A”): Floor mounted, top spud.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard; Madera FloWise 15” Height Elongated No. 3451.001 or comparable product by one of the following:

    a. Kohler Co.
    b. Sloan Valve Company.
    c. Zurn Industries, LLC.

2. Bowl:

    a. Material: Vitreous china.
    b. Type: Siphon jet.
    c. Style: Flushometer valve.
    d. Height: 15 inch inch rim elevation.
    e. Rim Contour: Elongated.
    f. Water Consumption: 1.1 gal. – 1.6 gal. per flush.
    g. Effective Flush Volume: 1.28 gal. per flush.
    h. Spud Size and Location: NPS 1-1/2; top.
    i. Outlet: Bottom.
    j. Color: White.

3. Flushometer Valve: Hard-Wired Flushometer Valves. Comply with requirements in "Flushometer Valve" Article.

4. Toilet Seat: Standard Toilet Seat. Comply with requirements in "Toilet Seat" Article.

B. Water Closets (WC "B"): Accessible floor mounted, top spud.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard; Madera FloWise 16-1/2" Height Elongated No. 3461.001 or comparable product by one of the following:

   a. Kohler Co.
   b. Sloan Valve Company.
   c. Zurn Industries, LLC.

2. Bowl:

   a. Material: Vitreous china.
   b. Type: Siphon jet.
   c. Style: Flushometer valve.
   d. Height: 16-1/2 inch rim elevation.
   e. Rim Contour: Elongated.
   f. Water Consumption: 1.1 gal. – 1.6 gal. per flush.
   g. Effective Flush Volume: 1.28 gal. per flush.
   h. Spud Size and Location: NPS 1-1/2; top.
   i. Outlet: Bottom.
   j. Color: White.

3. Bowl-to-Drain Connecting Fitting: ASME A112.4.3.

4. Flushometer Valve: Hard-Wired Flushometer Valves. Comply with requirements in "Flushometer Valve" Article.

5. Toilet Seat: Standard Toilet Seat. Comply with requirements in "Toilet Seat" Article.

C. Water Closets (WC "C"): Accessible floor mounted, close coupled, gravity tank.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard; Champion Pro Right Height Elongated Toilet Model 211AA.104 or comparable product by one of the following:

   a. Kohler Co.
   b. Sloan Valve Company.
   c. Zurn Industries, LLC.

2. Bowl:

   a. Bowl Type: Siphon jet.
   b. Height: 16-1/2 inch rim elevation.
   c. Rim Contour: Elongated.
   d. Water Consumption: 1.28 gal. per flush.

e. Rough-in: 12 inches.
f. Water Surface Area: 9 x 8 inches.
g. Color: White.

3. Toilet Seat: Standard Toilet Seat. Comply with requirements in "Toilet Seat" Article.

4. Supply Fittings: Comply with requirements in "Supply Fittings" Article.

2.4 WALL-MOUNTED WATER CLOSETS

A. Water Closets (WC "D" and "E"): Wall mounted, top spud.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard; Afwall Millennium FloWise Elongated No. 3351.101 or comparable product by one of the following:

a. Kohler Co.
b. Sloan Valve Company.
c. Zurn Industries, LLC.

2. Bowl:

a. Material: Vitreous china.
b. Type: Siphon jet.
c. Style: Flushometer valve.
d. Height: Refer to Plumbing Fixture Schedule on Drawings.
e. Rim Contour: Elongated.
f. Water Consumption: 1.1 gal. – 1.6 gal. per flush.
g. Effective Flush Volume: 1.28 gal. per flush.
h. Spud Size and Location: NPS 1-1/2; top.
i. Outlet: Back.
j. Color: White.

3. Support: Comply with requirements in "Support" Article.

4. Flushometer Valve: Hard-Wired Flushometer Valves. Comply with requirements in "Flushometer Valve" Article.

5. Toilet Seat: Standard Toilet Seat. Comply with requirements in "Toilet Seat" Article.

2.5 FLUSHOMETER VALVES

A. Hard-Wired Flushometer Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sloan Valve Company; Sloan Sensor Model No. 111 ESS-1.28-YO-DFB-OR-TP-HW-TMO or comparable product by the following:

a. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Minimum Pressure Rating: 125 psig.

3. Features: Include angle stop bumper, sweat solder adapter, cast set screw escutcheon, casing tube, integral check stop and backflow-prevention device.

4. Material: Brass body with corrosion and chloramine resistant components.

5. Exposed Flushometer-Valve Finish: Chrome plated.

6. Actuator: Solenoid complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

7. Trip Mechanism: Hard-wired electronic sensor complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application. Includes a courtesy flush, non-hold-open true mechanical override.

8. Consumption: 1.28 gal. per flush.

9. Minimum Inlet: NPS 1.

10. Minimum Outlet: NPS 1-1/4.

11. Provide 4" x 4" x 2-1/2" electric boxes as required by manufacturer for each hard wired flushometer.

12. Provide control wiring between flushometer solenoid valve, sensor, and transformer.

B. Transformer for Hard-Wired Flushometer Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sloan Valve Company; Model No. EL-154 or comparable product by the following:

   a. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Standard: Class II, UL Listed.

3. Features: Box-mount transformer designed for use with hard-wired flushometer valves. Operates up to 10 flushometer valves.

4. Input: 120 VAC.

5. Output: 24 VAC.

6. Volt amperes: 50.

2.6 TOILET SEATS

A. Standards Toilet Seats:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. American Standard.
    b. Bemis Manufacturing Company.
    c. Church Seats; Bemis Manufacturing Company.
    d. Kohler Co.
    e. ProFlo; a Ferguson Enterprises, Inc. brand.
    f. Zurn Industries, LLC.

2. Material: Anti-microbial treated fire-retardant plastic.

3. Type: Commercial (Heavy duty).

4. Shape: Elongated rim, open front.

5. Hinge: Self-sustaining, check.

6. Hinge Material: Stainless steel.

7. Seat Cover: Not required.

8. Color: White.

2.7 SUPPLY FITTINGS

A. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc. No. LF2166-F or comparable product by one of the following:

1. American Standard
2. Zurn Industries, LLC; Commercial Brass and Fixtures.

B. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass escutcheon with set screw.

C. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

D. Operation: Wheel handle.

E. Risers:

1. NPS 1/2.
2. Braided or corrugated stainless-steel flexible hose.

2.8 SUPPORTS

A. Water Closet Carrier:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg.; Series 100 and Series 200 M51 or comparable product by one of the following:

a. Josam Company.
b. Zurn Industries, LLC.

2. Description: Waste-fitting assembly, as required to match drainage piping material and arrangement with faceplates, couplings gaskets, and feet; bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.

a. Provide horizontal carrier fittings with NPS 2 auxiliary no-hub inlet where appropriate for other plumbing fixture vertical pipe connections.

1) Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg.; Series 209 and Series 219 M51 or comparable product.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before water-closet installation.
B. Examine walls and floors for suitable conditions where water closets will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 INSTALLATION

A. Water-Closet Installation:

1. Install level and plumb according to roughing-in drawings.
2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
3. Install accessible, wall-mounted water closets at mounting height for handicapped/elderly, according to ICC/ANSI A117.1.

B. Support Installation:

1. Install supports, affixed to building substrate, for floor-mounted, back-outlet water closets.
2. Use carrier supports with waste-fitting assembly and seal.
3. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals; and affix to building substrate.
4. Measure support height installation from finished floor, not structural floor.

C. Flushometer-Valve Installation:

1. Install flushometer-valve, water-supply fitting on each supply to each water closet.

2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.

3. Install flushometer valves for accessible water closets such that the operating handle faces the approach or transfer side of the water closet stall. Install sensor operated flushometer valves in the same manner so that, in the event that the sensor operated flushometer valve is replaced by a manually operated valve, the handle will comply with the above requirement.

4. Provide 4" x 4" x 2-1/2" electric boxes as required by manufacturer for each hard wired flushometer.

5. Provide control wiring between flushometer solenoid valve, sensor, and transformer.

D. Install toilet seats on water closets.

E. Wall Flange and Escutcheon Installation:

1. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."
2. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
3. Install escutcheon so set screw is facing floor.

F. Joint Sealing:

1. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."
2. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
3. Match sealant color to water-closet color.

3.3 PIPING CONNECTIONS

A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.
B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."
C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."
D. Where installing piping adjacent to water closets, allow space for service and maintenance.

3.4 ELECTRICAL CONNECTIONS

A. Install control wiring to field-mounted control devices.

B. Connect control wiring in accordance with Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

C. Ground equipment in accordance with Section 26 05 26 "Grounding and Bonding for Electrical Systems."

D. Install electrical devices furnished by manufacturer, but not factory mounted in accordance with NFPA 70 and NECA 1.

E. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate to be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.5 ADJUSTING

A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.
B. Adjust water pressure at flushometer valves to produce proper flow.

3.6 CLEANING AND PROTECTION

A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.
B. Install protective covering for installed water closets and fittings.

END OF SECTION 22 42 13.13

SECTION 22 42 13.16 - COMMERCIAL URINALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Urinals.
2. Flushometer valves.
3. Supports.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for urinals. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Urinal “A” flushometer valves.
2. Urinal “B” flushometer valves.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the “**As-Specified Verification Form**” (attached to Section 01 33 00 “Submittal Procedures”) for each item listed below; otherwise submit full Product Data for the following:

1. Urinal “A” bowls.
2. Urinal “B” bowls.
3. Support.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves and electronic sensors to include in operation and maintenance manuals.

1.6 MAINTENANCE MATERIALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than one of each type.

1.7 QUALITY ASSURANCE

A. Water Conservation:

1. Provide plumbing fixtures complying with applicable provisions of Section 604.4 of the Plumbing Code of New York State.

B. Regulatory Requirements: Comply with requirements in 36 CFR Part 1191 – “Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines"; for plumbing fixtures for people with disabilities.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. Source Limitations: Obtain urinal fixtures, flushometers and supports from single source from single manufacturer.

2.2 WALL-HUNG URINALS

A. Urinals (UR “A” and “B”): Top spud.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard America; Washbrook FloWise No. 6590.001 or comparable product by one of the following:

a. Kohler Co.; Dexter Model K-5016-ET.
b. Sloan Valve Company.; Model SU-1009.
c. Zurn Industries, LLC.; OMNI-FLO Model Z5755-U.

2. Fixture:

a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5/CSA B45.15.
b. Material: Vitreous china.
c. Type: Washout flush action with extended shields.
d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
e. Water Consumption: 0.5 gal. per flush.
f. Spud Size and Location: NPS 3/4; top.

g. Outlet Size and Location: NPS 2; back.
h. Color: White.

3. Waste Fitting:

a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
b. Size: NPS 2.

4. Flushometer Valve: Hard-Wired Flushometer Valves. Comply with requirements in "Flushometer Valve" Article.

5. Support: Comply with requirements in "Support" Article.

2.3 FLUSHOMETER VALVES

A. Hard-Wired Flushometer Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sloan Valve Company; Sloan Sensor Model No. 186 ESS-0.5-DFB-OR-HW-TMO or comparable product by the following:

a. Zurn Industries, LLC.

2. Standard: ASSE 1037.

3. Minimum Pressure Rating: 125 psig.

4. Features: Include sweat solder adapter, cast set screw escutcheon, casing tube, integral check stop and backflow-prevention device.

5. Material: Brass body with corrosion and chloramine resistant components.

6. Exposed Flushometer-Valve Finish: Chrome plated.

7. Style: Exposed.

8. Actuator: Solenoid complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

9. Trip Mechanism: Hard-wired electronic sensor complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application. Includes a courtesy flush, non-hold-open true mechanical override.

10. Consumption: 0.5 gal. (1.9 L per flush.

11. Minimum Inlet: NPS 3/4.

12. Minimum Outlet: NPS 3/4.

13. Provide 4" x 4" x 2-1/2" electric boxes as required by manufacturer for each hard wired flushometer.

14. Provide control wiring between flushometer solenoid valve, sensor, and transformer.

B. Transformer for Hard-Wired Flushometer Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sloan Valve Company; Model No. EL-154 or comparable product by the following:

a. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Standard: Class II, UL Listed.

3. Features: Box-mount transformer designed for use with hard-wired flushometer valves. Operates up to 10 flushometer valves.

4. Input: 120 VAC.

5. Output: 24 VAC.

6. Volt amperes: 50.

2.4 SUPPORTS

A. Type I Urinal Carrier:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; Series 637 or a comparable product by one of the following:

a. Josam Company.
b. MIFAB, Inc.
c. Wade Drains.
d. WATTS.
e. Zurn Industries, LLC.

2. Standard: ASME A112.6.1M.

3. Description: Type I, urinal carrier with top and bottom fixture support plates, coupling with seal and fixture bolts and hardware matching fixture, 1-1/4 inch diameter steel uprights welded to 4 inch square steel floor anchor plates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before urinal installation.

B. Examine walls and floors for suitable conditions where urinals will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 INSTALLATION

A. Urinal Installation:

1. Install urinals level and plumb according to roughing-in drawings.
2. Install wall-hung, back-outlet urinals onto waste fitting seals and attached to supports.
3. Install accessible, wall-mounted urinals at mounting height for the handicapped/elderly, according to ICC/ANSI A117.1.

B. Support Installation:

1. Install supports, affixed to building substrate, for wall-hung urinals.
2. Use off-floor carriers with waste fitting and seal for back-outlet urinals.
3. Use chair-type carrier supports with rectangular steel uprights for accessible urinals.
4. Measure support height installation from finished floor, not structural floor.

C. Flushometer-Valve Installation:

1. Install flushometer-valve water-supply fitting on each supply to each urinal.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Provide 4" x 4" x 2-1/2" electric boxes as required by manufacturer for each hard wired flushometer.
4. Provide control wiring between flushometer solenoid valve, sensor, and transformer.

D. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

E. Joint Sealing:

1. Seal joints between urinals and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to urinal color.
3. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

3.3 PIPING CONNECTIONS

A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.
B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."
D. Where installing piping adjacent to urinals, allow space for service and maintenance.

3.4 ELECTRICAL CONNECTIONS

A. Install control wiring to field-mounted control devices.

B. Connect control wiring in accordance with Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

C. Ground equipment in accordance with Section 26 05 26 "Grounding and Bonding for Electrical Systems."

D. Install electrical devices furnished by manufacturer, but not factory mounted in accordance with NFPA 70 and NECA 1.

E. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate to be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.5 ADJUSTING

A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.
B. Adjust water pressure at flushometer valves to produce proper flow.

3.6 CLEANING AND PROTECTION

A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.
B. Install protective covering for installed urinals and fittings.
C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 13.16

SECTION 22 42 16.13 - COMMERCIAL LAVATORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Lavatories.
2. Faucets.
3. Supplies.
4. Drains.
5. Traps.
6. Supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Lavatory “A” faucets.
2. Lavatory “B” faucets.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the “**As-Specified Verification Form**” (attached to Section 01 33 00 “Submittal Procedures”) for each item listed below; otherwise submit full Product Data for the following:

1. Lavatory “A” bowls.
2. Lavatory “B” bowls.
3. Supports.
4. Supply fittings.
5. Straight tailpiece drains.
6. Offset tailpiece drains.
7. Standard traps.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Water Conservation:

1. Provide plumbing fixtures complying with applicable provisions of Section 604.4 of the Plumbing Code of New York State.

B. NSF Compliance:

1. NSF/ANSI-61- Drinking Water System Components - Health Effects.
2. NSF/ANSI-372 for lead-free valve materials for potable-water service.

C. Regulatory Requirements: Comply with requirements in 36 CFR Part 1191 – “Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines"; for plumbing fixtures for people with disabilities.

1.5 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. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

1.6 FIELD CONDITIONS

A. Comply with “Project/Site Conditions” article in Part 1 of Section 22 05 00 “Common Work Results for Plumbing” for lead testing requirements prior to commencing any work.
B. Coordinate potable water lead testing with Owner prior to starting any construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Lavatory faucets intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. Source Limitations: Obtain lavatory fixtures, faucets and accessories from single source from single manufacturer.

2.2 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

A. Lavatory (LAV “A”): Vitreous china, wall mounted.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard America; Lucerne No. 0355.012 or comparable product by one of the following:

a. Kohler Co.
b. Sloan Valve Company.
c. Zurn Industries, LLC.

2. Fixture:

   a. Standard: ASME A112.19.2/CSA B45.1.
   b. Type: For wall hanging.
   c. Nominal Size: Rectangular, 20 by 18 inches.
   d. Faucet-Hole Punching: Three holes, 4-inch centers.
   e. Faucet-Hole Location: Top.
   f. Color: White.
   g. Mounting Material: Chair carrier.

3. Faucet: Manual-type, two-handle metering, centerset commercial, solid-brass valve. Comply with requirements in “Lavatory Faucet” Article.

4. Water-Temperature Limiting Device: Comply with requirements for temperature-actuated, water mixing valves specified in Section 22 11 19 "Domestic Water Piping Specialties" and as scheduled on Drawings.

5. Supplies: Comply with requirements in “Supply Fittings” Article.

6. Drain: Straight Tailpiece. Comply with requirements in “Drain” Article.

7. Trap: Standard Trap. Comply with requirements in “Trap” Article.

8. Support: Comply with requirements in “Support” Article.

B. Lavatory (LAV “B”): Vitreous china, wall mounted, accessible.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard America; Lucerne No. 0355.012 or comparable product by one of the following:

   a. Kohler Co.
   b. Sloan Valve Company.
   c. Zurn Industries, LLC.

2. Fixture:

   a. Standard: ASME A112.19.2/CSA B45.1.
   b. Type: For wall hanging.
   c. Nominal Size: Rectangular, 20 by 18 inches.
   d. Faucet-Hole Punching: Three holes, 4-inch centers.
   e. Faucet-Hole Location: Top.
   f. Color: White.
   g. Mounting Material: Chair carrier.

3. Faucet: Manual-type, two-handle metering, centerset commercial, solid-brass valve. Comply with requirements in “Lavatory Faucet” Article.

4. Water-Temperature Limiting Device: Comply with requirements for temperature-actuated, water mixing valves specified in Section 22 11 19 "Domestic Water Piping Specialties" and as scheduled on Drawings.

5. Supplies: Comply with requirements in “Supply Fittings” Article.

6. Drain: Offset Tailpiece. Comply with requirements in “Drain” Article.

7. Trap: Standard Trap. Comply with requirements in “Trap” Article.

8. Support: Comply with requirements in “Support” Article.

2.3 MANUALLY OPERATED LAVATORY FAUCETS

A. Lavatory Faucets: Manual-type, two-handle metering, centerset commercial, solid-brass valve.

1. Basis-of-Design Product: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Chicago Faucets; MVP Commercial Faucet No. 802-V665CP.
   b. Delta Faucet Company; Commercial Faucet No. 86T1153.
      MOEN M-PRESS COMMERCIAL FAUCET NO. 8886.
   c. Zurn Industries, LLC; Commercial Brass and Fixtures; AquaSpec Faucet No. Z86500.

2. Standard: ASME A112.18.1/CSA B125.1.

3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.

4. Body Type: Centerset, with 4” centers.

5. Body Material: Commercial, solid brass.

6. Finish: Polished chrome plate.

7. Maximum Flow: 0.25 gal. per metering cycle.

8. Mounting Type: Deck, exposed.

9. Valve Handle(s): Push button.

10. Spout: Rigid type.

11. Spout Outlet: Aerator.

12. Operation: Compression, manual.

2.4 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.

B. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc., or comparable product by one of the following:

1. American Standard America.
2. Zurn Industries, LLC; Commercial Brass and Fixtures.

C. Standard: ASME A112.18.1/CSA B125.1.

D. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass escutcheon with set screw.

E. Supply Stops: Basis-of-Design: No. LFHST02LKSB chrome-plated-brass, compression valve with inlet connection matching supply piping.

1. Operation: Loose key.

F. Risers: ASME A112.18.6/CSA B125.6, braided-stainless steel, flexible hose riser.

1. NPS 3/8.

2.5 DRAINS

A. Straight Tailpiece:

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc.; No. 155-A or comparable product by one of the following:

a. American Standard America.
b. Zurn Industries, LLC; Commercial Brass and Fixtures.

B. Offset Tailpiece:

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc.; No. 155-WC or comparable product by one of the following:

a. American Standard America
b. Zurn Industries, LLC; Commercial Brass and Fixtures.

C. Standard: ASME A112.18.2/CSA B125.2.

D. Drain: Grid type with NPS 1-1/4 tailpiece.

E. Material: Seamless, chrome plated cast brass, brass locknut, heavy rubber basin washer and fiber friction washer.

2.6 TRAPS

A. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc.; No. 8902-F or comparable product by one of the following:

1. American Standard America.
2. Zurn Industries, LLC; Commercial Brass and Fixtures.

B. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow, 17 gauge brass tube to wall with cleanout plug. Include chrome-plated brass escutcheon with set screw.

C. Standard: ASME A112.18.2/CSA B125.2.

D. Size: NPS 1-1/2 by NPS 1-1/4.

2.7 LAVATORY SUPPORTS

A. Lavatory Carrier:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; Series No. 700-M31 or a comparable product by one of the following:

   a. MIFAB, Inc.
   b. WATTS; A Watts Water Technologies Company.
   c. Zurn Industries, LLC.

2. Standard: ASME A112.6.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.
B. Examine counters and walls for suitable conditions where lavatories will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install lavatories level and plumb in accordance with roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-mounted lavatories.

C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, in accordance with ICC A117.1.

D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

E. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories.

3.3 PIPING CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."
C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 FIELD QUALITY CONTROL

A. Comply with “Field Quality Control” article in Part 3 of Section 22 05 00 “Common Work Results for Plumbing” for lead testing requirements prior to commencing any work.

B. Inspecting Agency: Engage a qualified laboratory to perform lead testing on all potable water faucets installed under this contract and used or potentially used for drinking or cooking purposes according to NYS Law 10 CRR-NY 67-4.1. Submit test results Owner and the Architect.

C. Replace any faucet that exceeds the lead action level (5 micrograms per liter) and coordinate with the Owner for retesting until satisfactory results are obtained.

3.5 ADJUSTING

A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.

3.6 CLEANING AND PROTECTION

A. After completing installation of lavatories, inspect and repair damaged finishes.
B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
C. Provide protective covering for installed lavatories and fittings.

END OF SECTION 22 42 16.13

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and all Division 01 Sections, apply to this Section and to all of Division 23.

1.2 SUMMARY

A. This Section includes the following:

1. Definitions, references, and abbreviations.
2. General regulatory requirements.
3. General requirements regarding site/field conditions including existing conditions and field measurements.
4. Sequencing and scheduling including coordination.
5. Definition of design equipment and procedures for consideration of specified equivalents, proposed equivalents, or substitutions.
6. HVAC demolition.
7. Equipment installation requirements common to equipment sections.
8. Minimum material requirements and equipment verification.
9. Electrical components for HVAC Work
10. Mechanical penetrations, waterproofing, and sealants.
11. Fire-stopping
12. Access doors
13. Painting and finishing.
14. General requirements for demonstration of completed systems.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. "Design Equipment", "Design Make", "Basis of Design", and similar terms: Equipment, specified in Technical Specification Section or on Contract Drawings using applicable manufacturer's designation, that forms the basis for performance requirements, physical dimensions, configuration, and similar aspects used in the design of this Project including (but not limited to) physical configuration of surrounding construction and location of connections to other components.

G. Specified Equivalents: Products identified in Technical Specification Section that may provide performance complying with specified requirements but may not have the same arrangement, configuration, size, construction, or other aspects as the specified Design Equipment. Refer to Section 00 21 13 - Instructions to Bidders, and Section 01 25 00 – Substitution Procedures for additional information and requirements regarding equivalents and substitutions.

H. "Equivalents", "Proposed Equivalents", "Proposed Products" and similar terms: These terms may be used interchangeably and mean the same thing: Products NOT identified in Technical Specification Section that the Contractor proposes in accordance with Section 00 21 13 - Instructions to Bidders and Section 01 25 00 – Substitution Procedures.

I. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor, all in accordance with Section 01 25 00 – Substitution Procedures.

1.4 ABBREVIATIONS

A. Abbreviations: Reference to technical society, organization, body or section made in Division 23 in accordance with the following abbreviations:

1.	AIA	American Institute of Architects
2.	ADA	Americans with Disabilities Act.
3.	AMCA	Air Movement and Control Association International, Inc.
4.	ANSI	American National Standards Institute
5.	ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
6.	ASME	American Society of Mechanical Engineers International
7.	ASTM	American Society for Testing and Materials International
8.	AWS	American Welding Society
9.	IEEE	Institute of Electrical and Electronics Engineers, Inc.
10.	NEC	National Electric Code
11.	NEMA	National Electrical Manufacturers Association
12.	NFPA	National Fire Protection Association
13.	NYBFU	New York Board of Fire Underwriters
14.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
15.	UL	Underwriters Laboratories Inc.

1.5 SYSTEM DESCRIPTION

A. Provide complete systems, properly connected, tested, balanced, adjusted, and ready for operation, including all necessary and required controls, safeties, details and accessories, including (but not limited to):

1. Demolition and removals required for equipment and system installation.
2. Piping systems and related equipment.
3. Ventilation systems and related equipment.
4. Support Systems and related equipment.
5. Insulation Systems and related equipment.
6. Miscellaneous items required for equipment and system installation.
7. Controls and electrical control wiring to equipment furnished in this contract.
8. Electrical power wiring to equipment furnished in this contract, where not covered elsewhere.

B. HEATING WORK DRAWINGS ARE DIAGRAMMATIC. Do not infer that Drawings show level of detail indicating every offset, elbow, union, fitting, elevation or aspect ratio changes, or other details required for complete installation.

1. Provide all required fittings, offsets, elevation changes, dampers, controls, components, and similar items not indicated on Drawings, as required for a complete properly operational system.

1.6 SUBMITTALS

A. General Division 23 submittal requirements:

1. Procedural Requirements: Comply with requirements of Section 01 33 00 - Submittals and as modified below.

   a. Specified Products: If product to be incorporated into Project is specified by name and product designation in Part 2 of product specification, and will be installed as specified in Part 3, and only where allowed as such in submittal portion of product specification, then submit “As-Specified Verification Form” (attached to Section 01 33 00 - Submittals) in lieu of “Product Data” identified.

   b. Do not use “As Specified Verification Form” unless specifically indicated in detailed product specification.

   c. Equivalent Products or Substitutions: If product to be incorporated into Project is <u>not</u> specified by name and product designation in Part 2 below, comply with all Product Data requirements specified.

2. Product Data: Submit Product Data for items listed in individual technical section. Clearly identify manufacturer, pertinent design, function, materials, construction, and performance data specifically addressing specification description and Contract Document requirements of item. Strike out products that are not applicable to item being submitted, where more than one product is indicated on manufacturer product literature.

a. Cover Sheet: Attach cover sheet, identified in Section 01 33 00, to Product Data of each item submitted. Provide cover sheet for only one type of item with related accessories, equipment with related components. Do not combine unrelated items under same cover sheet.

b. Specified Equivalent Product Data: Submit manufacturer's product information including product literature, technical specifications and descriptions, performance data, and similar items to demonstrate compatibility with Basis-of-Design Equipment as specified in "Manufacturers" in Part 2 - Products below.

3. Do not proceed with installation of systems in each area until agreement is reached with all concerned on exact arrangements for each room or area, unless otherwise directed by Architect. If Contractor proceeds prior to resolving conflicts, Contractor shall modify installed Work as required to permit other systems to proceed with a coordinated installation.

4. Specified Equivalent Drawings: Submit detailed drawings of proposed Specified Equivalents, indicating proposed installation of equipment and showing maintenance clearances, required service removal space, and other pertinent revisions to arrangement and configuration shown in Contract Documents.

5. Closeout Information, for inclusion in Operations and Maintenance Manual:

a. Approved submittals.

1) If "As-Specified Verification Form" submittal is approved, also include product data as specified in technical section for all components used.

b. Include all information required in Section 01 78 23 – Operation and Maintenance Data.

c. Include all other closeout information required by the individual technical specification sections.

B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

1. Sealants
2. Fire-stopping.
3. Access doors.
4. Painting and finishing.

C. Samples:

1. Submit color chart with paint manufacturer's color samples for final color selections prior to beginning painting. Comply with additional requirements for color selection samples specified in Division 09.

D. Closeout Information, for inclusion in Operations and Maintenance Manual:

1. Approved submittals.

a. If “As-Specified Verification Form” submittal is approved, also include product data for all components used.

2. Include all information required in Section 01 78 23 – Operation and Maintenance Data.

3. Letters on manufacturer’s letterhead from equipment manufacturers certifying that their equipment and systems have been installed in strict accordance with manufacturer's recommendations, properly aligned and adjusted, tested, lubricated, wired, balanced, etc.

4. Lubrication and Filter charts as described below.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements

1. Comply with applicable requirements of all Federal, New York State, and Local Building, Health, Mechanical, Plumbing and Electrical Codes, Laws, Ordinances and Regulations, including (but not limited to):

a. Building Code of New York State
b. Mechanical Code of New York State
c. Fire Code of New York State
d. Energy Conservation Construction Code of New York State
e. New York State Education Department Manual of Planning Standards
f. In event of a conflict between the Codes identified above and Contract Documents, comply with more stringent requirement.

2. Comply with applicable requirements of NFPA, utility company regulations, and following standards:

a. Provide Underwriters Laboratories (UL) labels on all electrical materials carrying 50 volts or more.

B. Certifications: Obtain and pay for all necessary inspections and certificates from all applicable agencies. Perform all required tests in accordance with regulation of agency having jurisdiction. Submit certificates of approval prior to Final Completion as defined in Section 01 77 00 – Closeout Procedures. Submit certificates of approval prior to request for final acceptance of Contract.

C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

D. Welding Quality Control for General Construction and Support Work:

1. This paragraph refers to qualifications for General Construction and Support Work welding only. Qualify welders, brazers, and any welding or brazing procedure to be used on piping for this Project in accordance with ASME "Boiler and Pressure Vessel Code", Section IX, as specified and detailed in Section 23 21 13 - HYDRONIC PIPING.

2. Welding and Brazing Procedure Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel." Qualification may by made by technically competent group or agency (subject to approval) meeting the following conditions:

   a. Group or agency qualifying the procedure meets all procedure qualification requirements of AWS D1.1/D1.1M, "Structural Welding Code - Steel.".

   b. Contractor accepts full responsibility for procedure qualified.

   c. Contractor has qualified at least one welder or welding operator using procedure qualified and provides record of qualification.

   d. Contractor accepts full responsibility for qualified procedures by signing related qualification records with procedure and performance qualifications including all dates, results, and associated data.

3. Welders' and Brazers' Qualifications: Ensure that all welders, welding operators, brazers, or brazing operators employed for this project are qualified for all welding and brazing procedures, proposed as part of this Project, in accordance with AWS D1.1/D1.1M, "Structural Welding Code - Steel.". Qualification by previous employer or technically competent group or agency (subject to approval) may be acceptable if following information is included:

   a. Documentation that the previous qualification was for essentially the same procedures proposed and was in full accordance with AWS D1.1/D1.1M, "Structural Welding Code - Steel.".

   b. Copy of performance qualification testing record showing who qualified the worker, date of qualification, and work history record showing continuous performance to maintain qualification.

4. Weld and Braze Qualification Records: Maintain and sign certified records of approved procedures used and approved qualified workers employed for welded and brazed joints performed as a part of Prime Contract. Ensure all welding and brazing work can be traced to a specific procedure and welder.

5. Inspection and Examination by Owner, Remedy by Contractor: Owner reserves right to examine, inspect, and test all piping using visual, radiographic, or other recognized testing methods to determine compliance with specified quality control requirements and requirements of applicable regulatory agencies.

   a. Cost of Owner's testing of acceptable installation provided at Owner's expense.

b. Repair piping installations not passing Owner's quality inspection testing using approved method or replace at no additional cost.
c. Cost of initial testing of piping not conforming to specified requirements and any retesting of repairs or replacement work shall be deducted from Contract Sum.

E. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Ship materials in manufacturer's containers, fully identified with manufacture's name, trade name, type, class, style, model, grade, size and color.

B. Storage and Protection

1. Store materials, equipment, fixtures, pipe, fittings, attachments, under cover, off ground in original containers as applicable, and protect from physical and weather damage while in storage and during construction.

2. Furnish extra materials identified in technical sections, in original manufacturer's containers and packaging, to Owner at location identified during Preconstruction Conference. Obtain receipt from Owner upon delivery of extra materials and send copy of receipt to Architect.

3. Replace or repair damaged, rusted, corroded or otherwise unusable materials physically damaged or weather damaged equipment as determined by Architect, at no change in Contract Sum.

1.9 PROJECT/SITE CONDITIONS

A. Field Measurements

1. DO NOT SCALE DRAWINGS: Refer to Architectural and Structural drawings for dimensions and details, and verify measurements in field before proceeding.

2. Install all items with proper provision for removal and access to coil bundles, boiler tubes, belts, valves, traps, and similar components.

3. Layout of equipment, piping, and similar components in Drawings is diagrammatic. Review Drawings in the field, identify interference with other construction and verify dimensions at Site prior to beginning installation.

a. Obtain exact size and location of all items and openings and confirm all existing conditions in field. Review Shop Drawings of all Contracts.

b. Coordinate all Heating Work that interferes with other construction with other responsible Contractor.

c. Obtain exact location and roughing requirements for all equipment furnished by others but installed by this Contractor before roughing. Owner reserves right to make reasonable changes prior to "roughing-in" without increase in Contract Sum.

4. Report any conflicts to Architect in writing before beginning installation.

1.10 SEQUENCING AND SCHEDULING

A. Perform all Heating Work in cooperation with Owner, Architect, Construction Manager, and all Contractors on this Project, and other separate Contractors at the Site.

1. Coordinate all Heating Work with construction schedule requirements in Division 01
2. Coordinate all submittals with the construction schedule and with requirements and schedules contained in Section 01 33 00 – Submittals Procedures.
3. Immediately report any delays in receipt of materials required for Heating Work including circumstances causing delays.

B. Existing Construction: Provide openings, chases, recesses, lintels and bucks required for admission of Heating Work, unless otherwise noted. Do not cut waterproofed floors or walls for admission of equipment or materials without written permission. Do not pierce structural members without written permission.

C. Supports for Heating Work: Provide anchor bolts required supporting or securing Heating Work. Locate settings and check locations as construction progresses. Provide templates or holding fixtures as required to maintain proper accuracy.

D. Cutting and Patching: Bear expense of cutting, patching, repairing or replacing of work of all Contracts required due to fault, error or damage by contractor responsible for Heating Work, unless otherwise specified in Contract Documents. Employ and pay Prime Contractor involved, or if there is no associated Prime Contractor, employ and pay qualified subcontractor as required for corrective work.

E. Refer to Division 01 for cooperation between Contractors. Prior to start of construction:

1. Obtain from Contract Drawings or Architect, exact location of items and openings in construction. Conform to existing conditions in field.

2. Review Shop Drawings of all Contracts.

3. If conflict occurs between Contract Drawings, advise Architect in writing before beginning installation and comply with Architect's directions.

4. Obtain exact location and roughing requirements for equipment furnished by other Contractor or by Owner, but installed by Contractor responsible for Heating Work before beginning roughing.

1.11 COORDINATION

A. Pre-Installation Conference:

1. Attend pre-installation conference. Arrange for all subcontractors to be in attendance.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate Heating Work with plumbing systems, lighting fixtures, ceiling mounted devices, ceiling heights, materials, structural work, maintenance clearances, electric code clearance, and building systems. Verify that Work of all Contractors can be installed without interference with Heating Work.

E. Notify Architect in case of unresolved interferences prior to installation of Heating Work.

F. Adjust exact size, location and offsets of exposed HVAC components to achieve reasonable appearance objectives without increase in Contract Sum.

G. Testing and Balancing: Cooperate with contractor responsible for Testing and Balancing work as required ensuring complete and proper testing, balancing and adjustment of air and water systems. Refer to Section 23 05 93 – Testing, Adjusting, and Balancing for HVAC, for details.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Equipment – Provide as specified and scheduled with all options as required for full compliance.

B. Specified Equivalents - If Specified Equivalents (refer to "Definitions" in Part 1 above) are proposed, comply with following requirements:

1. Submit "Specified Equivalent Drawings" as specified in "Submittals" in Part 1 above.

a. Provide required changes in design and adjacent construction or equipment at no increase in Contract Sum.

1) Where required, provide larger motors, equipment, additional control devices, valves, fittings, and other miscellaneous equipment necessary for proper operation and provide proper location of roughing and connections to other Contractors.

2) Provide additional motors, starters, power, wiring, and control wiring required.

3) Provide revisions to equipment, wiring, support structure, controls, valves, fittings, and other miscellaneous equipment.

4) Additional Architectural and Engineering work, coordination, and documentation.

b. If proposed arrangement for Specified Equivalent is rejected, revise to be compliant and resubmit or submit Basis-of-Design Equipment.

2. Submit "Specified Equivalent Product Data" as specified in "Submittals" in Part 1 above to demonstrate that proposed Specified Equivalent is equal to or better than Basis-of-Design Equipment with respect to all performance characteristics, including but not limited to durability, individual equipment operating costs, entire interrelated system operating costs, service access, noise levels, vibration levels, compatibility with Owner's other existing equipment to minimize parts inventory, aesthetics where applicable, and similar characteristics.

3. Do not assume that approval of a specified equivalent submittal implies approval of the installed product. Correct all deviations uncovered during construction and warrantee period that result in or are caused by any lower performance characteristic than the specified Basis of Design equipment.

C. Proposed Equivalents and Substitutions: In addition to requirements described elsewhere in these Contract Documents, all proposed equivalent and substitution products being considered shall be subject to the Specified Equivalent requirements listed above.

2.2 MATERIALS

A. Minimum Material Requirements:

1. Construct potable water systems and equipment according to Plumbing Code of New York State.

2. Provide electrical equipment and systems meeting UL standards and requirements of NEC.

3. Provide UL label on all equipment and material with listing service.

4. Material Flammability:

a. Flame spread rating of 25 or less.
b. Smoke developed rating of 50 or less.

5. Equipment Verification: Carefully check manufacturer's drawings and specifications as they affect their particular equipment; follow factory instructions for roughing, installation, connection, filling, lubrication, testing, balancing, adjusting, alignment, wiring, and start-up operation.

2.3 SEALANTS

A. Comply with requirements for sealants in non-fire rated penetrations specified in Section 07 92 00 "Joint Sealants", and also with requirements for Air Duct sealants in Section 23 31 00 – Ductwork.

B. Provide premium products specified for each application as appropriate.

2.4 PENETRATION FIRESTOPPING

A. Comply with requirements for sealants in fire rated penetrations specified in Section 07 84 13 “Penetration Firestopping”.

B. Submit Manufacturers Product Data Sheets for each type of product selected. Certify that Firestop Material is free of asbestos and lead paint, and complies with local regulations.

1. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

C. Submit system design listings, including illustrations from qualified testing and inspection agency that is applicable to each firestop configuration.

D. Submit a project specific Penetration Firestopping Schedule indicating where each firestop configuration will be used.

2.5 PAINT AND FINISHES

A. Refer to Division 09 for paint and finish product specifications.

PART 3 - EXECUTION

3.1 HVAC DEMOLITION

A. Refer to Division 01 Section "Execution" and Division 02 Section "Selective Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material at point of continued use or as otherwise specifically indicated.

2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.

3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and cap remaining ducts with same or compatible ductwork material.

4. Ducts to Be Abandoned in Place: Cap all duct ends with same or compatible ductwork material.

5. Equipment to Be Removed: Disconnect and remove equipment and all associated accessories. Plug, cap, seal, and otherwise patch to match as required.

6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, protect, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational. Document any existing damage before removals.

7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. Disposition of Removed Components:

1. All material and equipment removed during project Work but not being reused in the project is to be offered to the Owner. If accepted by Owner, deliver the removed materials and equipment to a project site location designated by the Owner.

2. For components that become the Contractor's property through this removal process: Confirm transfer of ownership in writing then promptly remove from the site and legally process.

3. For components indicated on the drawings to be turned over to the Owner: deliver to a project site location designated by the Owner.

4. For components indicated on the drawings to be reused: carefully remove, protect, and store until appropriate time for re-installation. Document any pre-existing damage prior to removals.

5. For pipe and tubing indicated to be reused, reuse only those portions of pipe, tubing, and associated fitting assemblies where they are direct replacements of the as specified and as shown new piping assemblies. Valves, strainers, other piping specialties, and insulation shall not be re-used unless specifically indicated on drawings.

3.2 EXISTING CONDITIONS

A. Reuse materials and equipment only as indicated on Drawings. Furnish new equipment and materials in conformance with Contract Documents for all Heating Work, including any material, operation, method or device mentioned, listed or noted within Division 23 Sections, unless reuse is specifically indicated, or unless specified as furnished or installed by Owner, all Contractors, or others.

B. If pipe, insulation, or equipment to remain is damaged in appearance or is otherwise made unserviceable by adjacent or associated work or error, remove damaged or unserviceable portions and replace with new products of equal capacity and quality. Verify, document, and confirm pre-existing damage with Owner and Architect before beginning work.

3.3 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

E. Ensure each equipment manufacturer:

1. Carefully checks Contract Drawings and Specifications applicable to manufacturer's equipment before roughing.

2. Reports to Architect, before or when Shop Drawings are submitted, any discrepancies or conditions applied to manufacturer's equipment that prevents proper functioning, servicing, and other aspects of equipment operation.

3. Provides manufacturer's printed installation instructions for each piece of equipment.

4. Thoroughly instructs Contractor exactly how equipment should be installed, connected, lubricated, started, operated, and similar aspects to ensure all factory instructions are rigidly followed during installation of equipment.

F. Install, test, start, and operate equipment as instructed by manufacturer.

G. Submit written evidence from equipment manufacturer that manufacturer's equipment and systems have been:

1. Installed in strict accordance with manufacturer's recommendations.
2. Properly aligned and adjusted, tested, lubricated, wired, balanced, and similar operations

H. Equipment Connections

1. Provide final make up water, heating water/glycol, drain, vent, refrigerant, and gas connections to all equipment as required.

2. Provide isolation valves and flanges or unions on the supply and return piping connections to all equipment arranged as required for reasonable service isolation and access.

3. Provide equipment waste, drip, overflow, bleed water, condensate, and drain connections extended to floor or roof drains or other approved points of discharge. Provide integral condensate pumps and appropriate piping for units where gravity condensate drain is not practical or possible.

4. Connect equipment complete and ready-to-use, including all valves, piping, piping accessories, traps, pressure reducing and backflow prevention devices, gauges, relief valves, vents, drains, insulation, sheet metal work, controls, dampers, and similar components required.

I. Precautions Against Freezing: In addition to applicable requirements in Division 01 and individual technical sections, take all necessary precautions with equipment and systems to prevent damage to building, piping, equipment, and other components due to freezing and water leakage until final acceptance. Before freezing weather occurs, make certain all:

1. Safety features are properly functioning.
2. Freeze protection is tested and sensing elements are properly located.
3. Openings around outside grilles, louvers, and similar items are properly sealed; notify Architect in writing if openings are not adequately sealed.
4. Outside air dampers are tight fitting and operational, and damper motors are properly winterized.
5. Air systems are properly balanced.
6. Proper insulation is installed where required.

J. Concealment: Conceal all Work not specifically shown on the Drawings as exposed. Note piping risers may be shown outside of walls due to scale of drawing symbols – the general intent is for these pipes to be concealed within the general construction if possible or if not possible, to be within riser chases. If for any reason concealment is impossible, notify the Architect and obtain written approval before starting that part of the Work.

K. Exposed Items: Install exposed items as shown on Drawings or as approved by Architect. Obtain Architect's approval for final arrangement and appearance before installing items in areas without ceilings.

L. Damaged Components and Replacement: If pipe, duct, insulation, or any HVAC component or equipment is damaged in appearance or is otherwise unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.4 ERECTION OF SUPPORTS AND ANCHORAGES

A. Provide a complete system of support and anchorage for all Contract work.
B. Refer to Section 23 05 29 - Hangers and Supports for HVAC Components, and Division 05 and Division 06 complete for detailed additional requirements.

3.5 MECHANICAL PENETRATIONS, WATERPROOFING, AND SEALING

A. Openings Through Roofs: Curbs are required for rooftop air handling equipment, ventilators, fans, piping penetrations, etc. Roofing, flashing, and general waterproofing are the responsibility of the Contractor unless specifically indicated otherwise elsewhere in the Contract Documents. Refer to Architectural Drawings for related work by others.

1. Use factory pre-fabricated units as specified and noted on Drawings.

2. Caulk and waterproof neatly with additional material as required.

3. Employ the services of an approved roofing sub-contractor for all patching and/or new work indicated as part of the Heating Work.

4. Any roofing work performed under this Contract shall be performed in such a way as to not void any existing roofing warrantee. Additionally, whether there is a roofing warrantee currently in force or not for roof in area of new penetrations, all new penetration work shall be warranted leak free for a period not less than one year from final acceptance of project.

5. Provide structural support for roof deck around all roof curbs and roof deck penetrations larger than 12 inch x 12 inch, unless specifically indicated otherwise elsewhere on the Contract Documents.

B. Opening Through Outside Walls:

1. Guarantee all penetrations to be thoroughly air and watertight. Caulk and flash duct penetrations in accordance with specifications, details on Drawings, and as required.

2. Install louvers in accordance with specifications, manufacturer's recommendations, and details, as required to achieve guaranteed air and watertight penetrations. Direct drainage to drip away from building surface.

3. Use special waterproof construction as directed.

4. Provide mechanical sleeve seals for piping penetrations.

5. Provide structural support for wall above all penetrations wider than 12 inches, unless otherwise indicated elsewhere on the Contract Documents.

6. Below grade openings:

a. Provide mechanical sleeve seals for piping penetrations.

b. Seal duct penetrations by filling space between duct and sleeves with approved non-hardening caulking compound. Openings to be caulked from inside and outside, before back filling.

c. Seal below grade insulation system water tight to building foundation wall in accordance with insulation manufacturer's printed recommendations.

C. Openings Through Floors and Inside Walls: Provide through penetration systems for all mechanical work floor and wall penetrations which do not compromise the integrity of the floor or wall with regards to fire rating, smoke passage rating, acoustical noise reduction rating, or seismic rating. Insure through penetration system does not transmit mechanical vibrations to building walls or floors. Seal all floor penetrations to effectively block the passage of smoke and fumes.

1. Provide structural support for floor deck around all penetrations larger than 12 inches in any dimension, unless specifically indicated otherwise elsewhere on the contract documents.

3.6 FIRESTOPPING

A. Provide Through-Penetration Firestopping Systems and Devices listed in UL Fire Resistance Directory under categories XHCR and XHEZ and conforming to construction type, penetrant type, annular space requirements and fire rating indicated or required for each application.

B. Provide systems that withstand passage of cold smoke either as inherent property of system or by use of separate product included as part of UL system or device designed to perform this function.

3.7 PAINTING

A. Painting of HVAC systems, equipment, and components is additionally specified in Division 09 Sections on Painting.

3.8 PROTECTION

A. Maintain systems during construction, temporary use, and until acceptance by Owner.

1. Properly lubricate all HVAC systems bearings during use.
2. Maintain limit controls, overload devices, and safety controls in operating condition during use

3.9 ALTERATIONS

A. Provide protection of existing facilities, demolition and removals, replacement and restoration, including patch-to-match requirements, and hazardous materials procedures to install Heating Work in conformance with Division 01 requirements.

B. Provide cutting and patching required to install Heating Work in accordance with the requirements of Division 01 covering cutting and patching.

3.10 ADJUSTING AND CLEANING

A. Adjust all work as required to insure systems perform as designed and as intended, including but not limited to the following:

1. Adjust all registers and diffusers to insure even air distribution free of objectionable drafts. Include all new and all existing to remain registers and diffusers on systems where HVAC modifications are made.

2. Adjust all hangers and supports to insure proper piping slope, alignment of flexible connections, even loadings, proper venting and draining, proper control over thermal expansion, etc.

3. Adjust all mechanical equipment insuring it runs properly as intended, providing the performance specified and required, and as required to maintain all warrantees.

B. Clean work furnished or provided as part of Heating Work, including but not limited to equipment, control panels and devices.

1. Refer to and comply with Section 01 50 00 - Temporary Facilities and Controls for additional requirements for cleaning during construction and Section 01 77 00 – Closeout Procedures for additional requirements for final cleaning.

2. Remove debris, leftover piping, tubing, metal, insulation, cartons, papers, etc., resulting from Heating Work.

3. Remove all rust, dirt, oil, etc. from Heating Work to be painted and maintain in condition ready for painting.

4. Clean inside and outside of all equipment and distribution systems provided including (but not limited to) following:

a. All enclosures.

b. Remove all rust, oils, and similar contamination from all equipment, piping and supports to be painted, and leave components ready for painting.

c. Remove debris, leftover piping, wiring, tubing, metal, insulation, cartons, papers, and similar items left in building or on Site. Clean building as often as necessary and when directed by Architect.

C. Final Cleaning: In addition to requirements specified in Section 01 77 00 – Closeout Procedures and other sections in Division 23, provide following measures.

1. Where heating units have been used to provide temporary heat, clean all permanent filters, replace all disposable filters, and clean all ducts, blowers, and coils.
2. Clean all piping strainers and replace all "startup" screens with permanent screens.
3. Provide written notification to Architect upon completion of all final cleaning procedures and request inspection of final cleaning.

3.11 DEMONSTRATION OF COMPLETED SYSTEMS:

A. Prior to Final Completion, thoroughly demonstrate and instruct Owner’s designated representatives in care and operation of all heating and ventilating systems and equipment provided in Heating Work. Provide necessary skilled labor to operate all systems for not less than 5 days and provide required instruction.

1. In addition to Contractor’s instruction, arrange for technically qualified factory representatives to train Owner's designated representatives in care, maintenance, and operation of following manufacturer’s equipment and systems.

a. Temperature controls.

2. Coordinate and schedule time and place of all training through Architect at Owner’s convenience.

3. Submit letters verifying satisfactory completion of all instruction including date of instruction, names of persons in attendance and countersigned by authorized representative of Owner.

4. Until final acceptance, Contractor retains full responsibility for systems operations and maintenance, even though operated by Owner's personnel during instruction, unless otherwise agreed to in writing.

5. During instruction, provide list, sealed in clear plastic, outlining operating, maintenance, and starting precautions and procedures to be followed by Owner for operating systems and equipment.

B. Lubrication Chart: Provide minimum 8-1/2 inch x 11 inch lubrication chart for all Work in Heating Work Contract, typed in capital letters, mounted under clear laminated plastic, and secured to wall where directed by Architect.

1. List all motors and equipment including following information:

   a. Name and location of equipment.
   b. Type of lubrication recommended by manufacturer.
   c. Lubrication period recommended by manufacturer.

2. Lubricate all motors immediately after installation and perform lubrication maintenance until final acceptance by Owner.

C. Air Filter Chart: Provide an air filter chart for all equipment installed in contract.

1. Chart shall be 8-1/2 inch x 11 inch minimum size, typed in capital letters, mounted under clear laminated plastic; secure to wall where directed.

2. List all equipment that includes filters in Contract. Obtain necessary information containing the following:

   a. Name and location of equipment
   b. Type of filters recommended by the manufacturer.
   c. Size of filters for each piece of equipment.
   d. Recommended replacement schedule from unit manufacturer.

END OF SECTION 23 05 00

SECTION 23 05 13 - COMMON ELECTRICAL REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. General requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

2. Starters and drive train accessories for electric motors.

1.3 SUBMITTALS

A. General: Submit all action submittals required by this Section concurrently.

B. Action Submittals:

1. Product Data: For each type of product indicated, demonstrating compliance with all specified performance and construction characteristics.

C. Closeout Submittals:

1. Installation, Operation, and Maintenance Data: For motors, drives, electrical power components, and heat trace - include in operation and maintenance manuals.

a. Wiring Diagrams: Employ competent technical aid to prepare composite wiring diagrams for field wiring of power, signal, and control wiring for all equipment and systems installed as part of the HVAC Work. Deliver diagrams to proper parties in time for roughing of conduit and equipment connections. Clearly indicate all items to be mounted or wired as part of DIVISION 26. Include as built wiring diagrams in O&M manual.

1.4 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Manufacturers: Provide products by one of following manufacturers or equal, except where unusual configurations involving frame, hermetic seals, shaft, bearing, or starting characteristics are peculiar to particular item of equipment as specified by Architect:

1. National Resource Management (NRM).
2. Baldor.
3. General Electric.
4. U. S. Motors.

B. Provide all motors required for the work of Division 23 specifications. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or individual technical specification sections.

C. Provide all motors suitable for operation at the frequency, voltage, and phasing of the building power.

D. Provide motors 1/2 HP and larger and motors indicated as driven by variable speed drives, designed for operation on 3-phase power, voltage as shown on electrical plans, +/- 10 percent, unless specifically indicated otherwise on drawings.

E. Provide constant speed motors 1/3 HP and smaller designed for operation on single phase, 120 volts +/- 10 percent.

F. Comply with NEMA MG 1 unless otherwise indicated.

G. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS AND APPLICATIONS

A. Provide each motor suitable for continuous duty operation at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level, and suitable for speed, enclosure, rating, type and horsepower not less than as scheduled or specified in Contract Documents. Provide motor enclosure and maximum allowable temperature rise in degrees Centigrade over 40 deg. C ambient as follows, unless otherwise specified:

1. General Purpose: Drip-proof 40 deg. C or encapsulated design 60 deg. C.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

C. Each equipment manufacturer is responsible for ensuring motors supplied with manufacturer's equipment are fully compatible with the application and capable of starting and running driven equipment without undue noise, heating, or distress.

2.3 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.
5. Electronically Commutated Motor (ECM)

B. Motors 1/20 HP and Smaller: Shaded-pole type.

C. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

D. Variable Speed Motors: Electronically commutated motor (ECM) shall be of permanent magnet, brushless DC premium efficiency design with variable speed electronic controller capable of maintaining constant speed, torque, and/or cfm as required by service, capable of accepting 0-10vdc or 4-20mA speed control signal from building management system. Adjustable slow start and gradual speed changes, permanently lubricated ball bearings, and extra quiet operation are all included.

E. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

F. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

2.4 POLYPHASE MOTORS

A. Single Speed General Application Motors:

1. NEMA MG 1, Design B, medium induction motor.
2. Efficiency: Premium efficiency, as defined in NEMA MG 1.
3. Service Factor: 1.15.
4. Random-wound, squirrel cage rotor.
5. Re-greasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
6. Insulation: Class F.
7. Temperature Rise: One class below insulation rating.
8. Motors 15 HP and Larger: NEMA starting Code F or Code G.
9. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
10. Enclosure Material: Manufacturer's standard rolled steel or cast iron enclosures corresponding to NEMA rating and application requirements.

2.5 STARTERS

A. Manufacturers: Provide all starting equipment and control devices manufactured by same manufacturer and furnished through single responsible supplier unless otherwise specified in Contract Documents. Factory-wired or assembled packaged equipment may be provided with starting equipment of any acceptable manufacturer. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cutler-Hammer
2. General Electric
3. Square D

B. Provide starters, contactors, and controllers complying with applicable NEMA standards, minimum size 0, and enclosed in enclosures of type appropriate for environment where installed including general purpose, explosion proof, weather resistant, or weather-tight construction as required.

C. Ensure all parts subject to wear, arcing, and similar use are easily removable.

1. Provide necessary auxiliary contacts for each starter subject to electrical interlock or automatic control.

2. Equip magnetic starters for motors operating 208 volts and over, line-to-line, equipped with self-contained light loads imposed thereon with a control transformer having a 120-volt grounded secondary winding, and having 120-volt starter operating coils.

D. Provide combination-type magnetic starters with fused disconnect switches. Fuse with class R fuses. Protect all starters with manual reset, solid state overload relay equal to (Square “D” motor logic) in one leg of single phase line to neutral circuits, in two legs of single phase line-to-line circuits, and in three legs of 3-phase circuits.

E. Provide 6-volt, red pilot light, integral transformer and long life bulb for all starters and contactors.

F. Manual Starters: Toggle operated, single pole for line to neutral circuits, two pole for line-to-line circuits, with thermal overload devices and neon pilot light; flush mounted unless shown otherwise, ganged with selector switch for multispeed applications. Provide manual starters similar to one of the following:

1. General Electric CR-101
2. Cutler-Hammer 9101
3. Square D Class 2510

G. Combination Magnetic Starters: Single speed, across the line, HAND-OFF-AUTO selector switch in cover. Provide combination magnetic starters similar to one of the following:

1. Cutler-Hammer 9589
2. General Electric CR-107
3. Square D Class 8538

H. Magnetic Contactors: With control coil in series with temperature controls as required.

2.6 COMPONENTS

A. Electrical Wiring: Provide all materials conforming to NEMA Standards and UL approved for intended service. Refer to appropriate sections in Division 26.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine conditions under which materials and methods are to be installed and notify Architect in writing of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected in acceptable manner.

1. Installation indicates conditions are acceptable to Contractor as required to ensure requirements for applicable warranty or guarantee can be satisfied.

2. Motors and Starters: Confirm electrical characteristics for all equipment.

3. Electrical Wiring: Check all electrical wiring associated with equipment for compliance with specifications and correctness of connections. Correct wiring in event equipment or devices fail to function in specified manner, whether due to incorrect connections or improper information and wiring diagrams.

B. Inspect and perform tests on project electrical wiring, including infrared scans (thermography), resistance testing, or other industry standard testing as required to demonstrate acceptable wiring. Owner reserves the right to provide their own additional similar testing:

1. Cost of Contractor’s testing included in bid price. Cost of Owner’s testing of acceptable installations provided at Owner’s expense.

2. Repair installations not passing Contractor's or Owner's quality inspection testing using approved method or replace at no additional cost.
3. Cost of initial testing of wiring not conforming to specified requirements and any retesting of repairs or replacement work deducted from Contract Sum.

3.2 INSTALLATION

A. Motors and Starters

1. Correct, at no additional cost, any misapplied motor or starter combination and improper thermal overload devices for motor starters provided as part of HVAC systems or components, along with damage to other equipment or construction.

2. Motors: Provide motors furnished by equipment manufacturer, specifically manufactured or selected for equipment served; mounted, and installed to provide complete installation that is substantially noiseless in performance under intended use. Replace motors unsatisfactory to Architect with new motor.

3. Starters and Accessories

   a. Provide starters and disconnects for all HVAC equipment. Refer to Equipment Schedules.
   b. Provide auxiliary contacts required for temperature controls, interlock with other equipment, alarms, and similar components and applications.

B. Miscellaneous Electrical Wiring included in HVAC systems installations:

1. Provide all control wiring and power wiring for all equipment and associated control devices (including automatic control system) required for HVAC systems and components.

2. Comply with all applicable NEC requirements. Install all electric wiring in accordance with all local and state codes and regulations having jurisdiction.

3. Wiring for Controls: Provide wiring specified in Section 23 09 00 – Instrumentation and Control for HVAC, for all control devices required for temperature control system and other miscellaneous controls not included in "Electrical Equipment and Control Schedule".

4. Allow sufficient headroom under equipment as directed for each location (unit heater, etc.). Verify space available for each equipment item. Refer to Architect for any correction, discrepancy or suggested change in size of location.

5. Secure all equipment and fixture mountings, wiring devices, and accessories (clips, supports, etc.) to structure with screws, bolts, or similar items; nailing not acceptable.

END OF SECTION 23 05 13

SECTION 23 05 23 – GENERAL DUTY VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Bronze ball valves.
2. Automatic Flow Control Balancing valves.
3. Air vent valves

1.3 DEFINITIONS

A. CWP: Cold working pressure.
B. EPDM: Ethylene propylene copolymer rubber.
C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

1.4 SUBMITTALS

A. Procedural Requirements: Comply with requirements of SECTION 01 33 00 - Submittals and as modified below.

1. Specified Products: If product to be incorporated into Project is specified by name and product designation in Part 2 below, submit "**As-Specified Verification Form**" (attached to SECTION 01 33 00 - Submittals) in lieu of "Product Data" identified below in this Article.

2. Equivalent Products or Substitutions: If product to be incorporated into Project is <u>not</u> specified by name and product designation in Part 2 below, comply with all Action Submittal requirements specified below.

B. Action Submittals:

1. Product Data: Submit concurrently for each type of valve proposed, demonstrating compliance with requirements.

C. Closeout Information, for inclusion in Operations and Maintenance Manual:

1. Approved submittal.

a. If "**As-Specified Verification Form**" submittal is approved, also include product data for all valves used.

2. Include all information required in SECTION 01 78 23 – Operation and Maintenance Data.

3. Receipt: For spare automatic flow control valve cartridges.

4. Valve Chart: Refer to Section 23 05 00 – Common Work Results for HVAC, for details.

1.5 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
2. ASME B31.9 for building services piping valves.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set ball and plug valves open to minimize exposure of functional surfaces.
4. Set butterfly valves closed or slightly open.
5. Block check valves in either closed or open position.

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.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Refer to HVAC valve schedule articles for applications of valves.

B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

C. Valve Sizes: Same as upstream piping unless otherwise indicated.

D. Valve Actuator Types:

1. Handwheel: For valves other than quarter-turn types.
2. Handlever: For quarter-turn valves NPS 5and smaller.

E. Valves in Insulated Piping: With 2-inchstem extensions and the following features:

1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.

F. Valve-End Connections:

1. Solder Joint: With sockets according to ASME B16.18.
2. Threaded: With threads according to ASME B1.20.1.

2.2 BRONZE BALL VALVES

A. Two-Piece Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Conbraco Industries, Inc.; Apollo Valves.
b. Milwaukee Valve Company.
c. NIBCO INC.

2. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig.
c. CWP Rating: 600 psig.
d. Body Design: Two piece.
e. Body Material: Bronze.
f. Ends: Solder or Threaded.
g. Seats: PTFE or TFE.
h. Stem: Stainless steel.
i. Ball: Stainless steel, vented.
j. Port: Full or Regular per application schedule.

2.3 AUTOMATIC BALANCING VALVES

A. Provide each valve with an identification tag attached by chain, factory marked with the zone identification, valve number and flow rate. Valve to be line size.

B. The GPM for the automatic flow control valves shall be factory set and shall automatically limit the rate of flow to within 5 percent of the specified GPM over at least 95 percent of the control range.

C. For 1/2 inch – 2 inch, the flow cartridge shall be removable from the Y- body housing without the use of special tools to provide access for regulator change-out, inspection and cleaning without breaking the main piping.

D. Pump head requirement: The permanent pressure loss added to the pump head shall not exceed seven feet.

E. Each valve shall have two P/T test plugs.

F. Construction:

1. For 1/2" through 2" pipe sizes: Assembly consisting of a de-zincification resistant (DZR) brass, bronze, or A-metal Y-type body, integral full port SS ball and stem ball valve and 'O' ring type union. For all insulated pipe services, provide manufacturer's pre-formed insulation cover to fit each valve, with extended, insulated, non-condensing handle on ball valves.

2. Stainless steel internal flow cartridge body and wear surfaces, with machined threads for spring free height adjustment, permanently marked with the GPM and spring range.

3. Factory leak tested at 100 psi. air under water.

G. Flow Verification:

1. Differential pressure measured across the valve shall be measured for flow verification and to determine the amount of system over heading or under pumping.

H. Design Make: IMI Flow Design Inc.

2.4 MANUAL BALANCING VALVES

A. Provide combination globe-type calibrated flow measuring balance, shutoff, and throttling valve with provision for attaching portable differential pressure meter with each meter connection having positive shutoff access valves equipped with removable insulating cover providing minimum R of 4.5. Rated for 250 PSI at 250 deg. F and provided with calibrated nameplate, ¼-inch drain/purge port, and drip-tight shut off. Similar to "CBV" by Armstrong, "3D" by B & G, or similar products by Tour & Anderson.

B. Threaded, grooved, or flanged ends as required to fit system piping with bronze, A-metal, or dezincification resistant brass body for pipe sizes ½-inch to 2-inches inclusive or cast or ductile iron body with bronze internal parts and Teflon or EPT seals rated for the service fluid and temperature for pipe size 2-1/2-inches and larger.

1. Valves designed to allow for presetting of balance points for proportional system balance prior to system start up.

C. Valve Size: As required to meet the Cv indicated on the Drawings, or if not indicated on Drawings, provide the larger of pipeline size or size required to provide maximum 5 ft. water gauge pressure drop at design flow.

D. Read-Out Ports: Include internal EPT inserts and check valves.

E. Adjustment Knob: Includes minimum of four full turns (1440 degrees) from bubble tight shutoff to full open position and includes pre-set feature indicating degree of valve opening including memory position stop and indicator.

2.5 AIR VENTS

A. Manual Air Vents:

1. For All Pipe Sizes In Accessible Locations Only: Bronze body, quarter turn ball valve with minimum 1/4-inch discharge and inlet connections. Provide collection chamber at inlet and 1/4-inch tube with return bend on outlet, piped to point of collection.

2. For Terminal Units In Accessible Locations: Bronze or brass body and non-ferrous internal parts, 150 PSIG working pressure, 225 deg. F operating temperature. 1/8-inch MNPT inlet connection. Coin or key operated, supply three keys minimum to owner. Similar to "Model 4V" by Bell & Gossett.

PART 3 - EXECUTION

3.1 EXAMINATION

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. Do not attempt to repair defective valves; replace with new valves.

3.2 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. Install special purpose hydronic valves (safety relief valves, reduced pressure zone backflow prevention devices, pressure reducing valves, etc.) as specified in section 23 21 13 – Hydronic Piping.

B. Install isolation valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

C. If valves with specified CWP ratings are not available, the same types of valves with higher CWP ratings may be substituted.

D. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 inchand Smaller: Threaded or solder joint ends.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. Install special purpose hydronic valves (safety relief valves, reduced pressure zone backflow prevention devices, pressure reducing valves, etc.) as specified in section 23 21 13 – Hydronic Piping.

B. Install isolation valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

C. If valves with specified CWP ratings are not available, the same types of valves with higher CWP ratings may be substituted.

D. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 inchand Smaller: Threaded or solder joint ends.

3.4 GENERAL DUTY VALVE SCHEDULE

A. Unless otherwise specifically indicated elsewhere, use the following:

B. Hydronic Flow Shutoff Service:

1. 2 inch and smaller: Full Port Ball Valves

C. Pressure Gage Shutoff Service: Standard or Full Port Ball valves.

D. Flow Adjustment and Balancing:

1. Provide line size automatic flow control balancing valves for all individual terminal loads. Size valve flow cartridges based on approved equipment submittal flow rates where different from that scheduled. Include in contract changing cartridges on 10% of automatic flow control valves to some different flow as required during TAB and system commissioning work.

E. Hydronic System Drain Service: Provide drain valves at all system local or global low points as required for complete system drainage.

1. 2 inch and smaller service: Provide ¾ inch full port ball or globe valves, with ¾ inch hose thread end and chained cap.

F. Hydronic System Air Venting:

1. Manual vents: provide standard or full port ball valve, minimum 1/4" NPT; ½" NPT on 4" and larger piping.

2. Equipment Air Vents:

a. Equipment Above Mains: Connect run outs or risers to upper quadrant or top of mains. Install vent assembly at branch high point, concealed within enclosure if possible, consisting of 1 in. diameter by 6 in. long air collection chamber with 1/4 in. soft copper tube to manual valve. Mount securely near bottom of enclosure, but not fastened to enclosure. For individual units, radiators, fan convectors and units with return grilles: Provide coin air vent valve, operated from discharge grille or access door. Positioning of valve shall not interfere with removal of enclosure.

b. Equipment Below Mains: Connect piping run outs or risers to bottom or lower quadrant of mains. Vent assembly not required in unit. Provide means of purging and draining each unit. Use tees instead of ells at low point of run outs.

3.5 VALVE INSTALLATION

A. When installing solder-joint end valves, protect valve body from soldering heat using water soaked rags or other heat sink method as required to avoid valve damage. Leaking stems or seats on solder-joint end valves shall be subject to immediate replacement with new valve.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem and handle movement.

E. Install all Manual Air Vents with air collection chamber above flow piping (minimum line size diameter x 6 inches long), and minimum ¼" tube extended to accessible location, terminating with ball valve located so liquid discharged during venting may easily be collected in minimum 1 quart container.

1. Coin vents may be connected directly to equipment served.

3.6 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION 23 05 23

SECTION 23 05 29 - HANGERS AND SUPPORTS FOR HVAC COMPONENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Hangers and supports for (but not limited to) following components:

   a. Piping hangers and supports
   b. Duct hangers and supports
   c. Equipment hangers and supports

2. Roof mounted supports and equipment penetrations including (but not limited to):

   a. Roof curbs.

3. Miscellaneous components and accessories including (but not limited to):

   a. Fasteners
   b. Insulation protection systems

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of the Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

A. Provide corrosion resistant construction as described below for hangers, hanger rods, supports, fittings, hardware, etc, unless otherwise noted or approved. Note that not all products described below are available in corrosion resistance as required for all applications listed – select appropriate corrosion resistant products as required. Multiple conditions may apply, in which case the more corrosion resistant construction is required:

1. General purpose indoor: ASTM B-633 Fe/Zn 25 minimum zinc plated fasteners, ASTM B-653 G90 minimum sheet steel, factory baked enamel paint, or anodized.

2. In contact with copper: Copper plated for size identification and felt lined or plastic coated.

3. In contact with aluminum: Same aluminum alloy as equipment or 300 series stainless steel. 300 series stainless steel fasteners.

4. Outdoors, in crawl spaces, manholes, pits, and below grade: 300 series stainless steel or post-fabrication (after forming, welding, drilling, etc.) ASTM A-153 hot dipped galvanized steel, minimum coating thickness 3 mils.

5. Miscellaneous fabricated custom supports, anchor bases, etc..: painted in accordance with Section 23 05 00 – COMMON WORK RESULTS FOR HVAC.

6. Other special conditions: where noted on drawings, provide materials of special temperature, corrosion resistance, or other properties, as required for durable and safe performance.

B. Allowable Working Loads:

1. Use only manufacturer's load rated hangers, supports, and fasteners designed and rated for the intended service.

2. Do not load connectors, hangers, or supports to more than the manufacturers' recommended working load or the following:

a. Use a safety factor of 5:1 minimum with respect to manufacturers' published ultimate shear strength.
b. Use a safety factor of 10:1 minimum with respect to manufacturers' published ultimate tension or pull-out strength.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product literature, technical specifications, and other data required to demonstrate compliance with specified requirements for following components:

1. Hangers and supports
2. Roof mounted supports
3. Miscellaneous components

B. Roofing Work:

1. Submit qualifications of proposed roofing and structural subcontractor(s)

2. Submit copy of any existing roofing warrantee and certification by existing warrantee holder that proposed roofing subcontractor is certified to provide compliant roofing warrantee work and that this project's roofing work will not (before construction) and has not (after construction) voided any warrantee.

3. Submit copy of new warrantee for roofing performed on existing out-of-warrantee roofing.

C. All supports, etc., shall meet the approval of the Architects / Engineers. Submit shop drawings showing fabrication and installation details including calculations for the following; include Product Data for components:

1. Equipment supports.
2. Include detailed layout and loading drawings for all above roof piping and equipment.

1.6 QUALITY ASSURANCE

A. Comply with applicable requirements of following standards for all hangers and supports:

1. MSS-SP-58 Pipe Hangers and Supports – Materials, Design, and Manufacture.
2. MSS-SP-69 Pipe Hangers and Supports – Selection and Application.
3. ANSI / ASME Code for Pressure Piping B 31.1
4. ASTM standards for corrosion resistant Zinc coatings.
5. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
6. UL 203 Standard for Pipe Hanger Equipment and Fire Protection Service
7. Metal Framing Association MFMA-2
8. ANSI/ NFoPA NDS - National Design Specification for Wood Construction
9. SMACNA – Sheet Metal and Air Conditioning Contractor's National Association, Inc.

PART 2 - PRODUCTS

2.1 GENERAL

A. For convenience, details and specifications have been based on product types as defined in MSS SP-58 and 69 where applicable, and, where not applicable, catalog numbers shown have been based on products by the listed manufacturers.

2.2 PIPING ATTACHMENTS

A. Individually Suspended Horizontal Rigid Piping or Tube Attachments:

1. Band type:

a. 1-1/4 inch diameter pipe size and less only.
b. Formed steel loop overlapped at top with rod sized hole or insert nut. With or without side insert closure.
c. MSS SP-58 type 5, 6, or 10.

2. Clevis type:

a. Any size pipe or tubing.
b. Formed steel bands top and bottom connected by sheer bolt.
c. MSS SP-58 type 1.

3. Roller type:

   a. Any size pipe or tubing.

   b. Radiused or angled roller and steel axle; yoke for single hanger rod or end sockets for double rod applications. Designed to accommodate longitudinal movement through roller action.

   c. MSS SP-58 type 41 and 43.

4. Provide products by one of the following manufacturers:

   a. B-Line Systems, Inc., Highland Illinois, or equal
   b. ERICO/Michigan Hanger Co.; Solon, Ohio, or equal
   c. Grinnell Corporation; Pipe Support Division, Cranston, Rhode Island, or equal.

B. Supported from below Horizontal Rigid Piping or Tube Attachments:

1. Split Ring type:

   a. 1-1/4 inch diameter pipe size and less only.

   b. Cast malleable iron split ring with steel pivot and bolt, cast boss on one side threaded for standard rod or pipe attachment. Designed to accommodate minimal longitudinal movement only.

   c. MSS SP-58 type 12.

2. Stanchion Saddle type:

   a. Any size pipe and tubing.

   b. Radiused pipe saddle support with U-bolt upper restraint. Threaded adjuster rod or pipe integral / welded to saddle for vertical adjustment. Designed to accommodate minimal longitudinal movement only.

   c. MSS SP-58 type 37.

3. Roller type:

   a. Any size pipe or tubing.

   b. Radiused or angled roller and steel axle with end sockets for double rod applications. Provide with U-bolt upper restraint. Designed to accommodate longitudinal movement through roller action.

   c. Roller MSS SP-58 type 41 and U-bolt MSS SP-58 type 24.

4. Provide products by one of the following manufacturers:

    a. B-Line Systems, Inc., Highland Illinois, or equal
    b. ERICO/Michigan Hanger Co.; Solon, Ohio, or equal
    c. Grinnell Corporation; Pipe Support Division, Cranston, Rhode Island, or equal.

C. Group Supported or Suspended (Trapeze) Horizontal Rigid Piping or Tube Attachments (Common Support Beam):

1. Support frame or trapeze beam of load rated brackets or channel strut product.

2. U-Bolt type:

    a. Any size pipe or tubing.

    b. Insulation support system rests directly on beam or shim, with U-bolt or split strut clamp upper restraint. Designed to accommodate minimal longitudinal movement only.

    c. U-bolt MSS SP-58 type 24, Strut clamp similar to B-Line "B-2000" series.

3. Radius Roller type:

    a. Any size pipe or tubing.

    b. Radiused roller and steel axle with end sockets for double rod applications. Provide with U-bolt upper restraint. Designed to accommodate longitudinal movement through roller action.

    c. Roller MSS SP-58 type 41 and U-bolt MSS SP-58 type 24.

4. Angled Roller type:

    a. 6 inch diameter pipe size and less only.

    b. Angled rollers with steel axles and formed steel angle clips designed for channel strut mounting. Provide with U-bolt upper restraint. Designed to accommodate longitudinal movement through roller action.

    c. Roller similar to B-Line "B218" or "B219" and Strut clamp similar to B-Line "B-2000".

5. Provide products by one of the following manufacturers:

    a. B-Line Systems, Inc., Highland Illinois, or equal
    b. ERICO/Michigan Hanger Co.; Solon, Ohio, or equal
    c. Grinnell Corporation; Pipe Support Division, Cranston, Rhode Island, or equal.

D. Individual Vertical Rigid Piping and Tube Attachments:

1. Split Ring type:

a. 1-1/4 inch diameter pipe size and less only.

b. Cast malleable iron split ring with steel pivot and bolt, cast boss on one side threaded for standard rod or pipe attachment. Designed to accommodate minimal longitudinal movement only.

c. MSS SP-58 type 12.

2. Riser clamp type:

a. 1-1/2 inch diameter pipe size and larger.

b. Twin formed steel bands with formed radius to fit pipe and extension wings drilled for clamping bolts, space between extension wings designed to accept various connections to building structure.

c. MSS SP-58 type 8.

3. Provide products by one of the following manufacturers:

a. B-Line Systems, Inc., Highland Illinois, or equal
b. ERICO/Michigan Hanger Co.; Solon, Ohio, or equal
c. Grinnell Corporation; Pipe Support Division, Cranston, Rhode Island, or equal.

E. Flexible Pipe, Tube, or Hose:

1. Lengths three feet and under to be supported by adjacent piping system.

2. Similar to attachments for rigid piping systems described above, with "V" notch bottom in lieu of radius, and associated continuous rigid trough angle of same material spanning between attachments.

F. Piping Insulation Protection Systems:

1. Pipe Insulation Shields:

a. One Piece:

1) Formed steel, minimum 18 gauge thickness, longer of 2 times diameter or 12-inch long minimum, and 180 degree circumference, sized for insulation thickness.

2) MSS SP-58/69 type 40.

b. Two Piece Sliding:

1) Manufactured two piece sliding shield system designed to accommodate thermal movement.

2) MSS SP-58/69 type 40 inner shield similar to one piece shield above adhered to pipe insulation, with second outer shield of formed steel, minimum 18 gauge thickness, one times diameter length 6-inch long minimum, and 180 degree circumference, sized to fit outside inner shield, with formed ribs to keep shield centered on support clevis or trapeze.

3) Inner and outer shields separated by layer of PTFE (Teflon), minimizing friction between shields and allowing minimum four inches controlled pipe movement relative to hanger without insulation damage or outer shield moving past the end of the inner shield.

2. Type "A" Insulation Protection System:

a. 1" piping and smaller only.
b. Provide one piece or two piece sliding shield as required by distance from piping anchors.

3. Provide products by one of the following manufacturers:

a. B-Line Systems, Inc., Highland Illinois, or equal
b. ERICO/Michigan Hanger Co.; Solon, Ohio, or equal
c. ICA Inc.; Lehighton, Pennsylvania, or equal.
d. Buckaroos, Inc.

2.3 DUCT ATTACHMENTS

A. Per SMACNA Duct Manual standards for size, height, and location of ductwork, and as noted below.

1. Materials and corrosion resistance as listed above.

2. SMACNA load tables allow for no external loads on duct: provide for 200 lb external load on all duct hangers and supports. Increase hanger and support sizes from SMACNA tables accordingly:

a. Minimum band size 20ga. x 1 inch.
b. Duct 48" wide and larger; provide trapeze style support of metal channel framing or angle iron, suspended from threaded rods.

3. Hanger bands to extend down sides and turn under bottom 1 inch minimum for all duct sizes. Minimum (2) #10 sheet metal screws per hanger (one each on side and bottom), (2) screws minimum on sides for duct over 12 inches tall, 12 inches on center max.

4. Round exposed duct: hang from twin half round bands and rods, or as otherwise detailed.

2.4 BUILDING ATTACHMENTS

A. Structural Steel Connectors:

1. C-Clamp style:

   a. FM approved, U.L. listed, steel or malleable iron C-clamp with hardened set screw and lock nut, tapped for rod size, typically eccentrically loads structure.
   b. Hanger rod bypasses structure: MSS SP-58 type 19.
   c. Hanger rod in line with set screw: MSS SP-58 type 23.

2. Center Loading Beam and Channel Clamp Style:

   a. Forged or formed steel or malleable iron construction, beam clamps with connection for concentrically loading structure, of types as required by loading and configuration.

   b. MSS SP-58 types 21, 27, 28, 29, and 30.

3. Pivoting or Adjustable Connection Style:

   a. Structural welding lug with forged steel clevis, side beam bracket, or other appropriate pivoting beam clamps as required for sloped steel.
   b. Use for sloped steel, where thermal movement requires pivot, where seismic controls requires non-moment building connection, and elsewhere as required.
   c. MSS SP-58 types, 21 or 22 with 16 or 17, 34, 57 with 14, etc...

4. Provide products by one of the following manufacturers:

   a. B-Line Systems, Inc., Highland Illinois, or equal
   b. ERICO/Michigan Hanger Co.; Solon, Ohio, or equal
   c. Grinnell Corporation; Pipe Support Division, Cranston, Rhode Island, or equal.

B. Existing Concrete Connectors

1. Self-energizing tapered expansion bolt/sleeve: GSA specification FF-S-325, Group II, Type 3, Class 3, UL Listed, FM approved, complete with split expansion sleeve, washer, and hex head nut; similar to “Rawl Lok/Bolt” by Rawlplug.

2. Dual-Interlocking Expansion Wedge Stud: GSA specification FF-S-325, Group II, Type 4, Class 1, UL Listed, FM approved, complete with split expansion sleeve, washer, and hex head nut; similar to “Rawl-Stud” by Rawlplug.

3. Dual-Interlocking Expansion Wedge Threaded Rod Anchors: UL Listed, FM approved, complete with split expansion sleeve; similar to “Rod Hanger Wedge Anchor” by Rawlplug.

4. Provide products by one of the following manufacturers:

   a. Hilti, Inc.; Tulsa, Oklahoma, or equal
   b. Ramset/Red Head; Michigan City, Indiana, or equal
   c. Rawlplug Co. Inc.; New Rochelle, New York, or equal.

C. Hollow Masonry, Hollow Concrete, Pre-cast Plank Connectors

1. Toggle Bolt Type: GSA specification FF-B-588C,Type 1, Class A with ultimate load capacities meeting or exceeding load capacities for hollow concrete block in conformance with ASTM C-90; similar to “Rawl Toggle Bolt” by Rawlplug.

2. Epoxy/Screen tube type: Manufacturer’s load rated epoxy resistant to the chemical exposure of the application and capable of developing the ultimate strength of the threaded rod used, with stainless steel screen tube designed specifically for use with epoxy anchors in hollow masonry. Use manufacturer’s recommended mixing/injection device. Similar to the “Foil-Fast”, “Chem-Fast”, and “Chem-Stud” systems by Rawlplug.

3. Through bolt, nuts, square plate steel washer (thickness equal to half bolt diameter, width equal to six diameters minimum).

4. Provide products by one of the following manufacturers:

   a. Hilti, Inc.; Tulsa, Oklahoma, or equal
   b. Ramset/Red Head; Michigan City, Indiana, or equal
   c. Rawlplug Co. Inc.; New Rochelle, New York, or equal.

D. Flanged Connectors:

1. Applicable for attachment to building steel, concrete, or wood.

2. Malleable iron flange base, with central threaded hole for connection to threaded rod and symmetrical side hole for securing to structure with appropriate fasteners, typically used with split rings, similar to “Model No. 365M" by ERICO/Michigan Hanger.

3. Pipe Stanchion Flanged Support Plate and Floor Stand: ASTM A-536 ductile iron support plate with 1-inch rolled thread adjustment stud and nut, or 1/4-inch carbon steel base plate welded to schedule 80 threaded steel pipe, designed for use with Stanchion Saddle style supports described above; similar to “PS1236 Redi-Jack Pipe Support” by Red Hed.

4. Provide products by one of the following manufacturers:

   a. B-Line Systems, Inc., Highland Illinois, or equal
   b. ERICO/Michigan Hanger Co.; Solon, Ohio, or equal
   c. Red Hed; Lincoln, Rhode Island. or equal.

E. Wood Construction Fasteners:

1. Apply NDS criteria to all structural wood connections.

2. Use load rated through bolts, lag screws, coach screws, side beam brackets, and wood screws (nails not acceptable). Tighten connections between members. Install fasteners without splitting wood members.

   a. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials.

2.5 ROOF MOUNTED SUPPORTS

A. Roof Curbs: Double shell, galvanized steel, welded and painted, 1-1/2 inch minimum thickness, with pressure treated wood blocking, braced and fully insulated with rigid fiberglass insulation (3 PCF). Includes gasket at top of curb for airtight seal between curb and ventilator or fan. Provide raised cant, recessed, or flanged curb bottom to suit roof construction and insulation.

1. Steel Thickness: 20 gauge up to 36 inches, 18 gauge 38 to 72 inches, and 16 gauge over 72 inches. Provided with reinforcing and heavier gauge as required to adequately support weight load on curb; coordinate exact size with specified equipment.

2. Minimum height of curbs above finished roof:

    a. 14 inches for curbs supporting exhaust and relief air equipment.

3. Provide with pressure treated blocking, through bolted to structure with stainless steel fasteners, as required bringing base of curb into proper plane for installation. Blocking minimum width to be no less than blocking height. Refer to Division 6 section “Roof Rough Carpentry” for additional details.

4. Provide products by one of the following:

    a. Pate or equal
    b. Con-Fab or equal
    c. Thy-Curb or equal

B. Curb Adapters: Where shown on drawings, provide curb adapters to transition in size from curb to equipment provided as a part of this contract. Curb adapters of fully welded aluminum (12ga) or stainless steel (16ga) construction designed for continuous exposure to the elements. Provide with integral curb counter flashing and drip edge with minimum 2 inch downturn and quarter inch clearance to existing curb exterior on all sides and minimum two screws per side, sized for proper wind resistance, #12 ss screws minimum. Upper portion similar to Roof Curb above.

2.6 MISCELLANEOUS COMPONENTS AND ACCESSORIES

A. Wood Construction:

1. Apply NDS criteria to all structural wood construction.

2. Do not use wood where it may compromise the structure of the construction. Use steel and stainless steel members for mechanical supports in steel and concrete construction. Use wood structural members only in pre-existing wood construction. Use only grade stamped wood rated for the application.

3. Do not use wood where it may compromise the fire resistance rating of the construction. Use fire resistance treated wood where applicable.

4. Use decay resistant pressure treated wood and stainless steel fasteners adjacent to all penetrations of the thermal envelope and exterior to the buildings.

5. Employ workers who are demonstrably skilled in working wood. Cut, fit, and place wood grounds, nailers, blocking, and anchorages neatly and accurately of sufficient size and strength to adequately support and anchor HVAC materials and equipment. Replace all sloppy and deficient work.

B. Threaded Rods, Bolts, Nuts, Washers, Metals, Hardware, and Miscellaneous Assembly Components:

1. Provide manufacturer's load rated fasteners with size, strength and corrosion resistance as required for the application.

2. Rods, bolts, machine screws: rolled forged ANSI B1 Class 2A or better thread, bolts and screws with heads as required by the application, length as required for full thread engagement of but minimal projection past receiving connector including building attachment, (double) nuts, equipment attachment, etc.

3. Nuts: heavy pattern where space permits and where subject to repeated operation, ANSI B1 Class 2B or better thread.

4. Washers: US pattern where space permits, SAE pattern otherwise, with toothed or split lock washer when attached to equipment with moving or vibrating parts.

5. Sheet metal screws: self drilling, thread forming, hardened steel (hardened SS as required), load rated screws with hex heads designed for power driving

6. Structural Steel: ASTM A 36/A 36M, carbon-steel, black and galvanized, and/or series 300 Stainless Steel plates, bars, angles, channels, and other shapes in thickness and size as required for load.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine conditions under which hangers and supports are to be installed and notify Architect in writing of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected in an acceptable manner.

1. When Contractor confirms conditions as acceptable to ensure proper and timely installation and to ensure requirements for applicable warranty or guarantee can be satisfied, submit to Architect written confirmation. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to Contractor.

2. Identify any discrepancies between specifications and field conditions or changes required due to specific equipment selection, prior to installation. Corrective work required by discrepancies after installation at Contractor's expense.

3.2 GENERAL INSTALLATION

A. Provide complete hanger and support systems for piping and ductwork systems and equipment, including all necessary attachments, fasteners, threaded rods, bolts, miscellaneous hardware, and associated work as required.

B. Provide specified products, installed in accordance with applicable sections of this specification, in accordance with the manufacturer's recommended installation instructions, and as detailed on the Drawings.

C. Support pipe, duct, and equipment from the building structure.

1. Provide approved miscellaneous support structure as required to attach hangers and supports to building structure in conformance with all applicable standards and related specification sections.

2. Do not use chain, perforated hanger strapping or band, wire hangers, or kinked, bent, or otherwise damaged hangers and supports.

3. Do not support one pipe from another, one duct from another, pipe from duct or equipment, or any similar combination.

4. Install lateral bracing with pipe hangers and supports as required to prevent swaying.

5. Provide special hangers and supports as shown on the drawings, as required to suit existing conditions, and as required for proper installation of equipment.

D. Coordinate the installation with applied fireproofing and where possible install attachments to structure prior to fireproofing. Where prior installation is not possible, repair fireproofing as required.

1. Repair or replace any fireproofing removed or damaged during installation of components.
2. Ensure repaired or replacement fireproofing continuously matches or exceeds rating of adjacent fireproofing and ensure that all warranties are maintained.

E. Load Distribution: Install hangers and supports so that live and dead loads and stresses from movement will not be transmitted to connected equipment.

3.3 PIPE HANGER AND SUPPORT INSTALLATION

A. Comply with MSS SP-58 and MSS SP-89 and as specified below. Install hangers, supports, clamps, and attachments as required properly supporting piping from the building structure.

B. Trapeze Pipe-Hanger Installation: Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.

2. Field fabricate from manufactured slotted channel system or structural shapes selected for loads being supported.

C. Size piping attachments for insulated piping to fit outside insulation. Size piping attachments for un-insulated piping to fit outside diameter of pipe.

D. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping. Provide for slope of trapeze supported piping systems with adjustable individual piping attachments.

E. Pipe Hangers and Supports Spacing (Maximum):

1. Provide hanger or support as close as possible to and within 24 inches of any elbow.

2. Provide hanger or support on branch pipe within 24 inches of main at takeoff / tee.

3. All Horizontal / Sloped Heating and Cooling Piping Systems:

Piping Material	Maximum spacing of hangers.
a. Copper ¾ in. and smaller	5 ft.
b. Copper 1 in. and 1-¼ in.	6 ft.
c. Copper 1½ in. and larger	8 ft.
d. Annealed copper	3 ft.
e. Flexible piping or hose	Continuous

4. Vertical Piping:

a. Steel and Copper 1¼ in and smaller	Two per floor level.
b. Steel and Copper 1½ in and larger	One per floor level.

F. Insulated Piping

1. Center insulation shields at piping attachments and secure shield from lateral movements by wrapping PVC tape around circumference of piping insulation and shield at both ends of shield.

2. At all piping attachments, provide piping insulation protection system of strength and configuration required to guarantee integrity of pipe insulation and associated vapor barrier. Refer also to SECTION 23 07 00 HVAC INSULATION.

3.4 BUILDING ATTACHEMENTS INSTALLATION

A. Threaded Rod for Hangers:

1. Double nut each end of each rod. Threaded clamp, turnbuckle, etc. counts as one nut.

2. Rod size for individual pipe hangers and two rod / two pipe or duct trapeze style supports:

Rod size:	for Pipe size:	for Duct size:
3/8”	2” and smaller.	48” wide to 72”
1/2”	2-1/2" and 3".	Over 72” wide
5/8”	4" and 5".	
3/4”	6".	

3. For multiple pipe or duct trapeze style supports with two rods for more than two pipes or two or more ducts, size rods according to manufacturers recommended safe working loads taking into account total hung weight, 200 pound live load, as well as capacity of structure; each rod not smaller than size shown above for largest pipe or the sum of the duct width in the trapeze. Submit details of all such supports and connectors for approval before construction, including schedule of proposed sizes and capacities.

B. Fastener Systems: Provide screws, bolts, approved anchors, etc., to secure piping, duct, equipment, supports, and miscellaneous components and accessories to structure. Nailing not permitted.

1. Install all fastener systems and anchorage in strict accordance with fastener manufacturer’s instructions and as otherwise indicated below.

2. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 3” and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

3. Minimize eccentric loading of structure as follows:

   a. For paired point loads eccentrically suspended (C-clamp attached supply and return pipes, etc), suspend from opposite edges of structural member.

   b. For point loads over 400 pounds, use center loading beam clamps or other structurally concentric building attachment, and confirm proposed configuration with Engineer by submittal.

4. For connections cast in place to new concrete, assume concrete strength as specified. Do not apply loads to freshly cured concrete until written approval is received from contractor responsible for concrete strength.

5. For connection to existing concrete:

   a. Connect only to sound concrete free of evidence of deterioration.

   b. Do not install connections or apply loads to recently cast curing concrete until written approval is received from contractor responsible for concrete strength. Use compressive strength certified by ASTM approved test results.

c. For older existing concrete and in the absence of ASTM approved tests certifying otherwise, assume a concrete compressive strength of $f'c$ = 3000 psi 20.7 Mpa.

d. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual. Do not use powder-actuated fasteners in precast concrete or in pull-out tension.

6. For connection to wooden structures: Apply NDS criteria to all structural wood connections. Unless grade stamped better, use #2 SPF / white wood strengths for fastener loading calculations.

3.5 DUCT HANGERS AND SUPPORTS

A. Install per SMACNA duct manual and as modified by the requirements of this section.
B. Provide support spacing per building structural system but not greater than 8 feet. Provide extra support structure as required.

3.6 ELECTRICAL WORK HANGER AND SUPPORT INSTALLATION

A. Refer to Division 26 complete.

3.7 ROOFTOP SUPPORT INSTALLATION

A. Roof Curbs:

1. Maintain existing roof warranties. Contractor is responsible for the installation of all Roof Curbs, Pipe Curbs, and Equipment Support Rails for their equipment complete. Employ the services of a qualified subcontractor specializing in roofing work and certified by the carrier of all new or existing roofing warrantees to perform warrantee compliant roofing work as required for this project. Employ the services of a qualified subcontractor specializing in structural work to perform structural roof support work as required for this project. Use their services to cut roof openings, provide structural support and installation of Roof Curbs, Pipe Curbs, and Equipment Support Rails, and to patch roofing cuts complete. Refer to SECTION 01 73 00 - EXECUTION for additional requirements and procedures for cutting openings in existing roofs and roof decks.

   a. If existing roofing is out of warrantee, provide minimum two year warrantee for roofing work of this contract.

2. Provide larger of curb height scheduled on Drawings or as recommended by equipment manufacturer, but not less than 14 in. above finished roof. Refer to required installation details and provide additional curb height where finished roof surface is above curb mounting flange.

3. Provide all roof curbs required for all rooftop-mounted equipment in Contract.

   a. Provide structural support for roof deck around all roof curbs and roof deck penetrations 12 inch x 12 inch and larger, unless specifically indicated otherwise elsewhere on the Contract Documents. Refer to drawings for additional support details around roof openings.

   b. Refer to Section 06 10 00 – ROUGH CARPENTRY, for additional wood blocking requirements.

   c. Verify exact size and location and set and secure unit to roof.

   d. Set and secure curb or support level as required by manufacturer of equipment served and as required by the installation details of the seismic restraint system. Provide tapered shims as required up to 3-1/2 inch thick. If structure slopes more than 3-1/2 inch over length of curb, provide sloped curb to match structure so as to minimize shims. Provide corrosion-resistant fasteners as required to secure curbs to deck or structure, coordinate with subsequent roofing requirements.

   e. Coordinate roof openings and set and secure curbs in ample time so as to avoid delay in construction schedule.

   f. Coordinate in curb access:

      1) Coordinate roof deck removal within curbs in all cases with Architect, Owner, Construction Manager and all affected trades as required to optimize access.

      2) In general, for exhaust fan, provide for below curb service access by complete removal of roof deck internal to curb throat free area.

      3) Coordinate special circumstances requiring exceptions to above with Architect and equipment manufacturers.

   g. Prevent water entry into building. Provide roofing work as required to flash curbs. Provide counter flashing and gaskets with curb mounted equipment as required to keep water from entering curb. Provide temporary caps as required until permanent installation is made.

   h. Install Curb Adapters in manner similar to how supported equipment is secured to curb. Provide complete with closed cell gaskets, minimum two stainless steel fasteners per side and additionally as required for equipment support.

3.8 ADJUSTING

A. Adjust all hangers and supports after installation of piping and associated equipment to distribute loads equally on attachments and to achieve proper pitch for the applicable piping system.

B. Trim excess length of continuous-thread hanger and support rods as required - avoid hazardous protrusion.

3.9 PAINTING AND TOUCHUP

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 23 05 29

SECTION 23 05 53 - IDENTIFICATION FOR HVAC COMPONENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Pipe labels.
3. Duct labels.
4. Stencils.
5. Valve tags.
6. Equipment Location Ceiling Markers

1.3 SUBMITTALS

A. Procedural Requirements: Comply with requirements of SECTION 01 33 00 - Submittals and as modified below.

1. Specified Products: If product to be incorporated into Project is specified by name and product designation in Part 2 below, submit "**As-Specified Verification Form**" (attached to SECTION 01 33 00 - Submittals) in lieu of "Product Data" identified below in this Article.

2. Equivalent Products or Substitutions: If product to be incorporated into Project is not specified by name and product designation in Part 2 below, comply with all Action Submittal requirements specified below.

B. Action submittals:

1. Submit manufacturer's data sheets for all proposed products demonstrating compliance with specifications.

C. Closeout Information, for inclusion in Operations and Maintenance Manual:

1. Approved submittal.

a. If "**As-Specified Verification Form**" submittal is approved, also include product data for all identification components used.

2. Include all information required in SECTION 01 78 23 – Operation and Maintenance Data.

3. Valve Chart - Refer to SECTION 23 05 00 – Common Work Results for HVAC, for details.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
B. Coordinate installation of identifying devices with locations of access panels and doors.
C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Paint: Refer to DIVISION 09.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Brimar Industries, Inc. or equal.
2. Campbell International (Ltd.), or equal.
3. Craftmark Identification Systems, Fort Worth, Texas, or equal
4. EMED Company, Inc., Buffalo, New York , or equal
5. Seton Name Plate Company, New Haven, Connecticut, or equal

2.2 LABELS

A. Warning Signs and Equipment Labels:

1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware, or multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware

2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

3. Colors:

a. Brass Labels: black in-filled letters on brass background
b. Plastic Labels: white letters on black plastic background
c. Warning Signs: yellow letters on black background.

4. Able to withstand temperatures up to 160 deg F. continuously.

5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

6. Fasteners: Stainless-steel rivets or self-tapping screws.

7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Equipment Label Content: Include equipment's Drawing designation or unique equipment number and equipment function.

C. Warning Sign Content: Include caution and warning information, plus emergency notification instructions.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Include Equipment Schedule in Operation and Maintenance Manual.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive. Secure in place with full circumference tape wrap.

C. Pipe Label Contents: Include identification of piping service using abbreviations indicated below, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction (flow direction arrow circumference tape preferred).

2. Lettering Size: In accordance with ANSI 13.1 and as follows:

	Outside diameter:	Letter Height:
a.	2” or less	¾”
b.	6” or less	1.25”
c.	10” or less	2.5”
d.	Over 10”	3.5”

3. Pipes too small to be directly labeled: provide hanging equipment tag with ½” lettering. Outside diameter indicated is to outside of pipe insulation on insulated piping.

D. Piping Systems: Identify the following systems as indicated:

1. Heating Hot Water Supply (HWS)
2. Heating Hot Water Return (HWR)

2.4 DUCT LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Colors: Letter color, black; background color, white.

C. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

D. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

E. Minimum Letter Size: One inch for viewing distances up to 60 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

F. Fasteners: Stainless-steel rivets or self-tapping screws.

G. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

H. Duct Label Contents: Include identification of duct service, duct size (inches x inches clear inside dimensions, side labeled first), and an arrow indicating flow direction.

1. Unless specifically indicated otherwise on Drawings, use duct service designations below, where (SYSTEM) is the equipment served:

   a. (SYSTEM) TOILET EXHAUST

2. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.

2.5 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts (1 inch for each five feet viewing distance).

1. Stencil Material: Durable, thin, as required to make crisp stenciled pattern.
2. Stencil Paint: Exterior, gloss, acrylic enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.
4. Stenciled Label Contents: as described in pipe and duct labels above.

2.6 VALVE TAGS

A. Valve and Hydronic Specialty Identification: Provide 1-1/2-inch diameter brass tags, 0.032-inch minimum thickness, with predrilled or stamped holes for attachment with #16 brass jack chain, factory engraved or stamped with 1/2-inch letters for piping system abbreviation and 1/2-inch numbers, with black in fill, legend as described below.

1. Stamp "H" and valve number for each main, riser, zone, and branch heating valve.

B. Provide manufacturer's tags for all balancing fittings.

C. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses. Include valve-tag schedule in Operation and Maintenance Manual.

2.7 EQUIPMENT LOCATION CEILING MARKERS

A. 5/8-inch diameter celluloid covered or vinyl PSA backed stickers, suitable for ink notation on a colored face; color coded as follows:

1. Yellow: Volume Dampers
2. Blue: Isolation Valves
3. Green: Controls Devices (valves, automatic dampers, controllers)
4. Orange: Equipment (VAV boxes, fan coils, blower coils, fans, pumps, etc.)
5. Red: Fire Dampers

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

B. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.
B. Locate equipment labels where accessible and visible.

3.3 PIPE IDENTIFICATION

A. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles and flow direction arrows, complying with ASME A13.1, on each piping system. Stencils shall be crisp and neat with no overspray, drips, runs, or other imperfections visible from normal viewing distance.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 15 feet along each run.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

3.4 PIPE LABEL INSTALLATION

A. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of **15 feet** along each run.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

3.5 DUCT LABEL INSTALLATION

A. Install plastic-laminated duct labels with permanent adhesive on air ducts.

B. Stenciled Duct Label Option: Stenciled labels, showing service, size, and flow direction as indicated above, may be provided instead of plastic-laminated duct labels, at Installer's option, for concealed ductwork or if lettering larger than 1 inch high is needed for proper identification because of distance (over ten feet) from normal location of required identification. Stencils shall be crisp and neat with no overspray, drips, runs, or other imperfections visible from normal viewing distance. Refer to Division 09 sections on painting for more information.

C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.6 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

1. Valve Numbering System: Extension of and compatible with existing valve numbering system, where valves are installed in existing building or in addition to existing building. Do not duplicate existing numbers; verify existing numbers in the field

2. Verification: Verify existing valve numbers in field and provide valve numbering avoiding duplication of existing numbers.

3.7 EQUIPMENT LOCATION CEILING MARKERS

A. Provide markers in the metal grid of lay-in tile, in metal panel ceilings, at access doors in hard ceilings, and other locations as appropriate, indicating the location of dampers, valves, controls, equipment, fire dampers, and other devices as required. Write on markers with sharply contrasting permanent ink in neat handwriting clearly identifying equipment located beyond mark with abbreviation used in valve chart, equipment schedule, etc.

END OF SECTION 23 05 53

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Testing, Adjusting, and Balancing (TAB) Work shall be a joint effort of the Contractor and the TAB Agency, performed with the intention of leaving the systems involved in a properly functioning and balanced flow condition as designed and indicated in the Construction Documents, similar to the "Total System Balance" condition described in the AABC Standard.

1. The division of responsibility for the TAB Work is outlined below. Contractor to perform preparation and ancillary work described below, with the option of subcontracting a portion of their work to the TAB Agency, but the TAB Agency must take sole responsibility for any portion of the preparation or TAB Work defined as the TAB Agency's Work.

2. TAB Agency Work to be performed by a fully qualified independent TAB Agency as described in quality assurance below and as approved by the Architects and Engineers, to be paid for by the Contractor responsible for HVAC Work as a first tier subcontract to their work.

B. Section includes preparation for, and Testing, Adjusting, and Balancing (TAB Work) of HVAC components, equipment, and systems:

1. Contractor Preparation and Participation:

a. Place systems in satisfactory operating condition as detailed below prior to the arrival of the TAB Agency for the specified TAB Work, and notify the TAB agency, Construction Manager, and Engineer in writing when systems are ready for TAB Work.

b. Attend and actively participate in coordination and TAB meetings.

c. Keep TAB Agency apprised of construction schedule as required facilitating TAB agency job site visits prior to concealment of work. Provide overall construction schedule to TAB agency at coordination meetings and TAB meetings, update schedule regularly noting milestones and dates affecting TAB review and work schedule, and provide at minimum 7 calendar days notice prior to concealment.

d. Coordinate and provide mechanical and controls systems operation, revisions, and other ancillary work as required during TAB Work, as detailed below.

e. Make changes as required to create a testable, balanceable system, as recommended by TAB agency but only as approved by the Engineer.

2. TAB Agency Preparation:

a. Review Construction Documents and Coordination Drawings with Engineer, Construction Manager, and Contractor and assist in preparation of submittals, particularly Coordination Drawings, dampers, and balancing valves, by preparing recommendations to Contractor and Engineer on locations of balancing valves, dampers, access doors, test connections, etc., as well as any other special considerations affecting the TAB Work and/or the fabrication or engineering of the systems. Documentation of assistance shall be both by mutually agreed upon notations on the submittals / sheet metal Shop Drawings prior to submittal, and by TAB Agency's letter accompanying submittal, verifying review and TAB Agency approval of the specific submittal.

b. Visit job prior to concealment of work, repeatedly if necessary due to construction scheduling, check work, and advise the Contractor, Construction Manager, and Engineer on correctness of locations of dampers, access doors, test connections, etc., as well as any other special considerations affecting the TAB work. Advise in writing, copied to the Contractor, Construction Manager, and the Engineer within 3 days of the site visit but in any event before concealment.

C. TAB Work includes:

1. *Testing* of all mechanical components for performance, calibration, capacity, and other characteristics as outlined below and as required, demonstrating conformance with contract documents and submittals.

2. *Adjusting and Balancing* of all mechanical components of this project as described in the contract documents, achieving specified air and water flow at all terminal equipment, distribution at lowest noise levels and energy use, and achieving specified thermometer, gauge, and sensor instrument accuracy and calibration, all as outlined below.

3. Documentation, correspondence, data recording, reporting, and demonstration all as outlined below and elsewhere in the contract documents.

4. *Coordination* with other Contractors, subcontractors, Construction Manager, Owner's Representatives, and Architect / Engineer as required achieving specified TAB results.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.
B. ASHRAE: American Society of Heating, Refrigerating, and Air-Conditioning Engineers
C. Contractor: The entity contracted to perform the HVAC Work described in these contract documents.
D. NEBB: National Environmental Balancing Bureau.
E. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
F. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

G. TAB: Testing, adjusting, and balancing.
H. TABB: Testing, Adjusting, and Balancing Bureau.
I. TAB Agency: An entity engaged to perform TAB Work who is qualified and approved to do so as described below.

1.4 SUBMITTALS, GENERAL

A. Contractor:

1. Prior to submittal of any equipment affecting TAB Agency, review with TAB Agency and obtain commentary and approval as described in “Summary” Article. Include TAB Agency review commentary with affected submittals.

2. Immediately upon approval of other submittals, provide the TAB Agency with copies of approved submittals, including Shop Drawings of all hydronic and air systems and equipment requiring balancing.

1.5 ACTION SUBMITTALS

A. Contractor:

1. Perform no work affecting TAB prior to TAB Agency approval.
2. Within 30 days after award of Contract, submit TAB Agency qualifications proposal for approval

B. TAB Agency:

1. Submit TAB Agency qualifications proposal for approval.

   a. Name and contact information of proposed TAB Agency,
   b. Documentation that they meet the qualifications specified in "Quality Assurance" Article,
   c. Evidence of current TAB Agency and TAB Supervisor Certification,
   d. List of instruments to be used in testing and balancing, with current certification of all instruments’ calibration,
   e. Examples of data forms proposed for each system type showing input cells for this Project’s required data,
   f. 3 regional references for comparable recent jobs.

2. Submit Strategies and Procedures Plan: Within 30 days of Architect’s approval of TAB Agency, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

3. Submit Certified Final TAB Report.

1.6 INFORMATIONAL SUBMITTAL

A. Contractor and TAB Agency:

1. Systems Readiness Report as described more fully below.

B. TAB Agency:

1. Instrument Calibration Reports: Include the following on calibration agency letterhead:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.
f. Test data points over range qualified – standards and measured values.

2. Contract Documents Examination Report: Within 15 days of Architect's approval of TAB Agency, submit the Contract Document Examination Report as specified in Part 3.

3. Include commentary with all Contractor submittals affecting TAB work as described above.

4. Pre-Construction Inspection and Testing Report: Prior to removal of any affected construction.

1.7 QUALITY ASSURANCE

A. TAB Agency, Employee, and TAB Work Qualifications:

1. TAB Agency: Fully certified current member of "Associated Air Balance Council" (AABC), "National Environmental Balancing Bureau" (NEBB), or "Testing, Adjusting, and Balancing Bureau" (TABB), specializing in the adjusting and balancing as specified in this Section of systems as specified and as shown on the Contract Documents, with minimum three years documented experience as a fully certified member, and three current regional references for projects of comparable scope.

2. TAB Field Supervisor: Employee of the TAB Agency and currently certified by AABC, NEBB, or TABB as a Testing, Balancing and Adjusting Supervisor.

3. TAB Technician: Employee of the TAB Agency and currently certified by AABC, NEBB, or TABB as a TAB technician.

4. All TAB Work: Performed by direct employees of the TAB Agency, who are either TAB Field Supervisors themselves, or who are TAB Technicians working under the direct supervision of a TAB Field Supervisor.

B. Conform to basic procedures and methods outlined by applicable publications in testing and balancing of air and water systems by the following organizations, and as modified by this document:

1. Associated Air Balance Council (AABC).
2. National Environmental Balancing Bureau (NEBB).
3. Testing, Adjusting, and Balancing Bureau (TABB).
4. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
5. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
6. Individual manufacturer requirements and recommendations.

C. TAB Report Data Forms: Follow AABC, NEBB, TABB, or SMACNA format as modified by the data requirements of this Project, subject to submittal approval.

D. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

E. Instrumentation Type, Quantity, Accuracy, and Calibration: Instruments as described in ASHRAE 111, Section 5, "Instrumentation.", all currently certified as calibrated by a NRTL or NVLAP in accordance with Division 01 Section “Quality Requirements”.

F. Contractor: maintain qualified personnel at Project for system operation, trouble-shooting, making system changes, and performing mechanical adjustments in conjunction with TAB procedures.

1.8 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

B. Environmental Requirements: Accomplish TAB work under appropriate outdoor temperature conditions.

C. Concealed Conditions: Before concealment of systems, verify and advise on type and location of balancing devices and test points. Make changes as required to balancing facilities.

1.9 COORDINATION AND SCHEDULING

A. Refer to Division 00 and Division 01 for overall project sequencing and scheduling requirements. All HVAC work required for, and, approvable balancing in accordance with the requirements of this section is required to be complete before Contract Substantial Completion.

1. Contractor: Assure that all HVAC work required to properly and completely test and balance the various systems, occurs in a timely fashion coordinated with the overall project schedule as required, with final readiness reported at minimum two calendar weeks prior to contract scheduled Substantial Completion Date. For HVAC Work required to be performed simultaneous with TAB Work, coordinate schedule with TAB agency and provide qualified staffing as required keeping pace with TAB agency personnel. Coordinate and report partial systems readiness to TAB agency to allow TAB work to proceed in an orderly fashion.

2. TAB Agency: Assure that all TAB Work and all subsequent reporting on same occurs in a timely fashion coordinated with the overall project schedule prior to contract scheduled Substantial Completion Date. For HVAC Work required to be performed simultaneous with TAB Work, coordinate schedule with Contractor and provide qualified staffing as required to complete TAB work and reporting within two calendar weeks of final HVAC systems readiness for TAB.

B. Tab Agency: Coordinate, schedule, and run a TAB Strategies and Procedures meeting, with Contractor, Owner, Architect, Engineer, Controls Subcontractor, and Commissioning Agent all present. Provide TAB Plan and agenda in advance, and produce and distribute meeting minutes.

C. Contractor and TAB Agency: Perform all examination and preparation work required and submit Systems Readiness Report(s) prior to beginning TAB work.

D. Contractor and TAB Agency: After submission of Systems Readiness Report, coordinate and schedule all preparation and TAB work with each other, Architect/Engineer, Construction Manager, and Owner,. Notify O/AE/CM/Cx team of all scheduled TAB work test dates and times in writing with at least seven days' advance notice for each visit.

1. Cooperate with other contractors and affected subcontractors as required to provide complete and proper testing, adjusting, and balancing of HVAC systems.

E. Accomplish TAB Work during construction period as soon as the systems are complete enough to perform TAB work. Coordinate with project phases and before Owner takes possession. TAB work and approval of at least partial pencil copy reports is required before Owner takes possession.

F. Multiple visits will be required for phased construction in cooperation with construction schedule, with multiple “pencil copy” submittals of partial TAB reports required promptly as each phase of TAB work is accomplished.

G. Perform balancing for record at final stage when all previously completed sub-systems are checked and re-balanced to design performance.

H. Contractor and TAB Agency are subject to recall to site to verify report information before acceptance of the report by the Architect.

I. Contractor: provide 2 additional copies of Shop Drawings and other submittals for all equipment and systems to be tested and balanced to TAB Agency as soon as possible but no later than 60 days prior to scheduled completion of equipment and systems installation.

J. TAB Agency:

1. Verify that Contractor has placed all systems and equipment in satisfactory operating condition as required allowing TAB Work to be properly performed.

2. Cooperate with Contractor and affected subcontractors as required to provide complete and proper testing, adjusting, and balancing of air and water systems.

3. Visit Project prior to concealment of Work and note location of dampers, test connections, and similar items. Record this information, transmit to Contractor, and incorporate on Record Drawings.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. TAB Agency: Provide tools, ladders, recording meters, gauges, thermometers, velometers, anemometers, Pitot tubes, inclined gauge manometers, magnehelic gauges, amprobes, voltmeters, psychrometers, tachometers, ultrasonic or other non-intrusive flowmeters, and all other instrumentation required to perform specified TAB work. Accurately calibrate all instruments.

1. Make instruments available to Architect to facilitate spot checks during testing and back-checking.
2. Provide additional balancing devices as required.

PART 3 - EXECUTION

3.1 EXAMINATION

A. By TAB Agency:

1. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

2. Visit Site and examine existing systems before construction and new / re-worked systems prior to concealment of construction to check on and advise regarding location of installed balancing devices, such as test ports, gage cocks, thermometer wells, thermometers and gages, flow-control devices, balancing valves and fittings, volume dampers, test connections, etc. Verify that locations of these balancing devices are accessible. TAB Agency shall advise Contractor and Architect of TAB Agency findings by letter.

3. Examine the submittals for HVAC systems and equipment. Verify that proposed equipment can be balanced as specified and as required. Provide commentary on all submittals advising where additional balancing devices are needed or configuration adjustment is desired to facilitate TAB work.

4. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

5. Examine test reports specified in individual system and equipment Sections.

6. Examine manufacturer's equipment performance data including pump and fan curves.

   a. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

B. By Contractor:

1. Examine systems and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections has been performed, and all TAB preparation as described in "Preparation" Article is complete.

3.2 PREPARATION

A. TAB Agency:

1. Prepare a TAB plan that includes site specific strategies and step-by-step procedures with this project's equipment identified.

B. Contractor: Before TAB work commences on any portion of the system, and before new system startup, verify that systems are complete and in proper operating condition. Ensure the following, as applicable:

1. Equipment is operable, in a safe and normal condition, and is of the size and capacity specified in the Contract Documents, bearings are greased, and equipment with functioning controls is ready for operation. Required modifications to systems shall be made in advance of the TAB Agency's arrival for that portion of the work.

2. Provide proper equipment start-up as specified, complete with manufacturer's filled out standard published start-up forms.

3. Temperature control systems are operable to the extent required for that portion of the TAB Work. Control valves must at least be installed complete and hand operable. Automatic dampers must be operable and under control. Safety interlocks and controls on HVAC equipment must be properly functional.

4. All motors, pumps, and fans have correct rotation.

5. Permanent electrical-power wiring is complete, and proper thermal overload protection is in place for all electrical equipment.

6. All ductwork, air handlers, grilles, registers, and diffusers are installed, complete, and cleaned of dust and debris.

7. All piping, terminal radiation, boilers, chillers, heat exchangers, pumps, valves, required pressure taps, and hydronic specialties are correctly installed, complete, operational, and clean.

8. All ductwork, diffusers and registers have dampers where specified, and all hydronic systems have balancing and isolation valves where specified.

9. Duct system leakage has been tested where required and minimized.

10. Hydronic systems are flushed, vented, cleaned, leak free, and filled with specified heat transfer fluid.

11. Hydronic expansion tank has been pre-charged to the proper pressure and systems filled to proper cold fill pressure.

12. Glycol based systems have specified glycol fill station properly installed and set to fill at appropriate pressure, and alarm EMCS on pump operation.

13. System pump suction piping is properly vented to ensure absence of entrained air.

14. All manually set dampers (fire, fire/smoke, register, grille, diffuser, and manual volume dampers) operate smoothly and are adjusted open. All automatic dampers have actuators and required linkages installed and rough adjusted.

15. All hydronic systems valves are installed with proper direction of flow and operate smoothly, balancing valves are adjusted open, two-way control valves are open, three-way valves are properly installed for their intended function of diverting or mixing fluid flows, and service valves are open or closed as required for normal flow.

16. Make preliminary adjustments to airflow patterns of all registers, grilles, and diffusers to obtain uniform space temperatures and air movement free from objectionable drafts and noise.

17. Clean new final design filters are installed everywhere called for.

18. Hydronic strainers are clean and any temporary screens are replaced with permanent screens. Sidestream filters have clean new filter bag installed and valves are closed.

19. Coil fins are clean and straight.

20. Access doors in ducts are closed and duct end caps are in place.

21. Access doors necessary to reach duct volume dampers, balancing valves, and measuring stations are installed in accessible locations and are operable.

22. As-built conditions are accurately recorded on working as-built drawings, including locations of all access points, manual and automatic dampers, isolation, balancing, and control valves, fittings, and all other items affecting TAB work. Provide copies of these annotated as-built drawings for TAB agency's use during TAB work.

C. Contractor:

1. Prepare and submit Systems Readiness Reports to Engineer, Commissioning Agent, and TAB Agency, with itemized checklists of the above items as appropriate for the equipment to receive TAB Work, with a column for Contractor indicated status and another with room for TAB Agency commentary, itemizing any remaining deficiencies discovered and confirming all systems preparation and examination has been properly performed.

    a. Include itemized list of all examination and preparation procedures outlined above and as otherwise required by TAB Agency's procedures, with initialed dated verification of each item by authorized responsible party.

    b. Promptly report abnormal conditions in mechanical systems or conditions that prevent system balance. If, for design reasons, system cannot be properly balanced, report as soon as observed.

2. Report any defects or deficiencies observed during performance of TAB procedures.

D. TAB Agency:

1. Review, edit, and submit annotated Contractors Systems Readiness Reports to Contractor, Engineer, and Commissioning Agent, with itemized TAB Agency concurrence or commentary, itemizing deficiencies discovered and confirming all systems preparation and examination has been properly performed, with initialed dated verification of each item by authorized responsible party.

    a. Report abnormal conditions in mechanical systems or conditions that prevent system balance within 24 hours of discovery. If, for design reasons, system cannot be properly balanced, report as soon as observed.

2. Report any defects or deficiencies observed during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values. Include updates in partial TAB report submittals. Adjust as-built drawings as required to accurately reflect deviations from draft as-built set.

3. Promptly report abnormal conditions in mechanical systems or conditions that prevent system balance. If, for design reasons, system cannot be properly balanced, report as soon as observed.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. In the following TAB procedures portions of Part 3 Execution of this document, the procedures are deemed to be TAB Agency work unless specifically identified as Contractor work.

B. Contractor required assistance and Ancillary Work during TAB Agency Work includes the following general work categories and notes on Contractor Work requirements in subsequent specific procedure descriptions:

1. Maintain mechanically qualified personnel at Site to perform necessary mechanical modifications and adjustments in conjunction with TAB procedures.

2. Operate systems.

3. Provide trouble-shooting.

4. Cut insulation, pipes, ducts, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures. Properly plug all holes. Provide new insulation that matches removed materials, finished in accordance with Division 23 Section "HVAC Insulation."

5. Change air filters as required.

6. Adjust automatic damper linkages so they all operate smoothly and close tightly.

7. Perform necessary controls operations required for TAB procedures.

8. Re-adjust / make final adjustments to registers, grilles, and diffusers in cooperation with Owner and TAB Agency as required to obtain uniform space temperatures and air movement free from objectionable drafts and noise. As this affects system pressure drops, this must be completed before final airflow balancing.

9. Make any required additions or changes in types, locations, etc., of balancing equipment.

10. Provide other mechanical adjustments as required in conjunction with TAB procedures.

11. Leave system in proper working order, closing access doors, closing doors to electrical switch boxes and securing cover plates, restoring thermostats to specified settings, restoring systems to automatic operation as required, replacing ceiling tiles, plugging access ports and repairing insulation, cleaning, etc...

C. Tab Agency: Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111, NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing", and in this Section.

1. Provide all testing and Balancing as required by the specific procedures outlined below and as required to provide the final test report as described below.

2. Mark equipment and balancing devices, valve position indicators, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

3. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES: AIR SYSTEMS TESTING, ADJUSTING, AND BALANCING

A. Visit Site prior to concealment of construction to check and advise regarding location of dampers, test connections, etc. TAB Agency shall advise Contractor and Architect of TAB Agency findings by letter.

B. Review sheet metal shop drawings and mark locations of all required balancing dampers before duct fabrication.

C. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct in such a manner that local flow dynamics have a negligible effect on the measurements. Use multiple, bidirectional, traverses if flow measurements cannot be made in a section with at least 8 diameters straight duct upstream and 4 diameters of straight duct downstream from the measuring station. Mark all traverse locations on plans in report.

D. After adjustments, take measurements to verify balance has not been disrupted. Verify that disruptions in balance have been corrected.

E. Permanently mark valve, damper, and other adjustment device settings at devices to simplify restoration of settings. Record settings and include in report. Set and lock memory stops.

F. Procedures:

1. Verify that all systems are complete and operable as scheduled.

2. Verify that registers, grilles, and diffusers are adjusted to obtain uniform space temperatures and air movement free from objectionable drafts and noise. Cooperate with Owner and Contractor and reach agreement on air distribution pattern before proceeding.

3. Provide temporary filter media as follows: with the system fully operational, all dampers open, and the fan running at the scheduled RPM, check submittal values for new, midlife, and final/clogged filter pressure drops, check and record air pressure drop across the new clean final design filters, and provide temporary media to approximate midlife pressure drop across the filters for use during balancing. Record and report both pressure drop values at the final design flowrates. Adjust filter differential pressure switches to trip at correct final/clogged filter pressure drop in cooperation with Energy Management and Control System manufacturer's representative.

4. With the system fully operational, all dampers open, and the fan running at the approved submittal RPM, measure the airflow through all terminal units as well as the total system volume, without making any adjustments, and formulate a plan for preliminary adjustments of dampers and fan speed. Terminal units shall be defined to include all diffusers, registers, grilles, duct entries, louvers, hoods, etc.; i.e., wherever air enters or leaves ductwork whether indoors or outdoors. Record and report all initial values.

5. In cooperation with Energy Management and Control System manufacturer's representative, make mechanical adjustments of automatically operated dampers to operate as specified, indicated, and/or noted. Adjust and set the extreme operating conditions of these dampers and check completed damper control operations for proper calibration, reporting to control installers conflicts with those requiring adjustment. Test leakage of closed dampers. Adjust and set intermediate positions of outside air and return air dampers as required to achieve design outside airflow requirements defined in the sequence of operations, and / or calibrate outside air flow meters at this point. Balance variable volume systems at maximum air flow rate with full cooling and at minimum air flow rate with full heating

6. Adjust terminal units to the proportionally correct cfm, not necessarily the design cfm.

    a. If all the dampers in a branch line's terminal units must be adjusted to limit cfm, then use the branch line volume damper to limit the pressure drop across the terminal units in that branch so that at least one terminal unit's damper remains wide open but still has the correct flow. Adjust all branch ducts to proper proportional cfm in this way, leaving the volume dampers in the flow limiting branches wide open.

    b. Provide branch duct volume control by duct internal devices such as dampers and splitters only to the extent that the most open damper or splitter remains wide open and adjustments do not create objectionable air motion or sound levels. Under no circumstances shall total air system volume be throttled back to design flow through the partial closing of all dampers and splitters.

    c. Record and report all initial adjustment positions and proportional flowrates achieved.

7. Vary total air system flowrate by adjustment of fan speeds. Provide drive changes required.

8. Verify that all terminal units are at the design cfm to within the balancing tolerance, and if not, repeat steps f. and g. above until design conditions are satisfied.

9. Test and record final motor, drive, air moving equipment, exhaust fan, damper, and terminal unit information at this point.

10. Test and record air heating and cooling coil information after this point, as follows:

    a. Perform this step in conjunction with hydronic system balancing and after cooling and heating systems are operational.

    b. Set hydronic control valve to fully open at design flow and temperature as described below. Allow cooling coils to become fully wet with condensation. Test temperatures outside of the line of sight to the coil.

    c. Test and adjust coil performance for all data indicated to be on report test sheets.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

    a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

    a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.

    b. Measure static pressure directly at the fan outlet or through the flexible connection.

    c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.

    d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

    a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.

5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.

6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fan sizes to achieve indicated air-handling-unit performance.

7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.

3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.

2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

A. Prepare test reports with pertinent design data, and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against the approved pump flow rate. Correct variations that exceed plus or minus 5 percent.

B. Prepare schematic diagrams of systems' "as-built" piping layouts.

C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:

1. Open all manual valves for maximum flow.

2. Check liquid level in expansion tank.

3. Check makeup water-station pressure gage for adequate pressure for highest vent.

4. Check flow-control valves for specified sequence of operation, and set at indicated flow.

5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.

6. Set system controls so automatic valves are wide open to heat exchangers.

7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.

8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.7 PROCEDURES FOR HYDRONIC SYSTEMS

A. Measure flow at all automatic flow control valves to verify that valves are functioning as designed.

B. With the system fully operational, all branch and terminal isolation, balancing, and control valves open, and the pump running at 60Hz/VSD bypass, measure the flow through all terminal units as well as the total system volume, without making any adjustments, and formulate a plan for preliminary balancing valve adjustment. Record and report all initial flow and pressure drop values.

C. Adjust all manual balancing valves to the proportionally correct gpm, not necessarily the design gpm.

1. If all the valves in a branch line's terminal units must be adjusted to limit gpm, then use the branch line manual balancing or isolation valve to limit the pressure drop across the terminal units in that branch so that at least one terminal unit's balancing valve remains wide open but still has the correct flow. Adjust all other branch lines to proper proportional gpm in this way, leaving the balancing valves in the flow limiting branches wide open.

2. Provide branch volume control by balancing valves only to the extent that the most open valve remains wide open and adjustments do not create objectionable hydronic sound levels. Under no circumstances shall total system volume be throttled back to design flow through the partial closing of all branch valves.

3. Record and report all initial adjustment positions and proportional flowrates achieved.

3.8 PROCEDURE FOR MISCELLANEOUS DEVICE TESTING

A. Test and adjust all devices on project as required to correctly report the data listed below under paragraph on final report.

3.9 TOLERANCES

A. Adjust system totals to the sum of the connected load (plus leakage for air systems) rather than the scheduled pump or fan capacity.

B. Adjust air handling systems as follows:

1. Main ducts (ie. each fan system) to within minus 5 percent and plus 10 percent of the design values.
2. Branch ducts and terminal units to within plus or minus10 percent of the design flow.
3. A total maximum variation of 10 percent between terminal units designated as “typical of (#)”.

C. Adjust hydronic systems as follows:

1. Branch lines and radiation to within 10 percent of the design flow values
2. A total maximum variation of 10 percent between terminal units designated as “typical of (#)”

3.10 PRELIMINARY REPORTING

A. Contract Document Examination Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for proper systems' balancing. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Pre-Construction Inspection and Testing Report: Prior to removal of any affected construction, prepare and submit report outlining results of Pre-Construction Inspection and Testing as outlined above and on the contract drawings.

C. Status Reports: Prepare biweekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.11 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.

2. Name and address of the TAB contractor.

3. Project name.

4. Project location.

5. Architect's name and address.

6. Engineer's name and address.

7. Contractor's name and address.

8. Report date.

9. Signature of TAB supervisor who certifies the report.

10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.

11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.

13. Data for terminal units, including manufacturer's name, type, size, and fittings.

14. Notes to explain why certain final data in the body of reports vary from indicated values.

15. Test conditions for fans performance forms including the following:

    a. Conditions of filters.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Position of balancing devices.

E. Exhaust Fan Data (PRE, PWE, EF, F):

1. Location
2. Manufacturer
3. Model
4. Air flow, specified and actual
5. Total static pressure (total external), specified and actual
6. Inlet pressure
7. Discharge pressure
8. Fan motor and drive data
9. Fan RPM(for VSD driven fans, under various design conditions including at least full heating, 100% OA economizer, and full cooling loads).

F. System-Coil Reports: For water coils of terminal units, include the following:

1. Unit Data:

   a. System and air-handling-unit identification.
   b. Location and zone.
   c. Room or riser served.
   d. Coil make and size.
   e. Flowmeter type.

2. Test Data (Indicated and Actual Values):

   a. Air flow rate in cfm.
   b. Entering-water temperature in deg F.
   c. Leaving-water temperature in deg F.
   d. Water pressure drop in feet of head or psig.
   e. Entering-air temperature in deg F.
   f. Leaving-air temperature in deg F.

G. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

   a. System and air-handling-unit number.
   b. Location and zone.
   c. Traverse air temperature in deg F.
   d. Duct static pressure in inches wg .
   e. Duct size in inches.
   f. Duct area in sq. ft..
   g. Indicated air flow rate in cfm.
   h. Indicated velocity in fpm.
   i. Actual air flow rate in cfm.
   j. Actual average velocity in fpm.
   k. Barometric pressure in psig.

H. Air-Terminal-Device Reports:

1. Unit Data:

   a. System and air-handling unit identification.
   b. Location and zone.
   c. Apparatus used for test.
   d. Area served.
   e. Make.
   f. Number from system diagram.
   g. Type and model number.
   h. Size.
   i. Effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

   a. Air flow rate in cfm.
   b. Air velocity in fpm.
   c. Preliminary air flow rate as needed in cfm.
   d. Preliminary velocity as needed in fpm.
   e. Final air flow rate in cfm .
   f. Final velocity in fpm.
   g. Space temperature in deg F.

I. Electric Motors:

1. Manufacturer
2. HP/BHP
3. Phase, voltage, amperage (nameplate, actual, and no load)
4. RPM
5. Service factor
6. Starter size, rating, heater elements

J. Automatic Air Dampers (AAD, TBAAD, or internal to air moving equipment):

1. Location

2. Manufacturer

3. Model

4. Airflow, specified and actual.

5. Check closed position leakage and report.

6. Damper and/or actuator position at all required positions, along with associated controls signal required to achieve position. Coordinate required positions of return air and outside air ventilation control dampers with positions required by required ventilation rates. Refer to SECTION 23 09 00 – INSTRUMENTATION AND CONTROLS FOR HVAC, and coordinate damper position adjustment with temperature controls and Owner's required occupancy schedule.

7. Total static pressure drop at all required positions.

K. Manual Air Volume Dampers (VD, or shown with no text as: ⊺):

1. Location.
2. Report final damper position as angular deviation of blades from axial, with 0° being fully open and 90° being closed. Mark this position on duct at damper also.
3. Total static pressure drop across damper in as balanced condition.

L. Air Distribution Test Sheet (registers, grilles, and diffusers):

1. Air terminal number
2. Room number/location
3. Space Temperature
4. Terminal type
5. Terminal size
6. Area factor
7. Design velocity
8. Design air flow
9. Test (initial, adjusted, and final) velocities
10. Test (initial, adjusted, and final) air flows
11. Percent of design air flow

M. Louvers, Goosenecks:

1. Air terminal number / drawing designation
2. Room number/location
3. Terminal type
4. Terminal size
5. Free Area
6. Design velocity
7. Test (final) velocity
8. Design air flow
9. Test (final) air flow
10. Percent of design air flow
11. Design Pressure drop
12. Test (final) pressure drop

N. Automatic Balancing Valves Reports:

1. Identification/station
2. Location
3. Size

4. Manufacturer
5. Model
6. Design flow rate
7. Functional pressure drop range.
8. Actual/final pressure drop at system full flow condition.

O. Hydronic Control Valves Reports:

1. Location
2. Manufacturer
3. Model
4. Flowrate, specified and actual.
5. Pressure drop at full flow condition.

P. Controls Sensors Reports:

1. Coordinate work with Energy Management and Control System.

2. Test all controls system temperature, pressure, air monitoring (CO_2, CO, combustible gasses, humidity, etc.), and electrical current analog sensors for mid normal operating range accuracy. Adjust where applicable.

3. Test all controls system temperature, pressure, air monitoring (CO_2, CO, combustible gasses, humidity, etc.), and electrical current digital (on/off) sensors/switches for trip point. Adjust where applicable.

4. Verify that locations shown on Operators Work Station are schematically correct.

5. Identification/number

6. Location

7. Service

8. Manufacturer

9. Temperature, test reading and actual

10. Pressure, test reading and actual

11. Air composition, parts per million, test reading and actual. Test and adjust at normal ambient and alarm conditions.

Q. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.12 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.

2. Check the following for each system:

a. Measure water flow of each device.
b. Verify that balancing devices are marked with final balance position.
c. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection by TAB Agency is complete and documentation verifies that testing and balancing are complete and accurately documented in the report, request that a final inspection be made, giving at minimum 7 calendar days' notice. Deliver copies of Draft Final Report to Engineer and Commissioning Authority with final inspection request.

a. Engineer may elect to postpone final inspection upon delivery of written notice to TAB Agency that significant portions of the required TAB results are missing from draft report. If inspection is postponed, TAB Agency shall promptly return to site and provide missing TAB Work, then submit a revised draft and request the Final Inspection again.

2. The TAB Agency and Contractor's qualified technicians are to provide access, tools, and measurements during the inspection in the presence of the TAB Agency Supervisor and the Commissioning Authority.

3. Commissioning Authority will randomly select measurements, documented in the report or as required by contract, to be rechecked. Rechecking will be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.

4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED." If recheck calls for a measurement that is required but cannot be found in the draft report, the missing measurement will be noted as "MISSING".

5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the TAB Work will be considered defective and rejected. If the number of "MISSING" measurements is greater than 10 percent of the total measurements checked during the final inspection, the TAB Work will be considered defective and rejected.

C. If TAB Work is considered defective and rejected, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection. Pay all costs associated with second inspection including Commissioning Authority's reasonable additional fees.

2. If the second final inspection also fails, Owner may require additional inspection similar to second inspection or may contract the services of another TAB agency to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB Agency's final payment.

D. Prepare test and inspection reports.

3.13 ADDITIONAL TESTS

A. Re-check and adjust systems approximately 6 months after final acceptance and submit report:

1. Measure the total flow rate of each of the systems originally covered by this section.

2. For each of the systems that no longer operate at design flow measure the flow at each of the terminals of that system.

3. Measure the flow at any terminals included in the original balancing, reported by the Owner or Architect to have continued or new problems.

4. Adjust system changes back to the design values if possible, and submit reports in writing to the Architect, Contractor, and Owner, noting any changes and/or complaints, and offering an interpretation of the cause and significance of the problems.

END OF SECTION 23 05 93

SECTION 23 07 00 – HVAC INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and all Division 01 Sections, apply to this Section.

1.2 SUMMARY

A. Section includes materials and installation requirements for mechanical component insulation and related accessories.

1. Insulation Materials:

a. Cellular glass.
b. Flexible elastomeric.
c. Mineral fiber.
d. Phenolic.
e. Polyisocyanurate.

2. Insulation Accessories:

a. Adhesives.
b. Lagging adhesives.
c. Sealants.
d. Factory-applied jackets.
e. Field-applied jackets.
f. Tapes.
g. Securements.
h. Corner angles.
i. Insulation protection systems

1.3 DEFINITIONS

A. “Concealed”: Work within or behind various construction elements, or in crawl spaces or trenches, that is not exposed to view when Project has been completed. (Areas above ceilings, including above Auditorium or Large Group Instruction partially open “cloud” ceilings and chases are considered a concealed location.)

B. “Exposed”: Anything exposed to view when project has been completed.

1.4 SUBMITTALS

A. Comply with requirements of SECTION 01 33 00 – Submittal Procedures and as modified below.

B. Provide all submittals required by this Section concurrently.

C. Product Data

1. Submit complete manufacturer's product information for each type of insulation and accessory specified in this section demonstrating compliance with specified requirements and including:

a. Thermal and vapor transmission performance.
b. MSDS information.
c. Flame spread / smoke developed data.
d. Manufacturer's recommended installation methods.

D. Submit insulation schedule indicating each required service with type of insulation, thickness and R value, covering method, finishes, and any applicable notes.

E. Contract Closeout Submittals: Comply with requirements of DIVISION 1 sections on closeout, including submission of maintenance instructions as item in "Operating and Maintenance Data" manual described there.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Provide insulation system installation by qualified Installers who are trained in installation of each proposed insulation material and product with at least one of the following qualifications:

1. Have successfully completed a mechanical insulation apprenticeship program by the Department of Labor, Bureau of Apprenticeship and Training,
2. Have successfully completed an ASHRAE / NIA 8 hour Mechanical Insulation Training course or equal, or
3. Have five years documented experience as a mechanical insulation specialist with references attesting to successful completion of at least three comparable projects.

1.6 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports for HVAC Components."

B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.8 DELIVERY, STORAGE AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. For convenience, details and specifications have been based on products by the following manufacturers:

1. Armstrong; Lancaster, Pennsylvania
2. Benjamin Foster
3. CertainTeed; Valley Forge, Pennsylvania
4. Fit Tight Covers, Inc.
5. Johns Manville; Defiance, Ohio
6. Kingspan Tarec
7. Knauf; North Carolina
8. No Sweat Valve Wraps, Inc.
9. Owens-Corning; Toledo, Ohio
10. Polyguard Products Inc., Ennis, Texas
11. Thermaxx, LLC.
12. Or Approved Equal.

2.2 MATERIALS

A. Pipe and Fitting Insulation: Provide pipe insulation in compliance with ASTM C 585 Dimensional Standards.

1. Insulation Thickness:

a. Pipe and fitting insulation thicknesses specified assume an insulation conductivity (k) value of 0.27 btu•in/hr•ft2•ºF. For pipe and fitting insulation with conductivity other than 0.27 btu•in/hr•ft2•ºF, insulation must be thicker for higher conductivity and may be thinner for lower conductivity as required to achieve same or higher R value. Adjust insulation thickness from that specified in accordance with the following formula:

T = r[(1+t/r)K/k-1] where:

1) T = Adjusted insulation thickness, inches
2) r = Actual pipe outside radius, inches.
3) t = Insulation thickness specified, inches.

4) K = actual insulation conductivity, btu•in/hr•ft2•ºF.
5) k = specified conductivity, 0.27 btu•in/hr•ft2•ºF.

b. Hydronic Piping for Heating:

1) Pipe sizes ½ inch through 1-¼ inches ..... 1-1/2 inch

c. Runout piping in restricted spaces where it is not possible to provide the specified thickness may use reduced thickness insulation as required by space restriction.

2. Interior Above Grade Hydronic Piping Insulation:

a. ASTM C547, cylindrically molded preformed rigid half pipe shell forms, factory one-piece "hinged" construction.

1) Rigid pipe or tube insulation may be of mineral wool, fiberglass, closed cell glass, formed polyisocyanurate, or formed phenolic.

2) Thermal Conductivity ("k"): Measured in accordance with ASTM C 335. For k values greater than 0.27, include calculations and compliant increased thickness proposed. For k values equal or less than 0.27, provide specified insulation thickness or calculations justifying thinner insulation.

3) Jacket: All Purpose (AP) vapor barrier jacket with:

a) White kraft paper outer surface bonded to aluminum foil, reinforced with fiberglass yarn, permanently treated for fire and smoke safety and to prevent corrosion of foil.

b) Self sealing pressure sensitive lap.

c) Water Vapor Permeance: ASTM E96, Procedure A, 0.02 perm maximum.

d) Puncture resistance: ASTM D781, 85 scale units minimum

e) Burst resistance: ASTM D774, 100psi minimum.

f) Similar to "150TL facing" as used in "AP T Plus Jacket" and tape by Johns Manville, or equal.

3. Fitting and Valve Insulation: Precut fiberglass blanket to match thickness, appearance and insulation value of adjacent pipe insulation; similar to "Hi Lo Temp Fiber Glass Insulation Insert" by Johns Manville, with fitted protective jacket specified for the installation.

B. Pipe and Fitting Protective Jackets:

1. Intended for permanent installation on non-serviceable components only.

2. Interior Pipe and Fitting Insulation Protective Jacket:

a. Plastic: High-impact, UV resistant polyvinyl chloride, white, paintable, covering designed to fit over AP jacketed insulated piping systems, molded to fit various sizes of fittings and piping as required; similar to "Zeston 2000 or Zeston 300 PVC Jacketing" by Johns Manville.

1) 20 mil thickness: Fittings and valves in interior applications eight feet above finished floor and higher.
2) 30 mil thickness: Fittings, valves, and straight pipe in interior applications lower than eight feet above finished floor.

b. Aluminum: Circumferentially corrugated 20mil thick or embossed 24 mil thick, with approved moisture barrier, with matching preformed fitting covers by same manufacturer. Similar to Corrolon by Childers.

C. Valve Covers, Serviceable Hydronic Component Insulation Jackets:

1. 2" nominal size and smaller Autoflow Control and Control Valves, and other similar piping components needing periodic service, maintenance or adjustment - provide easily removable insulation jacket requiring no special tools for installation or removal / replacement:

a. Factory fabricated removable and reusable cover similar to products by No Sweat Valve Wraps, Inc., or approved equal.

b. Size so outer jacket overlaps adjoining sections of pipe insulation.

c. Flame and smoke spread 25/50 per ASTM E-84 or less.

d. Maximum k- factor .26 or matching surrounding insulation, using fiberglass blanket.

e. Outer jacket made of material equal to DuPont Tychem® QC (polyethylene coated Tyvek) , overlapping and completely covering the insulation with seams joined by integral elastic banding and tabs made from hook and loop fasteners (Velcro).

f. Butt ends and stem penetrations have sewn-in-place elastic. On cooling service, provide PSA backed closed cell foam gasket material adhered to stem penetration or surrounding insulation jacket between substrate and elastic jacket closure, as required insuring a complete vapor seal.

D. Duct Insulation

1. Provide insulation thickness on ducts, plenums, and equipment equal to height of flanges, but not less than thickness required to achieve duct insulation R values specified herein:

   a. R=6 deg. F-sq. ft.-h/Btu-in:

      1) All interior HVAC duct where insulation is required, unless otherwise noted elsewhere.

2. Rigid Board: 3 PCF minimum density glass fiber board (6PCF when exposed in mechanical or utility spaces) or phenolic, with factory-applied AP vapor barrier; similar to "800 series Spin-Glas" and "AP" facing by Johns Manville, or Kingspan KoolDuct.

3. Semi-Flexible: 2.5 PCF minimum density continuous glass fiber oriented strand sheets, with factory-applied AP vapor barrier. Strand orientation such that material has comparable rigidity to board type insulation above in one direction and comparable compressive strength, but is flexible enough in the other direction to wrap curved surfaces at a factory recommended minimum bend radius of 3T where T is the material thickness. Similar to "CrimpWrap" by CertainTeed.

4. Flexible: Glass fiber blanket, 3/4 PCF minimum density, with factory-applied, flame-resistant, FSK jacket; all joints taped; similar to Owens Corning "Fiberglas All Service Duct Wrap".

E. Ductwork Insulation Protective Jackets:

1. All Purpose (AP) Vapor Barrier for Duct Insulation: White kraft paper outer surface bonded to aluminum foil and reinforced with fiberglass yarn, permanently treated for fire and smoke safety and to prevent corrosion of foil.

   a. Water Vapor Permeance: ASTM E96, Procedure A, 0.02 perm maximum.
   b. Puncture resistance: ASTM D781, 85 scale units minimum
   c. Burst resistance: ASTM D774, 100psi minimum.
   d. Similar to "150TL facing" as used in "AP T Plus Jacket" and tape by Johns Manville, or equal.

2. Foil-Skrim-Kraft (FSK) Vapor Barrier for Duct Insulation: Foil faced outer surface bonded to kraft paper backing and reinforced with fiberglass yarn, permanently treated for fire and smoke safety and to prevent corrosion of foil.

   a. Water Vapor Permeance: ASTM E96, Procedure A, 0.02 perm maximum.
   b. Similar to "FSK Jacket" and tape by Johns Manville, or equal.

F. Insulation Accessories:

1. Mechanical Pin Fasteners: Provide welded or adhered pins of length based on manufacturer's recommendations for insulation density and thickness, securely holding insulation with insulation manufacturer's recommended compression. Mechanical Pin Fastener types include:

a. Stud style welded pins minimum 12 gauge diameter with matching push-on washers. Welded on with capacitor discharge type pin welder with no burn through or undercutting. Welded on prior to insulation application allowing for inspection prior to insulating.

b. Cup head style welded minimum 12 gauge diameter with integral washers. Welded on with capacitor discharge type pin welder with no burn through or undercutting. Welded on after insulation application dis-allowing inspection of pin welds without insulation removal. Not permitted for any Class A or tighter duct, not permitted for any fire rated duct insulation application.

c. Adhered style with perforated metal back plate (minimum 4 square inches surface area) welded to 12 gauge pins with matching push washers, bonded with full coverage of manufacturer's recommended adhesive. Not permitted for any fire rated duct insulation application.

d. Not permitted: PSA backed "peal and stick" pins, sheet metal fastening screws, or any other penetration of duct by fasteners.

2. Insulation Securement Bands: For larger cylindrical surfaces and fire rated duct insulation, tension securement bands may be used to supplement or replace mechanical pin fasteners. Provide bands of material compatible with insulation and system being insulated, minimum ½ inch wide and as required to avoid compressing insulation at required securement tension (3/4 inch minimum for diameters over 36 inches), 24 gage thick or thicker. End buckles of similar material. Wrapping or securing with wires not permitted.

3. Insulation Covering Canvas: 8 oz., 100 percent cotton, with flame spread 10 and smoke developed 0 ratings; similar to "Thermocanvas" by Fattal, Chicago, Illinois.

4. Insulation Tapes: Provide insulation manufacturers' recommended and matching tapes, matching characteristics of exterior jacket of insulation, in widths as required and as specified below to seal all gaps and reinforce vulnerable areas in vapor barrier. Provide tapes with peel off protective coating covering high performance acrylic adhesive unless manufacturer documents superior performance of alternative recommendation.

5. Insulation Adhesives and Mastics: Provide insulation manufacturers' recommended and matching adhesives and mastics, as required and as specified below to seal all gaps and reinforce vulnerable areas in vapor barrier. Provide with water based and low VOC formulations unless manufacturer documents superior performance of alternative recommendation and performance deficiencies of water based low VOC products.

6. Corrosion Inhibition Coating:

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Polyguard Brand, ReactiveGel™ RG-2400 series of coatings and accessories.

b. Materials shall be compatible with insulation materials, jackets, substrates, and conditions of service. Provide product formulation specifically designed for the conditions of service.

c. Product is a field applied gel chemical surface conversion compound utilizing reactive mineralization technology, creating a corrosion resistant mineral barrier 50-200 angstroms deep into the metal surface which increases in thickness as time passes.

d. Viscosity: Brookfield method; 200,000-300,000 cps

e. Specific Gravity: Gravimetric; 0.98-1.08

f. Application: Spray, rag, brush, roll, glove.

g. Corrosion test performance, thickness .025":

1) 1000 hours Accelerated Weathering per ASTM B117 - pass with no corrosion.
2) ASTM G-23 – pass with no corrosion.

h. Service Temperature Range: Minus 40 to plus 350 deg F. depending on formulation.

i. Color: Blue.

j. V.O.C.: EPA Method; NONE

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
B. Verify that systems and equipment to be insulated have been tested and are free of defects.
C. Verify that surfaces to be insulated are clean and dry.
D. Proceed with installation only after unsatisfactory conditions have been corrected.
E. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion inhibition coating to surfaces to be insulated as follows:

1. All non-galvanized ferrous components with a service temperature below ambient (chilled water and chilled water/glycol systems): Coat with one full coverage coat of specified corrosion inhibition coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 INSTALLATION

A. General:

1. Provide thermal and acoustical insulation for components shown on the Drawings as specified in this Section for the following:

   a. All heating and air conditioning systems piping including fittings, valves, and accessories.
   b. Exhaust, ductwork: extending from exterior wall or roof 15 feet into the building envelope in all directions of duct branch take-offs.

2. Comply with manufacturer's installation instructions and recommendations.

3. Do not begin mechanical insulation until permission is granted to begin mechanical insulation installation, hydronic systems have proved drip free under pressure, duct systems have passed required duct leakage requirements and testing, indoor work areas are weather tight, and outdoor work areas are at appropriate ambient conditions.

4. Below ambient temperature applications:

   a. Provide corrosion inhibition coating as specified above.
   b. Apply vapor barrier mastic and sealant to all open ends, joints, seams, breaks, and punctures in insulation.

5. Do not use any insulation support system which causes compression of insulation, localized or widespread, to less than 75% of the rated nominal thickness. Wires wrapped around rectangular duct insulation are not permitted as insulation support.

6. Provide for durable and repeated service access as part of insulation system.

   a. Do not permanently cover inspection stampings, hand holes, manholes, plugged outlets, or similar features on equipment – provide removable labeled insulated access port with beveled and sealed insulation plug, gasketed if vapor barrier is needed, durably fabricated for repeated access.

   b. Provide removable insulated boxes as specified for Pumps, Suction Diffusers, Heat Exchanger Frames and Heads, Triple Duty, Balancing, and Control valves, and other HVAC components needing periodic maintenance or adjustment.

7. Install thermal mechanical insulation as follows:

    a. Only on clean, dry surfaces and after piping and ductwork has been tested and found to be tight.
    b. Continuously through wall or ceiling openings and sleeves.
    c. On cold surfaces with continuous unbroken vapor seal.
    d. Insulate ducts and pipes individually.

8. Where more than one layer of insulation is required to achieve specified thickness or R value, apply thinner layer first, and stagger joints between insulation layers at least 3 inches.

B. Pipe Insulation

1. Comply with manufacturer's installation instructions and recommendations. Install only when ambient temperatures are within range recommended by manufacturer. STAPLES NOT PERMITTED.

2. Provide high impact plastic wrapper on all exposed, insulated piping from finished floor to 8 ft. above finished floor.

3. Interior Pipe and Fitting Insulation: Install on all heating piping. Seal with factory applied pressure-sealing adhesive strip on the longitudinal lap. Seal butt joints with pressure-sealing adhesive strip at least 2 inches wide. Install valve and fitting covers in all locations.

4. Insulation at Pipe Support: Refer to SECTION 23 05 29 - Hangers and Supports for material specifications of insulated piping support assembly and pipe support insulation. Complete insulation installation for the applicable pipe support insulation type to be used.

C. Ductwork Insulation: Provide external thermal insulation on ducts as specified or indicated on Drawings; external thermal insulation not required where ducts are shown or specified with internal acoustical insulation. Insulate and seal around duct dampers, damper motors, thermometers, instruments, access doors, and similar component as required without restricting operation or function. Insulate all ducts in all concealed spaces.

1. Use flexible type insulation on concealed ductwork with widths or diameters of 18 inches or less only. Insulate all other ductwork requiring insulation with rigid board type, semi-flexible type, or other type as required by drawings and specifications.

2. Duct Insulation Mechanical Fasteners: Provide mechanical fasteners for all duct surfaces over 12” wide. For duct surfaces 18’” wide and less, provide single row of fasteners down duct centerline. For duct surfaces over 18” wide, install minimum of 2 rows per side, applied on maximum 18" centers, starting within 3" of any edge.

    a. Pins with the point facing out accepting push washers: clip points close to washers and cover with vapor barrier adhesive and tape. Not permitted on mechanical room duct unless covered by puncture resistant protective wrapper.

3. Duct Insulation Tape: Apply only to clean dry dust free surfaces as recommended by tape manufacturer and as required for durable adhesion.

   a. Pealing tape, loose insulation, or otherwise broken vapor barrier subject to repeated recall.

4. Rigid Board Type Insulation Installation: Install board with all corners mitered or rabbeted; no butt joints allowed. Secure insulation with mechanical fasteners. Apply corner reinforcement angles (beads) on all corners for exposed ductwork (including in mechanical or storage spaces), with edge tape over beads. Seal all breaks and joints in vapor barrier with 3 to 5 inches wide insulation tape (minimum 1.5" tape past break all around).

5. Semi-flexible Type: Install similar to rigid board type, on round duct, curved elbows, etc.. Wrap curved and round surfaces taught, provide circumference tape band maximum two feet on center (butt joints and center of four foot roll stock).

6. Flexible Type Insulation Installation: Make all joints and seams with 2-inch lap of vapor barrier cemented with Benjamin Foster "BF85-20". Apply Benjamin Foster "BF-20" adhesive to ducts in 6-inch brush widths at 1 ft. intervals and at each facing edge. Tape all adhered with Benjamin Foster "BF-20". Tape seal all seams, breaks, and joints in vapor barrier, then continuously coat all tape with manufacturer's recommended vapor barrier adhesive

END OF SECTION 23 07 00

SECTION 23 08 00 - COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1. See especially Section 01 08 00 "General Commissioning Requirements" for general commissioning process requirements and Commissioning Coordinator responsibilities.

1.2 SUMMARY

A. Section includes commissioning process requirements for the following Building Mechanical Systems, which are described in more detail in the technical specifications of Division 23.

1. Distribution systems, including hot water distribution systems and exhaust systems.
2. Terminal and packaged units, including unit heaters, cabinet unit heaters and finned-tube radiation.
3. Energy Management and Control System.
4. Systems testing, adjusting, and balancing verification, including all of the above mentioned systems.

1.3 DEFINITIONS

A. BAS: Building automation system, also known as Energy Management and Control System (EMCS).

B. Building Mechanical Systems: All Systems, Subsystems, Equipment, and Components of the building systems traditionally known as Heating, Ventilating, Air Conditioning, Refrigeration, Plumbing, and Electrical Works.

C. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

D. CxA: Commissioning Authority –The Owner or a third party commissioning agent designated by the Owner.

E. DDC: Direct digital controls, a part of the BAS.

F. HVAC&R: Heating, Ventilating, Air Conditioning, and Refrigeration.

G. "Systems," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

H. TAB: Testing, adjusting, and balancing.

1.4 SUBMITTALS

A. Qualification Data: For BAS and HVAC&R Testing Technician.

B. Construction Checklists: Provide construction pre-functional test checklists filled out by qualified technician for all equipment to be commissioned on this project, including but not limited to all :

1. BAS.
2. Heating-water piping and accessories.
3. Metal ducts and accessories.
4. Fans.

C. Certificates of readiness and completion of installation.

D. Test and inspection reports and certificates.

E. Corrective action documents.

F. Instrumentation Calibration Information

G. Functional Performance Test Procedures

1.5 QUALITY ASSURANCE

A. BAS Testing Technician Qualifications: Technicians to perform BAS construction checklist verification tests, construction checklist verification test demonstrations, commissioning tests, and commissioning test demonstrations shall have the following minimum qualifications:

1. Journey-level or equivalent skill level with knowledge of BAS, HVAC&R, electrical concepts, and building operations.
2. Minimum three years' experience installing, servicing, and operating systems manufactured by approved manufacturer.
3. International Society of Automation (ISA) Certified Control Systems Technician (CCST) Level I.

B. HVAC&R Testing Technician Qualifications: Technicians to perform HVAC&R construction checklist verification tests, construction checklist verification test demonstrations, commissioning tests, and commissioning test demonstrations shall have the following minimum qualifications:

1. Journey-level or equivalent skill level. Vocational School four-year program graduate or an Associates degree in mechanical systems, air conditioning, or similar field. Degree may be offset by three years' experience in servicing mechanical systems in the HVAC industry. Generally, required knowledge includes HVAC&R systems, electrical concepts, building operations, and application and use of tools and instrumentation to measure performance of HVAC&R equipment, assemblies, and systems.

2. Minimum three years' experience installing, servicing, and operating systems manufactured by approved manufacturer.

3. One of the following:

    a. National Environmental Balancing Bureau (NEBB) Certified Testing, Adjusting, and Balancing Technician.
    b. Associated Air Balance Council (AABC) Certified Test and Balance Technician.
    c. Owner retains the right to waive NEBB or AABC Certification.

C. Testing Equipment and Instrumentation Quality and Calibration: For test equipment and instrumentation required to perform HVAC&R commissioning work, perform the following:

1. Submit test equipment and instrumentation list. For each equipment or instrument, identify the following:

    a. Equipment/instrument identification number.
    b. Planned commissioning application or use.
    c. Manufacturer, make, model, and serial number.
    d. Calibration history, including certificates from agencies that calibrate the equipment and instrumentation.

2. Test equipment and instrumentation shall meet the following criteria:

    a. Capable of testing and measuring performance within the specified acceptance criteria.
    b. Be calibrated at the manufacturer's recommended intervals with current calibration tags permanently affixed to the instrument being used.
    c. Be maintained in good repair and operating condition throughout the duration of use on this Project.
    d. Be recalibrated/repaired if dropped or damaged in any way since last calibrated.

D. Proprietary Test Instrumentation and Tools:

1. Equipment Manufacturer's Proprietary Instrumentation and Tools: For installed equipment included in the commissioning process, test instrumentation and tools manufactured or prescribed by equipment manufacturer to service, calibrate, adjust, repair, or otherwise work on its equipment or required as a condition of equipment warranty, perform the following:

a. Submit proprietary instrumentation and tools list. For each instrument or tool, identify the following:

1) Instrument or tool identification number.
2) Equipment schedule designation of equipment for which the instrument or tool is required.
3) Manufacturer, make, model, and serial number.
4) Calibration history, including certificates from agencies that calibrate the instrument or tool, where appropriate.

b. Include a separate list of proprietary test instrumentation and tools in the operation and maintenance manuals.

c. HVAC&R proprietary test instrumentation and tools become the property of Owner at the time of Substantial Completion.

1.6 CONTRACTOR'S RESPONSIBILITIES

A. Provide mechanical work in accordance with contract document requirements.

B. Perform commissioning tests including Materials Checks, Installation Checks, Start-up Checks, Startups, and Functional Testing, all at the direction of the CxA.

C. Attend construction phase controls coordination meetings.

D. Attend and participate in TAB review and coordination meetings

E. Attend and participate in commissioning meetings.

F. Participate in Building Mechanical Systems maintenance orientation and inspection as directed by the CxA.

G. Prepare Construction / Prefunctional Checklists and Functional Performance Test procedures and execute and document results. All Prefunctional Checklists and tests must be documented using specific, procedural forms in Microsoft Word or Excel software developed for that purpose. Prior to testing, Contractor shall submit those forms for review and approval.

H. Submit documentation required for Commissioning work. At minimum, include: Detailed Start-up procedures, Full sequences of operation, Operating and Maintenance data, Performance data, checkout sheet forms used by factory or manufacturer's field technicians, Functional Performance Test Procedures, Control Drawings, and details of Owner-Contracted tests.

I. Review and approve other relative documentation for impact on Functional Performance Tests of the systems:

1. Shop Drawings and product submittal data related to systems or equipment to be commissioned. Review and incorporate comments from the CxA.

2. Incorporate manufacturer's Start-up procedures with Prefunctional checklists.

3. Factory Performance Test Reports: Review and compile all factory performance data to assure that the data is complete prior to executing the Functional Performance Testing.

4. Complete equipment Construction / Prefunctional Checklists, Start-up certification forms, and the manufacturer's field or factory performance and Start-up test documentation: review the documentation prior to commencing with the scheduled Functional Performance Tests.

5. Final Testing Reports: Contractor or Subcontractor performing the test will review the documentation prior to commencing with the scheduled Functional Performance Tests.

6. Operating and Maintenance (O&M) information per requirements of the Technical Specifications and Division 01 requirements: To validate adequacy and completeness of the Functional Performance Tests, the Contractor shall ensure that the O&M manual content, marked-up record Drawings and Specifications, component submittal drawings, and other pertinent documents are available at the Project Site for review.

J. Provide information requested by the CxA for final commissioning documentation.

K. Schedule work so that required installations are completed, and systems verification checks and functional performance tests can be carried out on schedule.

L. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

M. Inspect, check and confirm in writing the proper installation and performance of all Work.

N. Provide technicians to assist during system verification and functional performance testing as required by the CxA

1.7 CxA'S AUTHORITY

A. Directing Commissioning.

B. Assign Commissioning Agent for various commissioning tasks to stand in for the CxA.

C. Edit and approve project-specific construction checklists and commissioning process test procedures for actual Building Mechanical Systems, assemblies, equipment, and components to be provided as part of the construction contract.

D. Verify Testing, Adjusting, and Balancing of Work are complete.

1.8 COMMISSIONING DOCUMENTATION

A. Provide the following information to the CxA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.

2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for Building Mechanical Systems to be verified and tested.
4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
5. Certificate of readiness certifying that Building Mechanical Systems and associated controls are ready for testing.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

A. Certify that Building Mechanical Systems have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that Building Mechanical Systems instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify that Contractor portions of testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing report discrepancies have been corrected, and corrective work approved.

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Provide (Furnish and Install) measuring instruments and logging devices to record test data as directed by the CxA.

3.2 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning tests at the direction of the CxA.

B. Scope of Building Mechanical Systems testing includes entire HVAC&R installation. Testing includes measuring capacities and effectiveness of operational and control functions, accuracy and precision of sensing equipment, and other functional parameters as required, demonstrating that systems are performing as specified and intended. Commissioning testing includes verification of up to 30 percent of the control points, Testing and Balancing data, and other system requirements indicated in the individual technical sections, and on the drawings and schedules of these contract documents. Parameters not otherwise specified to be tested, as required to adequately demonstrate system performance, may constitute up to 10 percent of the 30 percent (3 percent of total).

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the Building Mechanical Systems Contractors and their Subcontractors, especially the Testing, Adjusting, and Balancing Subcontractor, and HVAC&R Instrumentation and Control Subcontractor, shall prepare detailed testing plans, procedures, and checklists for Building Mechanical Systems based on the actual installed equipment and the contract documents.

E. Perform tests using design conditions whenever possible.

1. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

2. The CxA may direct that set points be altered when simulating conditions is not practical.

3. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

F. If tests cannot be completed because of a deficiency outside the scope of the Building Mechanical System, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests. If deficiencies cannot be resolved, refine tests as required to adequately test Building Mechanical Systems within the constraints of the deficiency.

G. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.3 TESTING, ADJUSTING, AND BALANCING (TAB) VERIFICATION

A. Prior to performance of TAB Work, provide copies of approved sample report forms, checklists, and certificates to the CxA.

B. Notify the CxA at least 10 days in advance of TAB Work, and provide access for the CxA to witness Testing, Adjusting, and Balancing Work.

C. Subsequent to approval of formal TAB report, TAB Work will be subject to field verification. Provide technicians, instrumentation, and tools to verify testing and balancing of Building Mechanical Systems at the direction of the CxA. Roughly 10% of required TAB data points identified in TAB specification will be selected for subsequent field verification.

1. The CxA will notify TAB Subcontractor 10 days in advance of the date of field verification. Notice will not include data points to be verified..

2. The TAB Subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.

3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.

4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.4 SPECIFIC COMPONENT AND SYSTEM COMMISSIONING TESTS

A. Air Distribution Systems

1. TAB Air Flow Verification:

a. Prerequisites: Completion of "Examination" Article requirements and correction of deficiencies, as specified in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

b. Completion of "Preparation" Article requirements for preparation of a TAB plan that includes strategies and step-by-step procedures, and system-readiness checks and reports, as specified in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

c. Scope: HVAC&R air systems and hydronic piping systems.

d. Purpose: Verify code required flowrates to maintain indoor air quality.

e. Conditions of the Test:

1) Commissioning Test Demonstration Sampling Rate: As specified in "Inspections" Article in Section 230593 "Testing, Adjusting, and Balancing for HVAC."
2) Systems operating in full heating mode.

f. Acceptance Criteria:

1) Under all conditions, rechecked measurements comply with "Inspections" Article in Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC."

2) Additionally, no rechecked measurement shall differ from measurements documented in the final report by more than two times the tolerances allowed.

B. General Hydronic System Testing

1. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment requirements are specified in Division 23 piping Sections. HVAC&R Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

a. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.

b. Description of equipment for flushing operations.

c. Minimum flushing water velocity.

d. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

C. Exhaust Systems

1. Exhaust Fan Testing and Acceptance Procedures: Testing requirements are specified in Division 23 Section “Testing, Adjusting, and Balancing for HVAC”. Provide submittals, test data, inspector record, and exhaust fan performance certification to the CxA. Exhaust fans shall be equipped with all accessories as specified and scheduled and shall be demonstrated to operate on the approved fan curve with no greater than the approved power requirements.

D. Unit Heaters

1. Unit Heater Testing and Acceptance Procedures: Testing requirements are specified in Division 23 Section “Testing, Adjusting, and Balancing for HVAC”. Provide submittals, test data, inspector record, and Unit Heater performance certification to the CxA. Unit Heaters shall be equipped with all accessories as specified and scheduled and shall be demonstrated to deliver the scheduled airflow and heat capacity at no greater noise or power use levels than specified.

E. Cabinet Unit Heaters

1. Cabinet Unit Heater Testing and Acceptance Procedures: Testing requirements are specified in Division 23 Section "Testing, Adjusting, and Balancing for HVAC". Provide submittals, test data, inspector record, and Cabinet Unit Heater performance certification to the CxA. Cabinet Unit Heater shall be equipped with all accessories as specified and scheduled and shall be demonstrated to deliver the scheduled airflow and heat capacity at no greater noise or power use levels than specified.

F. Finned-Tube Radiation

1. Finned Tube Radiation (FTR) Testing and Acceptance Procedures: Testing requirements are specified in Division 23 Section "Testing, Adjusting, and Balancing for HVAC". Provide submittals, and test data certification to the CxA. FTR shall be installed level and plumb, neat and secure, with ready access to hydronic specialties as required for service, equipped with all accessories as specified and scheduled and shall be demonstrated to provide the specified and approved heating capacity while operating with no greater than the specified water flow.

G. Energy Management And Control System

1. Testing requirements are specified in Division 23 Section "Instrumentation and Control for HVAC", Section 3.11 SYSTEM TESTING AND COMMISSIONING. Provide submittals, test data, inspector record, and EMCS performance certification to the CxA.

2. Provide password and any other hardware and software as required to enable CxA to communicate directly, with full graphics and control capability, with the EMCS from the CxA's office over an internet browser interface. Install complete early in project.

H. Electrical Power Distribution Systems Serving The Above Listed Mechanical (Plumbing and HVAC&R) Systems

1. Be prepared for CxA to take thermal images of field connections for any line voltage power connections.

END OF SECTION 23 08 00

SECTION 23 09 00 - INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

B. Review and study all drawings and this entire project specification to become familiar with the equipment and system operation as designed and to verify the quantities and types of controllers, valves, dampers, operators, alarms, points, etc., required.

1.2 SUMMARY

A. The Board of Education of the Cornwall Central School District has passed a **Resolution of Standardization** requiring the use of Automated Logic Corporation products and all other controls system components to be as furnished by their Standardized Vendor (SV), in the WebCTRL Building Automation Energy Management and Control Systems. All components shall in general conform to this specification. Please contact Brian Johnson for additional information:

Brian Johnson
880 Broadway
Albany NY 12207-1316
(518) 465-8878, ext 146
bjohnson@easternheatingcooling.com

1. State Education Department public bidding requirements include publicly bid installation of standardized equipment purchased by the Owner. Installation of the Energy Management and Control System (EMCS) shall be in full accordance with this specification, by a fully qualified Temperature Controls Contractor (TCC) as described in quality assurance below and as approved by the Architects and Engineers, to be paid for by the Contractor responsible for HVAC Work as a part of their work. Bid installation shall include both removals of existing controls as specified below and installation of new controls as follows:

    a. Control Valves and their actuators,
    b. Automatic Dampers and their actuators,
    c. All control devices: input, output, and logical, including their interface with and mounting in or on piping, sheet metal and general building systems.
    d. All actuation devices for existing valves and dampers should they be involved,
    e. All wiring between all EMCS components and all power source wiring for them,
    f. Removal of all discontinued controls, including but not limited to all pneumatic control air components (piping, compressors, specialties, etc.).

2. Any incidental installations and work not covered above including but not limited to inspecting, testing, and SV acceptance of controls components installation, and controls programming, testing, adjusting, and commissioning labor shall be included in the product portion of this work and shall be provided complete by the Standardized Vendor, resulting in a complete functional control system per specifications.

B. This section describes the requirements for a complete Energy Management and Control System (EMCS) for building mechanical systems and components, based upon Direct Digital Control (DDC) logic including WEB served operator interface via the existing computer Operator Work Station, distributed microprocessor controls, and integrated electronic components, interfaces, and actuation, all installed complete as specified.

C. Perform all work in cooperation with the Owner, Architect, Construction Manager, and other Prime Contractors. Coordinate all work with the construction schedule established by the Owner, Architect, and Construction Manager, and immediately report any delays including circumstances causing the delays.

D. It is the Owner's intent to establish a fully compatible and interoperable Energy Management and Control System (EMCS) network as an extension of the Cornwall School District's distributed Automatic Logic Controls System. This shall be accomplished through the general removal of all existing controls components serving these systems, and providing new controls complete as specified herein. Provide new graphic displays for all new controls, and custom configure graphic displays to meet Owner and Engineer requirements. Provide each of the following portions of the complete EMCS as a standalone system that can communicate with any other Direct Digital Control (DDC) system which is following the same protocol:

1. Network Control Unit (NCU): Provide central processor WEB server capability for and fully integrated two way communications with all energy use and management equipment provided or modified by this project, along with any third party stand alone controls provided by the manufacturers of the Air Handlers, Refrigeration Machinery, Boilers, and Variable Speed Drives. NCU shall be capable of supporting a minimum of 127 field devices, providing reserve capacity for addition of future points and expansion of DDC system into building. The DDC system's NCU shall communicate with the OWS entirely using the BACnet protocol, with a conformance class of 5, as defined in the latest officially amended version of ANSI/ASHRAE 135-2004.

2. Distributed Controls: System controls shall include but not be limited to all controllers, sensors, devices, wiring, and all other hardware and software required to perform all of the functions and controls described later in this specification and on the drawings, including fully integrated two-way control of boilers, chiller, condensing units, pumps, VSDs, heat exchanger, and all associated temperatures, pressures, and other controllable parameters of mechanical equipment and systems provided or modified as part of this project. Provide control through the EMCS as outlined in the general controls sequences of operations below, as shown on the project drawings, and with controls similar to as shown where the exact configuration is not explicitly covered by the drawing and specification sequence of operations.

3. Engineer's Office: Provide password and any other hardware and software as required to enable Engineer to communicate directly, with full graphics and control capability, with the EMCS from the Engineer's office over an internet browser interface. Install complete early in project. Engineer will utilize to check progress of installation, to check operation of system during the punch list period, and to monitor system operation after completion of the work.

1.3 DEFINITIONS

A. DDC: Direct Digital Control.

B. PC: Personal computer.

C. EMCS: Energy Management and Control System, includes the complete automatic temperature control and energy use management system specified herein, based upon DDC technology, incorporating all necessary input and output devices, connecting hardware, software, and accessories.

D. OWS: Operator Workstation which is the main operator interface with the EMCS, comprised of a PC with graphical two way interface with, and data base and control capabilities for, the entire EMCS.

E. UC: Unitary Controller, a version of the SCU which is a smaller microprocessor-based controller, possibly pre-programmed to function specifically for the operation of a particular piece of equipment, such as a standard configuration air handler, unit ventilator, variable air volume box, lighting circuit, etc.

F. SCU: Standalone Control Unit, a microprocessor-based controller panel, which contains all necessary control logic to carry out its own, local functions, and can function independently of other SCU panels and all remaining portions of the EMCS. The SCU may serve one or many types of HVAC equipment and is not factory programmed for only one purpose.

G. NCU: Network Control Unit, a secure central processing unit microprocessor based WEB server residing directly on the Owner's Ethernet TCP/IP LAN/WAN; providing direct communications to SCUs, UCs, and other field devices; integrating and processing their data and presenting it as custom HTML WEB pages in accordance with custom programmed graphical interface edited at an OWS.

H. LAN: Local Area Network - the Owner's existing Ethernet communications backbone which connects all of the owners buildings (and various rooms) on their campus. To be used by the Contractor where possible to connect OWSs, NCUs, SCUs, and UCs. Coordinate with Owner to determine extent of interconnection possible.

I. BACnet: A Data Communication Protocol for Building Automation and Control networks as defined in American National Standard ANSI/ASHRAE 135-1995, including any updates or revisions to this document.

J. LonWorks: A control network technology platform for designing and implementing interoperable control devices and networks.

K. MS/TP: Master slave/token passing.

L. I/O: Input/output.

M. Modbus: a serial communications protocol originally published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs).

N. PID: Proportional plus integral plus derivative.

O. RTD: Resistance temperature detector.

P. System Modem: a modem which is installed on the EMCS so that a remote SCU, UC, or OWS can connect up to the LAN and can function the same as if it were locally-installed.

Q. System Printer: a printing device which is installed on the LAN so that all EMCS components can utilize it as an output device.

R. SV: Standardized Vendor of controls components.

S. TCC: Temperature Controls Contractor - The entity responsible for the work described by this section of specifications.

1.4 SYSTEM PERFORMANCE

A. Comply with the following performance requirements:

1. Graphic Display: Display graphic with minimum 20 dynamic points with current data within 10 seconds.

2. Graphic Refresh: Update graphic with minimum 20 dynamic points with current data within 8 seconds.

3. Object Command: Reaction time of less than two seconds between operator command of a binary object and device reaction.

4. Object Scan: Transmit change of state and change of analog values to control units or workstation within six seconds.

5. Alarm Response Time: Annunciate alarm at workstation within 45 seconds. Multiple workstations must receive alarms within five seconds of each other.

6. Program Execution Frequency: Run capability of applications as often as five seconds, but selected consistent with mechanical process under control.

7. Performance: Programmable controllers shall execute DDC PID control loops, and scan and update process values and outputs at least once per second.

8. Reporting Accuracy and Stability of Control: Report values and maintain measured variables within tolerances as follows:

a. Water Temperature: Plus or minus 1 deg F.

b. Water Flow: Plus or minus 5 percent of full scale.
c. Water Pressure: Plus or minus 2 percent of full scale.
d. Space Temperature: Plus or minus 1 deg F.
e. Ducted Air Temperature: Plus or minus 1 deg F.
f. Outside Air Temperature: Plus or minus 2 deg F.
g. Dew Point Temperature: Plus or minus 3 deg F.
h. Temperature Differential: Plus or minus 0.25 deg F.
i. Relative Humidity: Plus or minus 5 percent.
j. Airflow (Pressurized Spaces): Plus or minus 3 percent of reading.
k. Airflow (Measuring Stations): Plus or minus 5 percent of reading.
l. Airflow (Terminal): Plus or minus 10 percent of full scale.
m. Air Pressure (Space): Plus or minus 0.01-inch wg.
n. Air Pressure (Ducts): Plus or minus 0.05-inch wg.

1.5 QUALITY ASSURANCE

A. Provide all labor, material, equipment, software, and programming necessary to meet the functional intent of the EMCS, and the rigid requirements as specified herein and as shown on the drawings. Provide, without additional cost to the Owner, all equipment and labor not specifically referred to herein or on the plans, which are required to meet the functional intent expressed in the sequences of operations herein or on the drawings. The contractor is responsible for all costs of changes in the work required by substitute equipment.

B. The TCC must have been in business for at least ten years, providing DDC systems as their primary business with documented success. They shall have a minimum of five years as a manufacturer's authorized distributor or branch office representative for one or more of the manufacturers specified. They must have a trained staff of application engineers, project managers, software engineers, commissioning staff, training staff, and service staff experienced in the configuration, programming and service of the EMCS. They must have a local service department and stock the manufacturer's standard replacement parts.

C. The EMCS shall be installed only by skilled mechanics employed directly by the TCC except wiring may be installed by their first tier subcontractor under the TCC project manager’s direct supervision. Any subcontractor shall have documented success installing controls with the TCC for a minimum of five years prior to this project. Sub-contractual relations shall in no way relieve the contractor of any of their obligations under their contract.

D. The TCC shall have a training facility with regularly scheduled training as outlined below so as to provide ongoing regularly scheduled application training.

E. Manufacturer must be a firm regularly engaged in manufacture of microprocessor temperature control equipment, of configuration and capabilities similar to or better than specified equipment, for at least ten years, and must have similar earlier vintage models that have been in continuous satisfactory use for not less than ten years in similar service.

F. All work shall conform to the following Codes and Standards, as applicable to the Contracted Work at the Project job site and to the relevant Authorities Having Jurisdiction at the Project site. All products shall be labeled with the appropriate approval markings. In the case of conflict or discrepancy, the latest and most stringent regulation or code shall apply.

1. National Electrical Code (NEC) and applicable local Electrical Codes.
2. Underwriters Laboratories (UL) listing and labels.
3. Underwriters Laboratories of Canada (ULC) listing and labels.
4. UL 864 UUKL Smoke Control.
5. UL 864 UOJZ Fire Protection Signaling Systems.
6. UL-873; Temperature Indication and Regulating Equipment.
7. UL-916; Energy Management Systems for BAS components and ancillary equipment.
8. NFPA 70 – National Electrical Code.
9. NFPA 92A and 92B Smoke Purge/Control Equipment.
10. Factory Mutual (FM).
11. American National Standards Institute (ANSI).
12. National Electric Manufacturer's Association (NEMA).
13. American Society of Mechanical Engineers (ASME).
14. Institute of Electrical and Electronic Engineers (IEEE).
15. American Standard Code for Information Interchange (ASCII).
16. Electronics Industries Association (EIA).
17. Occupational Safety and Health Administration (OSHA).
18. American Society for Testing and Materials (ASTM).
19. Federal Communications Commission (FCC) including Part 15, R.F. Devices.
20. Americans Disability Act (ADA).
21. Uniform Building Code (UBC).
22. NEMA 250 – Enclosures For Electrical Equipment (1,000 V Maximum).
23. NFPA 101 – Life Safety Code.
24. IESNA – Illumination Engineering Society of North America.
25. UL 50 – Cabinets and Boxes.

1.6 GUARANTEES

A. Guarantee the EMCS complete to be free from defects in durability, materials, and workmanship, except for damages from other causes, for a period of one year after final acceptance.

B. Guarantee System to:

1. Maintain temperatures within +/- 1°Fof setting, within capacity of HVAC equipment.

C. Provide a one (1) year maintenance agreement to run concurrently with the Guarantee period, consisting of 24 hour emergency service and scheduled service (once per month minimum), as required addressing reported issues, for inspection and adjustment of operating controls, and replacement of parts or instruments found deficient or defective during this period.

D. Provide system backup and restore, software, programming, and sequence of operations enhancements, revisions, and adjustments at no charge to the Owner both during construction and commissioning and during this warrantee period.

1.7 SEQUENCE OF OPERATION

A. Refer to controls schematic drawings including written sequence of operations for specific pieces of equipment. Provide controls as specified and as required to achieve sequence of operations shown on drawings as well as specified below in general programming, and with controls similar to as shown where the exact configuration is not explicitly covered by the drawing and specification sequence of operations.

1.8 SUBMITTALS

A. Submit on controls in multiple portions as job progresses Include in each submittal a summary just inside the cover sheet of previously approved portions of submittal, currently submitted portions, and those portions not submitted yet. During closeout documentation, assemble all approved controls submittals into one package designed for use as both an installation and a maintenance manual.

B. Submit a Technical Proposal within 30 days of contract award, complete with the diagrams, Specification Compliance Reports, product information, and supporting documentation outlined below. Arrange the Technical Proposal in order of the specification article numbers, with tabs (bookmarked .pdf files for electronic submittals) at each division. The Technical Proposal shall be designed for use as both a clear demonstration of qualifications and as an installation and maintenance manual.

C. Include the following in a complete Technical Proposal:

1. Description of service capabilities including resumes for service technicians and designers that will be responsible for this project.

2. A list of local jobs (three minimum) of similar type and size the bidder has installed, utilizing the products proposed for this project, with Owner's representatives and engineer of record's names and telephone numbers for reference. This list should directly reflect:

    a. Projects that include direct integration to third party microprocessor controllers of the type specified within this scope.

3. Submit name of any proposed installation subcontractors, along with their statement of qualifications, resumes for service technicians who will be responsible for this project, and 3 local references for comparable recent jobs.

4. EMCS network wiring diagram showing interconnection of all panels, workstations, system printer(s) etc. A diagram describing system architecture for this project with product code numbers for workstation, network controllers, application specific controllers, transducers, sensors, communication networks, etc.. Diagram shall include all components intended to be used to meet or exceed specification requirements, shown in their functional relation to one another.

5. Provide information on owner training provided as part of the bid package as well as additional opportunities and factory schools available with associated costs. Include details of Operator HVAC Training System as specified herein.

6. Specification Compliance Report. The specification compliance report shall address every paragraph within this specification (230900), utilizing an outline format indicating clearly how the proposed system complies with this specification as follows:

    a. No Exception - proposed system complies without exception to both the letter and intent of this specification. Include Data Communications Protocol Certificates certifying that each proposed DDC system component complies with ASHRAE 135.

    b. Substitution Exception - proposed system is believed to meet the functional intent, but not the letter of the specification. For each paragraph for which a Substitution Exception is taken, the Specification Compliance Report shall identify all deviations from what is specified in the given paragraph and provide a complete description of what is included and how the proposed substitution meets the functional intent.

    c. Non-Compliance Exception - proposed system does not meet specification letter or functional intent, and the contractors intent is that the paragraphs requirements will not be provided. For each paragraph for which a Non-Compliance Exception is taken, the Specification Compliance Report shall identify all deviations from what is specified in the given paragraph and provide a complete description of what is included and why the contractor believes their proposed system should still be considered in spite of the non-compliance

    d. For all paragraphs indicated as “No Exception” or “Substitution Exception”, provide and reference factory product documentation to substantiate compliance.

7. Hardware Product Data Bulletins for all specified products, including PC components of OWS. Each bulletin shall describe product features, model numbers and manufacturer’s name.

8. Software Product Data Bulletins for all specified software features. Each bulletin shall describe product features, model numbers, and manufacturer’s name.

D. As job progresses and in ample time for review and iteration as required for complete approval, submit the following:

1. Complete written description of all proposed control sequences and control strategy, with any deviations from the specified sequence of operations highlighted and explained.

2. Detailed wiring and piping control diagrams and system description for each system.

3. Detailed layout and nameplate list for all control panels, including pneumatic, unit-specific controllers, data-gathering panels, microprocessor-based panels, third party microprocessor controllers, etc.

4. Damper schedule giving size, type, velocity, pressure drop, configuration, location, and number, type, and size of motorized actuators. Include apparatus bulletins and data sheets. Include all existing to remain dampers proposed for reuse along with comments on condition.

5. Valve schedule giving valve identification tag abbreviation, location, service, failsafe position, pipe size, valve size, make/model, type, configuration, design flow, capacity index (cv), and pressure drop. Include apparatus bulletins and data sheets.

6. Schedule showing direct integration to all third party microprocessor controllers included in this project, including all points available in a point listing describing point type (analog input, binary input, analog output and binary output), point address, units, applicable software interlocks (alarm, interlock, sequence, etc.), and a verbal description of the function and intended control of the point.

7. Termination schedule and point listing describing point type, (analog input, binary input, analog output and binary output), physical point location (eg. AHU #1 mixed air) and software interlocks (alarm, interlock, sequence, etc.).

8. A complete listing of inputs and outputs, control loops and/or routines, timing functions, and facilities management system functions for each controlled system. This listing shall include point logical names and identifiers.

9. For all equipment, submit copy of written installation, maintenance, and operating directions and details, along with manufacturer's printed installation instructions for all equipment furnished, showing required installation and location of the above items.

10. Provide a sample of program language and description of how programming is accomplished.

11. Color printout sheets of representative samples of all proposed graphics and text based OWS pages.

E. Software and Firmware Operational Documentation: Include the following:

1. Software operating and upgrade manuals.
2. Program Software Backup: On a magnetic media or compact disc, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.
5. Software license required by and installed for DDC workstations and control systems.

F. Software Upgrade Kit: For Owner to use in modifying software to suit future systems revisions or monitoring and control revisions.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For HVAC instrumentation and control system to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Maintenance instructions and lists of spare parts for each type of control device and compressed-air station.
2. Interconnection wiring diagrams with identified and numbered system components and devices.
3. Keyboard illustrations and step-by-step procedures indexed for each operator function.

4. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
5. Calibration records and list of set points.

1.9 RELATED AND ANCILLARY WORK

A. Electrical control wiring associated with building fire alarm system and duct smoke detectors: Installation is specified under Division 26.

B. Power source wiring for general (non-controls) HVAC motorized equipment: Installation specified under Division 26.

C. Provide power source and controls wiring for all EMCS equipment, complete back to breakers designated as temperature control power breakers on electrical drawings or other approved electrical power panel space. Includes all controls power source wiring, communication wiring, and actuated device power and control wiring. Installation specified both herein and in applicable sections of Division 26.

D. Piping work as required to maintain pressure tight integrity of all hydronic, potable water, and refrigerant based systems for the installation of all piping mounted controls components, including control valve installation, valve and control manifolds, pressure and temperature taps, flow switches, thermal wells, and similar devices: Installation specified both herein and under applicable piping section.

E. Sheet metal work as required to maintain pressure tight integrity of all airside systems for the installation of all airside mounted controls components, including dampers, pressure and temperature probe taps, flow sensors, and similar devices: Installation specified both herein and under applicable sheet metal and ductwork sections.

F. Insulation work as required to maintain the thermal integrity of the various systems associated with and subsequent to controls component installations: Installation specified in Division 23 section on Insulation.

G. For all equipment: Provide and follow written installation directions and details, with manufacturer's printed installation instructions for all equipment furnished, showing required installation and location of the above items.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for submittal, approval, fabrication, and shipping of control devices to equipment manufacturer in ample time for factory installation without impacting project schedule.

B. System Software: Update to latest version of software at Project completion.

1.11 INSTRUCTION AND TRAINING

A. Interactive Operator HVAC Training System

1. General:

a. Provide necessary software and learner workbooks to form a complete HVAC training system as described in this specification. Provide two (2) copies of the software and three (3) copies of the learner workbooks for the Owner's use.

2. Operation:

a. Usable by multiple students while maintaining records and bookmarks for each learner.

b. Operates from CD-ROM without the necessity of installing the program on a hard disk, or installed on hard drive. Students records stored on the computer's hard drive.

3. Features

a. Integrates text and graphics to explain the concepts of building environments, the systems that deliver these environments, and the controls that manage these systems.

b. Modular in design to allow the student to select and view whichever sections are appropriate in any order desired.

c. Menu driven with complete sections identified on the menu.

d. Includes a glossary of terms readily accessible from within the lessons allowing the review of a definition without losing the current lesson location.

e. Incorporates navigational aids including a learning map that allows the student to move directly to a desired section from the map.

f. Includes a password protected registration system to record student responses and bookmark progress. The registration system shall allow students to return to their previous lesson location or start the lesson again when logging on after the first session.

g. Includes a password protected mentor mode which can be used to monitor progress throughout the training program.

h. Includes mastery exam for each of the three sections of the training program; environments, systems, and controls.

i. Includes a final test, enabled by the mentor, to assure satisfactory completion of the learning program.

j. Includes a completion form upon successful completion of the training experience.

B. Factory Authorized Control System Training:

1. Provide factory trained and authorized instructors and control technicians to instruct the Owner's operating personnel.

2. Factory authorized on site training - Provide two (2) on site training sessions each four (4) hours in duration covering network layout, controllers, and software functions. Both generic and product specific training shall be provided. Sessions shall be scheduled by the Contractor at the Owner's convenience, at any time up to two years after system installation.

3. Factory authorized on site training - Provide six (6) on site training sessions each four (4) hours in duration covering network layout, controllers, and software functions. Both generic and product specific training shall be provided. Sessions shall be scheduled by the Contractor at the Owner's convenience, at any time up to two years after system installation.

4. Factory authorized off site training - Provide three (3) day factory authorized off site training course for up to two Owner's representatives, covering advanced topics related to their EMCS, including graphics modification and creation, control software programming, system communications, remote communications, database management, and trouble shooting. Include all incidental expenses.

5. Provide videotaping and audio taping of all training sessions, both off and on site. Turn over two copies of tapes and three copies of maintenance manual to Owner's representative.

C. Include in closeout documentation signed letter of acknowledgment of receipt of factory authorized training, videotapes, and maintenance manuals.

1.12 COORDINATION

A. Coordinate all controls work required for a complete operable controls system as specified. Carefully review project summary and scoping documentation and coordinate with contractors responsible for various ancillary portions of controls work. Where supportive or ancillary work is not specifically assigned to another contractor, provide complete as required for a complete operable system.

B. Coordinate equipment with Division 28 Sections on Fire Detection and Alarm Systems to achieve compatibility with equipment that interfaces with that system.

C. Coordinate supply of conditioned electrical branch circuits for control units and operator workstation.

D. Coordinate equipment with Division 26 Sections on Electrical Power Monitoring and Control to achieve compatibility of communication interfaces.

E. Coordinate equipment with Division 26 Sections on Panelboards to achieve compatibility with starter coils and annunciation devices.

F. Coordinate equipment with Division 26 Sections on Motor Controls to achieve compatibility with motor starters and annunciation devices.

G. Coordinate size and location of concrete bases. Refer to Section 23 05 00 – COMMON WORK RESULTS FOR HVAC SYSTEMS for additional information.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Standardized Vendor (SV):

1. Automated Logic Controls as installed by Eastern Heating and Cooling Solutions.

B. In other Part 2 articles where specific components are described, the basis of design and named equivalent TCCs integrate multiple manufacturers' components into a coherent system. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified:

1. Armstrong
2. Automated Logic Corporation.
3. Functional Devices Inc.
4. Honeywell International Inc.; Home & Building Control.
5. Invensys Building Systems.
6. Johnson Controls, Inc.; Controls Group.
7. KMC Controls/Kreuter Manufacturing Company.
8. McQuay International.
9. Siemens Building Technologies, Inc.
10. Schneider Electric
11. Solidyne Corp.
12. Staefa Control System Inc.; Siemens Building Technologies, Inc.
13. TAC Americas, INC.
14. TCS/Basys Controls.
15. Tekmar Control Systems, Inc.
16. Teletrol Systems Incorporated.
17. Tour & Andersson Control, Inc.
18. Trane; Worldwide Applied Systems Group
19. Triangle MicroSystems, Inc.
20. Victaulic, Inc.
21. Voltec, Inc.

2.2 GENERAL SYSTEM ARCHITECTURE

A. The EMCS shall consist of the following:

1. Operators' Workstations (OWS).

2. File Server (FS).

3. Network Control Units (NCU).

4. Standalone Control Units (SCU).

5. Application Specific Unitary Controllers (UC).

6. All controls power wiring 120 volts or less, all network and communication wiring, fiber optic cable, and other controls communication media.

7. All EMCS communications devices.

8. All related field devices including remote I/O cabinets, transformers and power supplies, relays, contactors, transducers, switches, cabling, and related electronic control equipment.

9. All necessary software and custom programming, including graphics and reports.

10. All necessary inputs, outputs, and devices required to meet the features and intent described herein including but not limited to:

    a. Transducers.
    b. Water flow switches and sensors.
    c. Differential Pressure sensors.
    d. Hydronic control valves.
    e. Opposed blade (control) or parallel blade (shutoff), low leakage dampers.
    f. Temperature, pressure, and humidity sensors and safety devices.
    g. Electronic valve and damper actuators.

11. All other equipment necessary for a complete, operational, EMCS.

B. The design of the EMCS shall network OWSs, FCs, NCUs, SCUs, UCs, and all sensors, safeties, actuators, and other devices. Inherent in the system's design shall be the ability to expand or modify the network via the Internet, the Level 1 LAN, the Level 2 bus, or via auto e-mail or auto-dial telephone line modem connections, or via a combination of all four networking schemes. LAN communications between buildings shall be standard ETHERNET TCP/IP and shall be compatible with the district’s existing ETHERNET LAN.

C. The EMCS shall:

1. Be modular in nature, with distributed controllers operating in multi-user, multi-tasking environment on token-passing network.

2. Be re-programmable and programmed to control mechanical, electrical, and plumbing systems.

3. Be capable of integrating multiple building functions, equipment supervision and control, alarm management, energy management, historical data collection, and archiving.

4. Permit expansion of both capacity and functionally through the addition of components and programming.

5. Include an operator workstation which permits interface with the network via dynamic color graphics with each mechanical system, building floor plan, and control device depicted by point-and-click graphics.

6. Not be dependent upon any single device for alarm reporting and control execution. Each DDC panel shall operate independently by performing its own specified control, alarm management, operator I/O, and historical data collection. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

D. The system architecture shall consist of no more than two communication levels as follows:

1. Level 1 shall be on the Owner's ETHERNET LAN as possible within the constraints of this specification. Contractor shall field verify extent and capacity of existing LAN with Owner prior to creation of network layout drawings, and shall include any and all extensions of the LAN required for complete and robust functioning of the EMCS:

a. Level 1 communications shall use the BACnet protocol.

b. This LAN operates under ETHERNET protocol at 10 Mbps or other speed as determined by the Owner. The Level 1 LAN will provide transfer of point data, alarms and file activity among OWSs, NCUs, and SCUs.

c. Any data from a Level 2 controller can also be transmitted onto this bus through a Level 1 controller. The high speed LAN shall support multi-user communications and multi-session activity. That is, all global data sharing shall occur simultaneously with the transmission of alarm data or user activity.

d. OWSs and NCUs shall reside directly on the LAN such that communications may be executed directly between controllers, directly between workstations, and between controllers and workstations, on a peer-to-peer basis.

e. SCUs and UCs may reside directly on the Level 1 Lan at the TCCs option.

2. Level 2 shall be on a EIA-485 bus or other comparable technology, designed to support a family of dedicated local controllers for control of HVAC equipment and lighting. The Level 2 bus shall communicate bi-directionally with the Level 1 LAN through NCU controllers for transmission of global data:

a. The Level 2 bus, or field bus, shall support local control units (SCUs and UCs) of modular size for operation of the building's HVAC and lighting systems. This bus shall operate at a minimum speed of 200 kbps with a length of 4000 feet and 10Mbps with a length of 150 feet, with 32 nodes before requiring a network repeater. A minimum of 127 controllers shall be configurable on the field bus.

b. The field bus shall permit peer-to-peer communications among all Level 2 controllers and allow simultaneous communications with portable computer service tools that are connected to a Level 2 controller. Failure of any Level 1 NCU controller shall not impair the operation of its associated field bus.

c. All Level 2 field wiring that connects non native BACnet unitary controllers shall have an additional wiring set run in parallel dedicated for future use by native BACnet replacement controllers.

E. NCUs shall be able to access any data from, or send control commands and alarm reports directly to any other NCU or combination of NCUs on the network without dependence upon a central processing device. NCUs shall also be able to send alarm reports to multiple operator workstations without dependence upon a central processing device.

F. Dynamic Data Access:

1. All operator devices, network resident, internet connected, or connected via dial-up modems, shall have the ability to access all point status and application report data, or execute control functions for any and all other devices via the LAN. Access to data shall be based upon logical identification of building equipment.

2. Access to system data shall not be restricted by the hardware configuration of the EMCS. The hardware configuration of the EMCS network shall be totally transparent to the user when accessing data or developing control programs.

3. All points contained on Level 1 and Level 2 controllers shall be considered global points. Any program in any controller on the network shall be able to reference any point in any controller regardless of its location on the network.

G. General Network Design:

1. Network design shall include the following provisions:

a. Data transfer rate for alarm reporting, report generation from multiple controllers, and upload/download between SCUs and OWSs shall be a minimum of 2.5 Megabaud.

b. Support of any combination of controllers and operator workstations directly connected to the local area network. A minimum of 50 devices shall be supported on a single local area network.

c. Detection and accommodation of single or multiple failures of either OWSs, SCUs, or the network media. The network shall include provisions for automatically reconfiguring itself to allow all operational equipment to perform their designated functions as effectively as possible in the event of single or multiple failures.

d. Message and alarm buffering to prevent information from being lost.

e. Error detection, correction, and re-transmission to guarantee data integrity.

f. Default device definition to prevent loss of alarms or data, and ensure alarms are reported as quickly as possible in the event an operator device does not respond.

g. Commonly available, multiple sourced, networking components and Ethernet protocols shall be used to allow the EMCS to coexist with other networking applications on the Owner's existing LAN/WAN. Ethernet and BACnet are acceptable technologies. BACnet system shall conform to the latest ASHRAE Standards and recommendations.

h. Use of an industry standard IEEE 802.x protocol.

i. Provide synchronization of the real-time clocks in all EMCS panels.

2.3 NETWORK CONTROL UNITS (NCUs)

A. General: Network Control Units shall be microprocessor based, multi-tasking, multi-user, and employ a real time operating system. Each NCU control panel shall consist of modular hardware including power supply, CPU board, and input/output modules. A sufficient number of NCUs shall be supplied to fully meet the requirements of this specification and the controls requirements shown on the drawings.

1. Basis of design NCUs: Schneider Electric Continuum bCX1-CR-xxx with InfbCX1 controller.

B. Webserver Functionality: All NCUs shall reside directly on the Owner's Ethernet TCP/IP LAN/WAN and shall be capable, out-of-the box, to be set up as a Web Server. The NCU shall have the ability to store HTML code and "serve" pages to a web browser. Provides the ability for any computing device utilizing a TCP/IP Ethernet connection and capable of running a standard Internet browser (Microsoft Internet Explorer™, Netscape Navigator™, etc.) to access real-time data from the entire BAS via any NCU.

1. Graphics and text-based web pages shall be constructed using standard HTML code. The interface shall allow the user to choose any of the standard text or graphics-based HTML editors for page creation. It shall also allow the operator to generate custom graphical pages and forms.

2. The WEB server interface shall be capable of password security, including validation of the requesting PC's IP address. The WEB server interface shall allow the sharing of data or information between any controller, process, or network interface (BACnet, LonTalk and TCP/IP) that the BMS has knowledge of, regardless of where the point is connected on the BAS network or where it is acquired from.

3. The BAS network controller must act directly as the WEB server. It must directly generate HTML code to the requesting user (i.e. WEB browser), eliminating the need for and reliance on any PC-based WEB server hardware or software. To simplify graphic image space allocation, HTML graphic images, if desired, shall be stored in any shared network device. The BAS Web server shall have the ability to acquire any necessary graphics using standard pathing syntax within the HTML code mounted within the BAS WEB server. External WEB server hardware and software are not acceptable.

C. Hardware Specifications

1. Memory: A minimum of 4MB of RAM shall be provided for NCUs with expansion up to 8MB. The 8MB versions shall include a floating-point math co-processor.

2. Communication Ports: Each NCU shall provide communication to both the Workstation(s) and the field buses. In addition, each NCU shall have at least three other communications ports that support a telephone modem, portable service tool, serial printer and connection to third party controllers such as a chiller control panel. On a LAN/WAN system, the NCU shall be provided with a 10Mbps plug-in Ethernet TCP/IP network interface card (NIC).

3. Input/Output (I/O): Each NCU shall support the addition of the following types of inputs and outputs:

    a. Digital Inputs for status/alarm contacts
    b. Counter Inputs for summing pulses from meters.
    c. Thermistor inputs for measuring temperatures in space, ducts and thermowells.
    d. Analog inputs for pressure, humidity, flow and position measurements.
    e. Digital Outputs for on/off equipment control.
    f. Analog Outputs for valve and damper position control, and capacity control of primary equipment.

4. Modular Expandability: The system shall employ a modular I/O design to allow easy expansion. Input and output capacity is to be provided through plug-in modules of various types or DIN-mountable IOU modules. It shall be possible to combine I/O modules as desired to meet the I/O requirements for individual control applications.

5. Real Time Clock (RTC): Each NCU shall include a battery-backed, real time clock, accurate to 10 seconds per day. The RTC shall provide the following: time of day, day, month, year, and day of week. In normal operation, the system clock shall be based on the frequency of the AC power. The system shall automatically correct for daylight savings time and leap years and be Year 2000 compliant.

6. Power Supply: The power supply for the NCUs shall be auto sensing, 120-220VAC, 60/50 Hz power, with a tolerance of +/- 20%. Line voltage below the operating range of the system shall be considered outages. The controller shall contain over voltage surge protection, and require no additional AC power signal conditioning. Optionally, if indicated on the drawings, the power supply shall accept an input voltage of (–48 VDC).

7. Automatic Restart After Power Failure: Upon restoration of power after an outage, the NCU shall automatically and without human intervention: update all monitored functions; resume operation based on current, synchronized time and status, and implement special start-up strategies as required.

8. Battery backup: Each NCU with the standard 120-220VAC power supply shall include a programmable DC power backup system rated for a minimum of 72 hours of battery backup to maintain all volatile memory or, a minimum of 2 hours of full UPS including modem power. This power backup system shall be configurable such that at the end of a settable timeframe (such as 1 hour) of running on full UPS, the unit shall shut off full UPS and switch to memory retention-only mode for the remainder of the battery power. The system shall allow the simple addition of more batteries to extend the above minimum battery backup times.

D. Software Specifications

1. General: The NCU shall contain flash ROM as the resident operating system. Application software shall be RAM resident. Application software shall only be limited by the amount of RAM memory. There shall be no restrictions placed on the type of application programs in the system. Each NCU shall be capable of parallel processing, executing all control programs simultaneously. Any program may affect the operation of any other program. Each program shall have the full access of all I/O facilities of the processor. This execution of control function shall not be interrupted due to normal user communications including interrogation, program entry, printout of the program for storage, etc.

2. User Programming Language: The application software shall be user programmable. This includes all strategies, sequences of operation, control algorithms, parameters, and setpoints. The source program shall be English language-based and programmable by the user. The language shall be structured to allow for the easy configuration of control programs, schedules, alarms, reports, telecommunications, local displays, mathematical calculations, passwords, and histories. The language shall be self-documenting. Users shall be able to place comments anywhere in the body of a program. Program listings shall be configurable by the user in logical groupings.

E. Control Software:

1. The NCU shall have the ability to perform the following pre-tested control algorithms:

   a. Proportional, Integral plus Derivative Control (PID)
   b. Two Position Control
   c. Digital Filter
   d. Ratio Calculator
   e. Equipment Cycling Protection

2. Mathematical Functions: Each controller shall be capable of performing basic mathematical functions (+, -, *, /), squares, square roots, exponential, logarithms, Boolean logic statements, or combinations of both. The controllers shall be capable of performing complex logical statements including operators such as >, <, =, and, or, exclusive or, etc. These shall be able to be used in the same equations with the mathematical operators and nested up to five parentheses deep.

3. Energy Management Applications: NCUs shall have the ability to perform any or all of the following energy management routines:

   a. Time of Day Scheduling
   b. Calendar Based Scheduling

c. Holiday Scheduling
d. Temporary Schedule Overrides
e. Optimal Start
f. Optimal Stop
g. Night Setback Control
h. Enthalpy Switchover (Economizer)
i. Peak Demand Limiting
j. Temperature Compensated Duty Cycling
k. CFM Tracking
l. Heating/Cooling Interlock
m. Hot/Cold Deck Reset
n. Free Cooling
o. Hot Water Reset
p. Chilled Water Reset
q. Condenser Water Reset
r. Chiller Sequencing

4. History Logging: Each controller shall be capable of logging any system variable over user defined time intervals ranging from 1 second to 1440 minutes. Any system variables (inputs, outputs, math calculations, flags, etc.) can be logged in history. A maximum of 32,767 values can be stored in each log. Each log can record either the instantaneous, average, minimum or maximum value of the point. Logs can be automatic or manual. Logged data shall be downloadable to the Operator Workstation for long term archiving based upon user-defined time intervals, or manual command.

5. Alarm Management: For each system point, alarms can be created based on high/low limits or conditional expressions. All alarms shall be tested each scan of the NCU and can result in the display of one or more alarm messages or reports.

6. Up to 8 alarms can be configured for each point in the controller.

   a. Messages and reports can be sent to a local terminal, to the front-end workstation(s), or via modem to a remote-computing device.

   b. Alarms shall be generated based on their priority. A minimum of 255 priority levels shall be provided.

   c. If communication with the Operator Workstation is temporarily interrupted, the alarm shall be buffered in the NCU. When communications return, the alarm shall be transmitted to the Operator Workstation if the point is still in the alarm condition.

7. Reporting: The NCU shall be able to generate user-definable reports to a locally connected printer or terminal. The reports shall contain any combination of text and system variables. Report templates shall be able to be created by users in a word processing environment. Reports can be displayed based on any logical condition or through a user command.

2.4 STANDALONE CONTROL UNIT (SCU) PANEL

A. SCUs shall be microprocessor based, multi-tasking, multi-user, real-time digital control processors designed to integrate multiple Unitary Controllers, provide central processing capacity and integration of distributed processing, and interface directly with the system OWS and LAN.

B. Each SCU panel shall consist of modular hardware with plug-in enclosed processors, communication controllers, power supplies, and input/output modules. A sufficient number of controllers shall be supplied to fully meet the requirements of this specification.

C. The basic elements of the direct digital control system structure shall consist of standard components kept in inventory by the equipment supplier. The components shall not require customizing other than setting jumpers and switches, adding firmware modules or software programming to perform required functions.

D. The system shall be capable of being expanded to its full capacity by adding sensors and entering programs in available random access memory (RAM). Future expansion shall not require hardware modifications to the controller.

E. SCU shall be listed in accordance with UL 864 as required to provide direct control of all smoke dampers.

F. Memory: Provide with sufficient memory to meet system performance requirements and support its own operating system, database system, and database including:

1. Control processes
2. Energy management applications
3. Alarm management
4. Historical/trend data for all points
5. Maintenance support applications
6. Custom processors
7. Operator I/O
8. Dial-up communications
9. Manual override monitoring

G. Point Types: Support the following types of point inputs and outputs:

1. Digital inputs for status/alarm contacts
2. Digital output for on/off requirement control
3. Analog inputs for temperature, pressure, humidity, flow and position measurements.
4. Analog outputs for valve and damper position control, and capacity control of primary equipment.
5. Pulse inputs of pulsed contact monitoring.

H. Expandability:

1. The system shall be modular in nature, and shall permit easy expansion through the addition of software applications, workstation hardware, field controllers, sensors, and actuators.

2. The system architecture shall support expansion capacity of all type of SCU panels, and all point types included in the initial installation.

I. Serial Communication Ports: Provide at least two RS-232C serial data communication ports for simultaneous operation of multiple operator I/O devices such a industry standard printers, laptop workstations, PC workstations, and panel mounted or portable Operator's Terminals. SCU panels shall allow temporary use of portable devices without interrupting the normal operation of permanently connected modems, printers, or network terminals.

J. Hardware Override Switches:

1. Provide the ability to manually override automatically executed commands at the SCUs via local, point discrete, onboard hand/off/auto operator override control via local keypad function for binary control points and with modulating control for analog control type points.

K. Hardware Override Monitoring:

1. SCU panel shall monitor the status or position of all override, and include this information in logs and summaries to inform the operator that automatic control has been inhibited. EMCS panel shall also collect override activity information for daily and monthly reports.

L. Local Status Indicator Lamps:

1. The SCU panel shall provide local status indication for each binary input and output for content, up-to-date verification of all point conditions without the need for an operator I/O device.

M. Integrated On-Line Diagnostics:

1. Each SCU panel shall continuously perform self-diagnostics, communication diagnosis, and diagnosis of all subsidiary equipment. The SCU panel shall provide both local and remote annunciation of any detected component failures, or repeated failure to establish communication. Indication of the diagnostic results shall be provided at each SCU panel, and shall not require the connection of an operator I/O device.

N. Sure and Transient Protection:

1. Isolation shall be provided at all network terminations, as well as all field point terminations to suppress induces voltage transient consistent with IEEE Standard 587-1980. Isolation levels shall be sufficiently high as to allow all single wiring to be run in the same conduit as high voltage wiring where acceptable by electrical code.

O. Power failure:

1. In the event of the loss of normal power, there shall be an orderly shutdown of all SCU panels to prevent the loss of database or operating system software. Non-volatile memory shall be incorporated for all critical controller configuration data, and battery back-up shall be provided to support the real-time clock and all volatile memory for a minimum of 72 hours.

2. Upon restoration of normal power, the SCU panel shall automatically resume full operation without manual intervention.

P. No digital control panel shall be loaded to more than 80% of its total available point capacity of the digital/analog/input/output sections.

Q. The SCU shall perform its assigned control and energy management functions as a stand-alone unit. Stand-alone control shall include, but not be limited to:

1. Supply and/or water reset.
2. Adaptive optimal start.
3. Time of day start/stop.
4. Zero energy band.
5. Night purge/warm-up.
6. Duty cycle.
7. Control valve, damper, motor and alarm capabilities.

R. EMCS Shall Operate Within The Following Limits:

1. Temperature 32°F to 120°F.
2. Humidity 0 to 95% RH.
3. Voltage +/- 10%.

S. Control algorithms shall be available and resident in the EMCS to permit proportional, integral, derivative, incremental, floating and two position control modes in combination to meet the need of the application and to adapt to job conditions.

T. Control shall be performed in a digital manner using the digital signal from the microprocessor based controller converted through electronic circuitry for modulation of electric or pneumatic actuators. This may take the form of a pulse width modulated signal or a true analog signal generated through a D/A convertor. Electro-pneumatic transducers used for pneumatic outputs shall be cabinet mounted either within the controller or in separate cabinet located immediately next to the digital control panel.

U. Adjustments of control variables shall be available at the controller with the modem through a non-intelligent terminal. Hand held or mounted in cabinet face. If hand held devices are provided two shall be furnished. These adjustments shall include, but not be limited to, setpoints, proportional gain, integral rates, the velocity and acceleration constants associated with incremental control and on/off values of two-position control.

V. The controller shall contain necessary mathematic, logic, utility functions, all standard energy calculations and control functions in ROM. These should be available in combination for programming the unit. These routines shall include, but not be limited to:

1. Math routines:

a. Basic arithmetic.
b. Binary logic.
c. Relational logic.
d. Fixed formulas for psychrometry.
e. Calculations.

2. Utility routines for:

    a. Process entry and exit.
    b. Keyboard functions.
    c. Variable adjustments and output.
    d. Alarm indication.
    e. Restart.

3. Control routines for:

    a. Signal compensation.
    b. Loop control.
    c. Energy conservation.
    d. Timed programming.

W. Final field programs shall be stored in battery backed up RAM. The EMCS (SCUs, UCs, etc.) shall be supplied with a minimum of eight hours of battery backup for the RAM with an automatic battery charger.

X. The EMCS shall be expandable by adding additional SCUs, UCs, etc., that operate through the processor of the EMCS.

Y. Provide digital sensors, differential air and/or water flow switches, space temperature sensors (30°F to 90°F), outside and air temperature sensors (-30°F to 120°F), hot water temperature sensor (0°F to 300°F), chilled water sensors (30°F to 90°F), humidity sensors, static pressure sensors, and other sensors and switches required to perform functions as specified.

Z. Provide transducers, EP switches, devices, required by the EMCS to position the control elements.

AA. Provide electric and pneumatic interface devices.

BB. The EMCS software shall contain a self-test procedure for checking the annunciator lights on the digital display, and the computer.

CC. Variable shall be identified as being reliable or unreliable. When a calculation is required to use a value (sensed or calculated), which is identified as being unreliable, the unreliable data value will flash. The calculation will use a default value programmed into the unit.

DD. Alarms (e.g. a pump that did not start) and deviation alarms (e.g. temperature out of limits) will be annunciated.

EE. The SCUs, UCs, shall be enclosed in a metal cabinet. The cabinet shall be constructed such that it can be mounted and electrical terminations made during the construction phase of the project.

FF. The EMCS cabinet shall be a hinged metal type with a baked enamel finish and provided with a key lock. Cabinets on each installation shall utilize one master key. Control wiring and system communications shall be electrically terminated inside the EMCS on a suitable termination board.

2.5 CONTROL UNITS

A. Modular, comprising processor board with programmable, nonvolatile, random-access memory; local operator access and display panel; integral interface equipment; and backup power source.

B. Units monitor or control each I/O point; process information; execute commands from other control units, devices, and operator stations; and download from or upload to operator workstation or diagnostic terminal unit.

C. Stand-alone mode control functions operate regardless of network status. Functions include the following:

1. Global communications.
2. Discrete/digital, analog, and pulse I/O.
3. Monitoring, controlling, or addressing data points.
4. Software applications, scheduling, and alarm processing.
5. Testing and developing control algorithms without disrupting field hardware and controlled environment.

D. Standard Application Programs:

1. Electric Control Programs: Demand limiting, duty cycling, automatic time scheduling, start/stop time optimization, night setback/setup, on-off control with differential sequencing, staggered start, antishort cycling, PID control, DDC with fine tuning, and trend logging.

2. HVAC Control Programs: Optimal run time, supply-air reset, and enthalpy switchover.

3. Chiller Control Programs: Control function of condenser-water reset, chilled-water reset, and equipment sequencing.

4. Programming Application Features: Include trend point; alarm processing and messaging; weekly, monthly, and annual scheduling; energy calculations; run-time totalization; and security access.

5. Remote communications.

6. Maintenance management.

7. Units of Measure: Inch-pound and SI (metric).

E. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.

F. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.

2.6 LOCAL CONTROL UNITS

A. Modular, comprising processor board with electronically programmable, nonvolatile, read-only memory; and backup power source.

B. Units monitor or control each I/O point, process information, and download from or upload to operator workstation or diagnostic terminal unit.

C. Stand-alone mode control functions operate regardless of network status. Functions include the following

1. Global communications.
2. Discrete/digital, analog, and pulse I/O.
3. Monitoring, controlling, or addressing data points.

D. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.

E. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.

2.7 I/O INTERFACE

A. Hardwired inputs and outputs may tie into system through controllers. Protect points so that shorting will cause no damage to controllers.

B. Binary Inputs: Allow monitoring of on-off signals without external power.

C. Pulse Accumulation Inputs: Accept up to 10 pulses per second.

D. Analog Inputs: Allow monitoring of low-voltage (0- to 10-V dc), current (4 to 20 mA), or resistance signals.

E. Binary Outputs: Provide on-off or pulsed low-voltage signal, selectable for normally open or normally closed operation.

F. Analog Outputs: Provide modulating signal, either low voltage (0- to 10-V dc) or current (4 to 20 mA) with status lights, two-position (auto-manual) switch, and manually adjustable potentiometer.

G. Tri-State Outputs: Provide two coordinated binary outputs for control of three-point, floating-type electronic actuators.

H. Universal I/Os: Provide software selectable binary or analog outputs.

2.8 POWER SUPPLIES

A. Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply shall match output current and voltage requirements and be full-wave rectifier type with the following:

1. Output ripple of 5.0 mV maximum peak to peak.
2. Combined 1 percent line and load regulation with 100-mic.sec. response time for 50 percent load changes.

3. Built-in overvoltage and overcurrent protection and be able to withstand 150 percent overload for at least 3 seconds without failure.

B. Power Line Filtering: Internal or external transient voltage and surge suppression for workstations or controllers with the following:

1. Minimum dielectric strength of 1000 V.
2. Maximum response time of 10 nanoseconds.
3. Minimum transverse-mode noise attenuation of 65 dB.
4. Minimum common-mode noise attenuation of 150 dB at 40 to 100 Hz.

2.9 UNITARY CONTROLLERS

A. Unitized, capable of stand-alone operation with sufficient memory to support its operating system, database, and programming requirements, and with sufficient I/O capacity for the application.

1. Configuration: Local keypad and display; diagnostic LEDs for power, communication, and processor; wiring termination to terminal strip or card connected with ribbon cable; memory with bios; and 72-hour battery backup.

2. Operating System: Manage I/O communication to allow distributed controllers to share real and virtual object information and allow central monitoring and alarms. Perform scheduling with real-time clock. Perform automatic system diagnostics; monitor system and report failures.

3. ASHRAE 135 Compliance: Communicate using read (execute and initiate) and write (execute and initiate) property services defined in ASHRAE 135. Reside on network using MS/TP datalink/physical layer protocol and have service communication port for connection to diagnostic terminal unit.

4. Enclosure: Dustproof rated for operation at 32 to 120 deg F.

2.10 ANALOG CONTROLLERS

A. Step Controllers: 6- or 10-stage type, with heavy-duty switching rated to handle loads and operated by electric motor.

B. Electric, Outdoor-Reset Controllers: Remote-bulb or bimetal rod-and-tube type, proportioning action with adjustable throttling range, adjustable set point, scale range minus 10 to plus 70 deg F, and single- or double-pole contacts.

C. Electronic Controllers: Wheatstone-bridge-amplifier type, in steel enclosure with provision for remote-resistance readjustment. Identify adjustments on controllers, including proportional band and authority.

1. Single controllers can be integral with control motor if provided with accessible control readjustment potentiometer.

2.11 ELECTRONIC SENSORS

A. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.

B. Current Transducer:

1. Solid or split core self powered analog current transducer slips over power wiring to provide combination load status and power use trending data.

a. Linear output from 0 to full scale.
b. 0-5Vdc output
c. Operating conditions: -15-60 deg C, 0-95%rh.
d. 2 second response time
e. Use solid core for new applications, split core for retrofits away from terminals.
f. Split core +/- 2% of full scale accuracy from 10% to 100%.
g. Solid core +/- 2% of reading accuracy from 10% to 100%.
h. Similar to Hawkeye 722, 922/932, size and range as required for load.

C. Status Sensors:

1. Power Monitor: 3-phase type with disconnect/shorting switch assembly, listed voltage and current transformers, with pulse kilowatt hour output and 4- to 20-mA kW output, with maximum 2 percent error at 1.0 power factor and 2.5 percent error at 0.5 power factor.

D. Temperature Sensors:

1. Temperature sensors shall be:

a. Platinum wound RTD Type $\pm$ 1°F. Factory calibration point - 70°F at 1000 OHMS or 0°C at 1000 OHMS. Adjustments for zero and span. Output 4-20 mA.

Or (for non averaging sensors)

b. Contractor may use thermistors which are compatible with system as follows:

1) Accurate to 0.35°F over a range of -40° to 240°F,
2) Noncalibrated devices, accuracy traceable to NBS testing,
3) Guaranteed stability of 0.2°F over a 15 year period,
4) Interchangable with any other in the new system, and
5) Shielded cable not require for the guaranteed performance.

2. Room element assemblies shall be located in conditions representative of the zone, on an interior wall where air is free to circulate around the element but away from non-representative air conditions such as drafts or heat radiation. Mount the assembly 5 feet above the floor on a standard electrical wallbox, or as otherwise directed or required to obtain satisfactory results. A mounting bracket, wallplate, decorative cover and tamper resistant screens shall be furnished with the assembly. May be S.S. wall plate type where applicable.

3. Liquid temperature sensors shall be mounted in separable brass immersion wells with 1/2" - 14 NPT threads, filled with "Insulgrease" or other approved heat transfer compound. Monitoring range to suit conditions. Well and spring loading device to assure RTD contact with end of sensing well. Whenever a sensing element and well are installed in a chilled water line, plumber's putty or some other suitable sealant shall be applied around the adapter as well as the point where the two sensors leads pass through the adapter. This is to prevent condensation of moisture in the well and failure of the element. Minimum well length to be equal to 1/2 of the pipe diameter; match bulb length to well length.

4. Battery powered “wireless communicating” sensors which use batteries as the source of power for transmission and communication of data are not acceptable.

2.12 HVAC PROCESS FLOW CONTROL COMPONENTS

A. Automatic Air Dampers (AAD on drawings):

1. Provide all automatic dampers except those specified as being furnished by equipment manufacturer. Automatic dampers are required at all exterior wall and roof openings serving a HVAC purpose which are provided or modified as a part of this project, whether or not called for on the drawings. Control dampers to operate with sequence described later or as directed.

2. Where damper is separating outside air from the conditioned space with no intervening air handler, for example relief air and exhaust fan dampers with short connected duct runs only, and additionally where called for on the drawings with the designation “TB AAD”, provide automatic dampers of thermally broken insulated construction design as described herein. Single thickness blades are permitted where they are in series with air handler dampers.

3. Size dampers at full duct or damper size indicated on the drawings, arranged for flanged to duct rather than inserted in duct installation (clear damper opening, not outside of frame, equal to duct size indicated). If neither duct or damper size is indicated; size for maximum velocity of 1500 fpm and maximum pressure drop including transitions to and from duct 0.05 in w.g.

4. Materials:

   a. General-service dampers not covered by the below restrictions, in galvanized steel ductwork, may be of galvanized steel construction.
   b. Dampers in aluminum ductwork: aluminum or stainless steel.
   c. Dampers subject to corrosive fumes: stainless steel of a type resistant to the fumes.

5. Overall Construction:

   a. Damper frames fabricated of extruded aluminum sections or formed steel, with reinforced corner bracing, suitable for flange mounting to duct. Seal any and all gaps at frame joints to maintain airtight integrity of ductwork.

1) Where flanged to duct mounting is not possible due to space restrictions or where Owner prefers access from inside duct, propose slip in style dampers on a case by case basis in damper submittal along with individual rationale for frame style selection.

b. Provide extruded aluminum airfoil construction for dampers modulating outside and return airflow, isolating lead/lag blowers, those operating on systems with over 2" water column potential close off pressure, and those operating over 1500 fpm.

c. Fasten aluminum frames with approved stainless steel fasteners, separated from dissimilar metal casing by dielectric gasketing.

d. Damper blades not more than 8" in width.

e. Mount blades on electroplated square or hexagonal steel shafting operating in stainless steel, bronze, or approved polymer sleeve bearings.

f. Provide corrosion resistant linkage and actuator mounting compatible with the damper materials and service, concealed in the frame outside of the airstream for flanged to duct applications and mounted in the airstream for slip in construction.

g. Provide parallel blade operation for all two position dampers, and opposed blade operation for modulating dampers, with exception of face and bypass dampers which shall be made up of two sections of parallel blade dampers with the blades of one damper opposed to the blades of the other for proper mixing.

h. Dampers over 48 in. in length and height shall be made into multiple sections.

i. Dampers shall be capable of sequencing as required.

j. Provide AMCA Standard 511 certified class 1A leakage dampers, with maximum leakage not exceeding 3 cfm per square foot at 1 inch water gage pressure differential, or 8 cfm per square foot at 4 inches water gage pressure differential when held in the closed position with a torque of no more than 6 inch pounds per sq. ft.

k. Temperature range shall be suitable for the intended service.

6. Galvanized Formed Blade Construction Dampers:

a. Frame of 16 gauge galvanized hat shaped channel.
b. Blades of single thickness 16 gauge interlocking formed galvanized steel.
c. Neoprene blade seals, and neoprene or compressible spring steel jamb seals.
d. Design make: Arrow Series 395.

7. Extruded Aluminum Airfoil Construction Dampers:

a. Frames and airfoil blades of extruded aluminum construction.
b. Extruded polymer dampers seals with airstream inflatable double edges, mechanically locked in extruded blade slots, and easily field replaceable.

c. Blades jamb seals compressible spring stainless steel.
d. Design make: Ruskin Model CD-50 or equal.

B. Valves:

1. Valve Types:

a. Ball valves – full port for two position on/off service, with characterizing disc for modulating service.
b. Butterfly valves - two-position on/off service or for use in modulating service where specifically called out as such on drawings.
c. Globe valves - modulating service.

2. Valve Bodies:

a. Screwed bronze bodies (2" size and smaller).

b. Flanged iron bodies (larger than 2" size).

c. Ball valves shall be of two piece full port stainless steel ball and stem design similar to those described in SECTION 23 05 23 but with reinforced actuator duty stems, adapters, and electronic actuators.

d. Butterfly valves shall be similar to those described in SECTION 23 05 23 with reinforced actuator duty stems, adapters, and actuators.

e. Globe valves shall have characteristic type throttling plug, #316 stainless steel or Monel stem, and removable composition seats, tight closing to class 4 standard minimum. Provided with necessary features to operate in sequence with other valves or damper operators and adjustable throttling range.

f. Two or three way as required.

g. Designed for 125 psi operating pressure.

h. Arrange to spring return to fail-safe position as called for, quiet operating.

3. Two position valves to be full line size unless otherwise indicated. Modulating water control valves shall be sized on the basis of the smaller of 15% of the total system pressure drop or 8 ft. of water column pressure drop, based on the system design flowrates. Include valve pressure drops in submittal for review. Tag each valve before delivery to project site with scheduled valve identification for location and service.

4. Provide valves and actuation so valves fail safe in normally open or closed positions as required to provide freeze, humidity, force, temperature, etc. protection. Fail position choice shall be submitted for review.

5. Select two-way modulating valves to have equal percentage characteristics.

C. Actuators:

1. Electronic actuators:

a. Electronic actuators shall be motor driven with cast aluminum enclosure, with completely oil-immersed metal gear trains, sealed integral spiral spring return mechanism, force sensor safety stop, and shall have torque as needed to insure positive movement against system stall pressure. Furnish entire mechanism in housings designed for easy removal for service or adjustment.

b. Size each actuator motor to operate with sufficient reserve power to provide smooth modulating or 2-position action as specified.

c. Provide permanent split-capacitor, shaded pole, or synchronous motors with gear trains completely oil-immersed and sealed.

d. Equip motors for outdoor locations and for outside air intakes with "0 ring" gaskets designed to make motors completely weatherproof, and equip with internal heaters to permit normal operation at -40 deg F (-40 deg C).

e. All actuators for exterior use shall be electronic style and shall have NEMA 4 enclosures with a rain shield covering the valve stem and entire actuator housing.

f. Damper actuators shall be direct-coupled over the damper shaft, and shall be installed without connecting linkage where possible.

1) Where linkages are required, for example with multiple section dampers or dampers where actuator must be installed in the air-stream, provide with linkage furnished by the damper manufacturer and designed for the actuator being used.

g. Ball and Butterfly valve actuators shall be direct-coupled over the valve shaft, installed without connecting linkage.

1) Globe valve actuators shall have a rack and pinion linkage provided by the valve manufacturer and designed for the actuator being used.

h. The actuator shall have electronic overload and digital rotation sensing to prevent damage to the actuator through the entire rotation range of the actuator.

i. Actuators shall be capable of both clockwise and counter clockwise motion by changing mounting orientation.

j. Provide proportional actuators for modulating services that accept a 0 to 10 VDC or 4 to 20mA control input and provide a 2 to 10 VDC or a 4 to 20mA operating range. An actuator capable of accepting a pulse width modulated / floating point control signal and providing full proportional operation is only acceptable for hydronic valve services where there is no connection to outside air.

k. All 24 VAC/DC actuators shall operate on Class 2 wiring and shall not require more than 10 VA for AC or more than 8 watts for DC applications. Actuators operating on 120VAC power shall not require more than 10VA. Actuators operating on 230VAC power shall not require more than 11VA.

l. All actuators shall have an external manual gear release and actuators with more than 60 in-lb torque capacity shall have a manual crank to allow manual positioning when the actuator is not powered.

m. All modulating actuators shall have an external, built-in switch to allow the reversing of direction of rotation.

n. Actuators shall be provided with a conduit fitting and minimum three foot electrical cable and shall be pre-wired to eliminate the necessity of opening the actuator housing to make electrical connections.

o. Actuators shall be UL Standard 873 listed and CSA Class 4813 02 certified as meeting correct safety requirements.

p. Actuators shall be designed for a minimum of 60,000 full stroke cycles at the actuators rated torque and shall have a minimum 2-year manufacturer's warranty, starting from the date of installation.

q. Design make: TAC-I/A *DuraDrive* series and Belimo models as required by torque.

2.13 MISCELLANEOUS DEVICES

A. Provide all necessary relays, controllers, accumulators, positioners, switches, solenoids, transformers, temperature sensors, and transducers for a complete system.

B. Locate these devices on local panel unless specified otherwise.

C. Wiring:

1. Controls power wiring: Provide wiring in accordance with requirements of Section 23 05 13 , Division 26, and the National Electrical Code.

2. Controls communications and data cabling:

a. Provide plenum rated cables, in full accordance with the requirements of Divisions 26 (Electrical) and 27 (Communication).

b. Provide cabling as recommended in writing by the controls manufacturer for optimized communications, similar to:

1) 22AWG single twisted pair, low capacitance (12.5pF/ft), shielded or unshielded plenum rated cable for low voltage communications.
2) 18AWG single twisted pair, low resistance (6mW/ft), shielded plenum rated cable.

3. Controls communications and data fiber optic cabling: Provide in accordance with the stricter of the requirements of Divisions 26, 27, and the written recommendations of the manufacturer of the equipment served.

4. Where additional wire to wire terminations are required beyond end device and controller termination strips, make connections using NEMA rated termination blocks with barrier isolated strip/screw or tube/screw connections, all labeled for current function. Flying splices not permitted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine conditions under which materials and methods are to be installed and notify Architect in writing of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected in acceptable manner.

1. Installation indicates conditions are acceptable to Contractor as required to ensure requirements for applicable warranty or guarantee can be satisfied.

2. Electrical Wiring: Check all electrical wiring associated with equipment for compliance with specifications and correctness of connections. Correct wiring in event equipment or devices fail to function in specified manner, whether due to incorrect connections or improper information and wiring diagrams.

3. Verify that conditioned power supply is available to control units and operator workstation as required.

3.2 WORK INCLUDED

A. Provide all labor, materials, equipment, and services required for the complete removal of all existing controls components being replaced or upgraded as a part of this project or which serve equipment being removed as a part of this contract.

1. Insure that controls for areas outside of this contract's work remain intact and functional. Report any existing problems with functionality before demolition. New problem areas not otherwise a part of this scope that result from this demolition work: rebuild original functionality or upgrade to be included in the new controls.

B. Provide all labor, materials, equipment, and services required for the complete EMCS installation, including Related Work, as required in the Contract Documents. Provide all programming labor required for creating the specified sequences of operation and associated graphics. Include labor required for integrating any software and programming enhancements made both during construction and commissioning and during the warrantee period. Include labor for any programming modifications required due to special circumstances not adequately described in the written sequences of operations, as required to control systems operation as intended.

C. Provide all controls wiring required to connect devices furnished as part of or adjunctive to this EMCS regardless of the source of supply. Provide connections to Owner's LAN, WAN, telephone, and internet as required to perform controls work. Coordinate all fiber optic, telecommunications, and other electrical connections with Owner.

D. Provide power wiring for controls requiring connection to AC power. Control circuits to be 120 vac maximum. Install wiring in accordance with requirements of SECTION 23 05 13 - COMMON ELECTRICAL REQUIREMENTS FOR HVAC EQUIPMENT, Division 26, and the National Electrical Code. Provide actuator power wiring to all automatic dampers including fire/smoke dampers. Coordinate required relays, etc.. with fire alarm system control wiring by Division 28.

E. Provide all necessary devices required for proper system operation, including special electrical switches, conditioned power supplies, transformers, disconnect switches, relays, circuit breaker protection, as required.

F. Provide all controllers, actuators, sensors, etc. as specified later herein, and as required to meet the specified sequence of operation.

G. Furnish all valves, control wells, and dampers to Contractor responsible for their installation, as specified and as required to meet the sequence of operation.

H. Provide interface connections from EMCS hardware to equipment starting circuits, alarms, etc.

I. The system shall include all accessory equipment and electrical wiring to fulfill the intent of this specification, including all control and communications components required to interface with the Owner's Ethernet LAN, forming a complete and interoperable system.

J. Each portion of the District EMCS system as described above shall include all gateways, translators, interpreters, software, programming, or other accessory devices as required to achieve BACnet communications over the LAN.

3.3 INSTALLATION

A. System shall be installed and adjusted by trained mechanics and technicians, with a demonstrated experience of not less than (5) years, in the installation, adjustment, and repair of temperature control systems.

B. Install software in control units and operator workstation(s). Implement all features of programs to specified requirements and as appropriate to sequence of operation.

C. Connect and configure equipment and software to achieve sequence of operation specified.

D. Install labels and nameplates to identify control components according to Division 23 Section "Identification for HVAC Components."

E. Install hydronic instrument wells, valves, and other accessories according to Division 23 Section "Hydronic Piping."

3.4 SYSTEM COMPONENTS

A. Current Transducer: As required; install per manufacturer's written instructions.

B. Temperature Sensors: Install per manufacturer's written instructions, in locations representative of the controlled spaces' temperature as required for proper control. Include proposed sensor locations in wiring diagram submittal.

1. Provide room temperature sensors for all spaces where thermostats are not specifically called for, as required to properly and individually control all building mechanical HVAC and domestic hot water equipment in accordance with the sequence of operation. For large spaces, provide at least one room sensor per 2000 square feet, in locations representative of the room's various exposures and internal loads.

2. Temperature Sensor with Guard: Provide sensor with guard (preferably S.S. wall plate sensor) wherever temperature sensor is called for in publicly accessed spaces similar to corridors, vestibules, lobbies, stairwells, cafeteria, gymnasium, auditorium, etc..

3. Duct and pipe temperature sensors: Provide as shown on the controls schematics and as required to properly control per the written sequence of operations.

C. Automatic Dampers: Furnish dampers, tagged for proper location, (with multiple section damper linkages). Install per manufacturer's printed instructions. Adjust to close tightly. Allow for conduit sleeve or blank space for roof fan dampers.

D. Valves: Install with union or flanged connection. Locate close to apparatus controlled with pipe reducers and increasers located adjacent to valve. Locate, arrange, and pipe per installation diagram in an upright position (stem vertical).

E. Actuators: Install per manufacturer's printed instructions as to motor size and quantity, linkage arrangement, drive connection point. Where ducts or valves are insulated, set damper operators at least 2 in. away from equipment to allow for insulation.

F. Miscellaneous Devices: As required; install per manufacturer's written instructions.

3.5 ELECTRICAL WIRING AND CONNECTION INSTALLATION

A. Install raceways, boxes, and cabinets according to Division 26 Section "Raceway and Boxes for Electrical Systems."

B. Install building wire and cable according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

C. Install signal and communication cable according to Division 27 Section "Communications Horizontal Cabling."

1. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
2. Install exposed cable in raceway.
3. Install concealed cable in raceway.

4. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
5. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
6. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.
7. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.

D. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.

E. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

3.6 SYSTEM SOFTWARE

A. Provide completely installed and ready for use.

B. System Configuration and Definition:

1. All temperature and equipment control strategies and energy management routines shall be definable by the operator. System definition and modification procedures shall not interfere with normal system operation and control.

2. The system shall be provided complete with all equipment and documentation necessary to allow an operator to independently add, delete, or modify the following:

a. SCUs.
b. OWSs.
c. UCs.
d. Points of any type, and all associated point parameters and using constants.
e. Alarm reporting definition for each point.
f. Control loops.
g. Energy management applications.
h. Time and calendar based programming.
i. Totalization for every point.
j. Historical data trending for every point.
k. Custom control processes.
l. All graphic displays, symbols, and cross references to point data.
m. Dial-up telecommunication definition.
n. All operator passwords.
o. Alarm messages.

3. System Definition/control Sequence Documentation: All portions of system definition shall be self documenting to provide hard copy printouts of all configuration and application data. Control process and EMCS control loop documentation shall be provided in logical, graphical flow diagram format to allow control sequence to be easily interpreted and modified at any time in the future.

4. Database Save/Restore/Back-Up: Back-up copies of all standalone EMCS panel databases shall be stored in at least one personal computer operator workstation, and a secure electronic copy of the original complete database setup shall be stored at the offices of the TCS, available for the Owner's use.

5. Continuous supervision of the integrity of all EMCS panel databases shall be provided. In the event that any EMCS panel on the network experiences a loss of its databases for any reason, the system shall automatically download a new copy of the respective database to restore proper operations. Database back-up/download shall occur over the local area network without operator intervention. Users shall also have the ability to manually execute downloads of any or all portions of an EMCS panel database.

3.7 SCU PANEL LOCAL OR PORTABLE OPERATOR'S TERMINALS

A. Each EMCS panel shall be capable of supporting an operator's terminal for local command entry, instantaneous and historical data display, and program additions and modifications.

1. There shall be a provision for both permanently mounting the standalone EMCS panel operator terminal, or using it as a portable hand held unit.

2. The EMCS panel operator terminal shall simultaneously display a minimum of 6 points with full English identification to allow an operator to view single screen dynamic displays depicting entire mechanical systems.

3. The operator functions provided by the EMCS panel operator terminal shall include, but not be limited to, the following:

   a. Start and stop points
   b. Modify setpoints
   c. Modify PID loop setpoints
   d. Override PID control
   e. Change time/date
   f. Add/modify start/stop weekly scheduling
   g. Add/modify setpoint weekly scheduling
   h. Enter temporary override schedules
   i. Define holiday schedules
   j. View analog limits
   k. Enter/modify analog warning limits
   l. Enter/modify analog alarm limits
   m. Enter/modify analog differentials
   n. Viewpoint history files

4. The EMCS panel operator terminal shall provide access to all real or calculated points in the controller to which it is connected, or any other controller in the network. This capability shall not be restricted to a subset of predefined "global points", but shall provide totally open exchange of data between the operator terminal and any EMCS panel in the network.

5. Operator access at all EMCS panel operator terminals shall be identical to each other, as well as identical to the PC or Laptop operator workstations. Any password changes shall automatically be downloaded to all controllers on the network.

6. The EMCS operator terminal shall provide English language prompting to eliminate the need for the user to remember command formats of point named. Prompting shall be provided consistent with a user's password clearance and the types of points being displayed, to eliminate the possibility of operator error.

7. A multifunction touch pad shall be provided for point and command selection, as well as parameter entry. To minimize the possibility of operator error, the EMCS panel operator terminal shall change the limit touch pad functions based upon an operator's password clearance, the function being performed, and types of points being displayed. Screen displays shall clearly indicate only valid touch pad functions.

8. Context Sensitive Help: On-line, interactive user's "Help" manuals and tutorials shall be provided. Based upon operator request, the "Help" function shall provide general system operating instructions and specific descriptions of commands available in the currently displayed menus.

9. Identification for all real or calculated points shall be consistent for all network devices. The same English language names used at PC workstations shall be used to access points at the EMCS panel operator's terminal to eliminate cross reference or look up tables.

10. In addition to instantaneous summaries, the EMCS panel operator's terminal shall allow a user to view a point history file for system points. Point history files shall provide a record of value of analog points over the last 24 hours, at 30 minute intervals, or a record of the last ten status changes for binary type points.

3.8 GENERAL CONTROLS SYSTEM PROGRAMMING DESCRIPTION

A. Provide color graphic floor plan displays and system schematics detailing all mechanical and electrical systems as indicated in the sequence of operations, at least one for each system and piece of mechanical equipment, including air handling systems, chilled water systems, and heating systems. Create displays to represent logical grouping of system points or calculated data based upon building function, and mechanical system points which aid the operator in the analysis of the facility. The operator shall be able to view and control these systems via graphical and text-based displays and controls.

1. Provide access to the various system schematic and floor plan graphics via any and all of mouse driven graphical penetration scheme, menu selection, “file tree” organization, or text based commands.

    a. Graphical menu penetration: locate and display systems graphics via a mouse driven procedure, designed and implemented to optimize performance analysis and speed alarm recognition. Five clicks maximum from whole district map to details of critical alarm via this route.

1) Whole District Map: Include each building shown as an active link; point and click to go to building. Display any building with (Owner defined, TCS implemented) alarms present as highlighted for rapid system review and diagnosis. Include at least three levels of alarm to facilitate prioritizing; each level shall be obvious and visually distinct. The most critical alarm in any building shall define the alarm level of that entire building in this graphic.

2) Main Building Display: Include a full floor key plan of each floor, broken into areas of detailed floor plans, with similar active point/click penetration scheme and highlighted alarm areas.

3) Detailed Floor Plans: Indicate the location of mechanical equipment (boilers, chiller, air handlers, duct and reheat / VAV systems, pumps and pumping systems, metering equip. etc.) and electrical equipment (switch gear, lighting, etc.) on the detailed floor plans. Highlight any systems when in alarm. Outline limits of each control zone (typically along walls, etc..) and provide active multicolored background for each zone. Zone background color shall change with space temperature deviation from setpoint, with a minimum of 8 background colors, colors to be distinct from alarm highlight colors.

4) System Specific Graphics: Provide pictorial schematically correct representations of each and every mechanical system controlled and/or monitored. Include all associated points, digital status, analog values, appropriate and/or significant calculated values, alarms, active adjustment of all user adjustable setpoints, links to all scheduling, trend logs, sequence of operations description, associated systems schematics in appropriate locations, etc. Include plain English descriptions of each active point / link shown. Include appropriate plain English warnings for alarms. Modify as required by Owner and Engineer during system review, start-up, and commissioning.

b. Menu and text based penetration: An operator request for information about a specific system shall cause the associated graphic display to be automatically selected and output on the viewing screen. The operator request may be entered via either the graphical menu penetration procedure or via a pull down directory tree style menu system with “specific building”, “specific mechanical room”, and “specific system” levels of identification. The pull down menu system shall cause the graphical menu system to be updated.

B. Graphic Representations

1. General: The program shall allow the operator to generate color graphics on-line using standard symbols selected from a standard library of symbols.

2. Provide customized graphics with dynamic point values and set points. Graphics shall include but not be limited to:

a. Each third party microprocessor controlled system with all points available.

b. Heating Hot Water System with heat injection systems, primary hot water system, secondary hot water systems, 3-ways, 2-ways, etc.

c. Air Handling Units, air and water sides, with coil pumps, zones, etc.

d. Floor Plans - The operator interface shall allow the user to access the various graphical schematics via a graphical penetration scheme of the floor plans. Minimum breakdown shall include:

1) Whole District map, showing all buildings.
2) Key plan of each building.
3) Floor plans of each building with zoom in capability.

C. Time Schedule Programs

1. The programs for the EMS shall schedule each system's operation on an hourly basis controlled through daily, weekly and/or monthly schedules. Schedules for each individual system, room or area shall be programmed and modified by the user on a calendar-like display at the OWS.

2. The programs shall store 60 months of schedules.

3. An internal time clock shall automatically compensate for daylight savings time and calendars generated by software shall automatically compensate for leap years.

D. Trend Logs:

1. Provide customized trend log reports with up to twenty variables per report for each HVAC system. Points shall be assignable at the OWS; coordinate desired points on each log with Owner during training and commissioning. Archive trended values on the system hard disk for future inquiry, with back up copies automatically prompted for and generated on removable media.

E. Alarm Points

1. All temperature inputs to the DDC system (space, return air, mixed air, discharge air, supply and return water, boiler and cooling systems) shall be alarmed at the host computer if the temperature is out of range 10 deg. F (adj.) above or below setpoint.

2. Fan status shall be monitored by analog current sensing devices or differential pressure switch. If the fan is scheduled to run and the status is not proven, an alarm condition shall be shown at the host computer.

3. Pump status shall be monitored by analog current sensing devices. If the pump is scheduled to run and the status is not proven, an alarm condition shall be shown at the host computer.

4. All alarm points of any stand alone controllers such as boiler burner controls, chiller or condensing unit controls, etc.., shall be monitored.

5. For all alarms, provide appropriate text and graphical annunciation to facilitate ease of understanding of source and location of problem. Coordinate annunciation with Engineer, equipment manufacturers, and Owner’s representatives.

F. Optimum Start Program

1. The building shall initially be brought to occupied temperature through an optimal start program. This program shall gradually increase space temperature requirements over a predetermined time to not only bring the building to required temperature but also soft start building mechanical equipment.

2. Each system shall have an independent modular program.

3. The program shall minimize the total energy consumption during daily start-up of each heating/cooling system.

4. A control algorithm shall compare the outside air temperature to space temperature and historical startup data to calculate a start time for each air handling system.

5. The start time for each system shall bring its respective zone to occupied setpoint at the time of occupied mode start.

6. The optimum start program shall be adjustable to the rate structure of the local energy company.

G. Optimum Stop Program

1. Each system shall have independent modular program.
2. The program shall minimize the total energy consumption during daily shut-down of each heating/cooling system.
3. A control algorithm shall compare the outside air temperature to space temperature to calculate a stop time for each air handling system.
4. The stop time for each system shall shut-down its respective zone as early as possible without letting the temperature drift out of the specified comfort range.
5. Minimum outside air ventilation shall be maintained where required by occupied status requirements of space served.

H. Smoke Dampers And Fire/Fan Shut Down

1. When fire alarm condition is initiated, the fire alarm system shall directly cause all fans 1000 cfm and larger to shut down and shall provide a signal to the EMCS to note fire alarm condition.

2. When fire alarm condition signal is received from the fire alarm system, initiate the following sequence:

   a. Cause all building fans 1000 cfm and larger to shut down. This is in addition to the direct shutdown caused by the fire alarm system.

      1) Allow variable speed drives to ramp down and ramp up on restart.

   b. Cause all smoke dampers and fire-smoke dampers to close and remain closed for the duration of the alarm condition. Delay closing smoke dampers until associated fan system has completely stopped (10 sec. Maximum).

c. Do not permit unrelated HVAC equipment (heating valves, pumps, etc..) in building to lose control.

d. Provide separate control wiring, connections to fire alarm system, all required smoke dampers, etc.., as required to accomplish the required sequence.

e. Upon termination of the fire alarm condition as indicated by a signal from the fire alarm system, cause all automatic fire/smoke dampers to open and prove open, then return all affected fans to their normally scheduled operation using the demand limiting staggered start algorithm.

I. Day/night Setback

1. The day/night setback will consist of lowering the space heating setpoint and raising the space cooling setpoint during the unoccupied mode, thereby reducing the heating and cooling energy requirements. The occupied and unoccupied areas will be specified by the owner and will be coordinated with the control system.

J. Economizer Cooling Cycle

1. The controls shall incorporate an enthalpy logic center with outdoor and return air temperature and humidity sensors that shall maximize the use of outdoor air for cooling before the mechanical cooling is energized and during operation through comparison of outdoor and return air enthalpy as follows. Note that multiple outdoor temperature conditions will be present at different outside air intake locations, and as such a comparable number of outside air sensors are required. Some mechanical systems may share a single outdoor air enthalpy center, for example adjacent UVs each facing east, providing the outdoor air conditions can be demonstrated to be virtually identical from an energy management perspective. Provide at minimum East, West, South, North, and Rooftop outdoor air sensors.

2. When the outdoor air enthalpy is less than the return air enthalpy during cooling mode, the logic circuitry shall cause the outdoor and return air dampers to modulate to the balanced outdoor air position that satisfies the critical space temperature transmitter set point before opening the system chilled water cooling valve.

3. If the outdoor air enthalpy is less than the return air enthalpy and the critical space temperature transmitter set point cannot be satisfied with 100% outside air, then the system shall circulate 100% outside air and the cooling water valve shall modulate open to satisfy the zone temperature requirements.

4. If the enthalpy sensors indicate that the return air has lower enthalpy than the outdoor air, then the system shall revert to normal cooling mode.

5. Upon a call for cooling to maintain the night setback temperature, only the economizer mode shall be operational. The chilled water control valve shall not be opened, and upon satisfying the space temperature transmitter night setback set point, the system shall revert to the normal unoccupied mode.

K. Maintenance Management: Continuously totalize run hours for equipment controlled and/or monitored for use by the maintenance management program.

L. Equipment Scheduling

1. Equipment shall be capable of 7 days, 24 hours schedules with separate holiday hours.
2. There shall be capability for five different holiday schedules which can be selected from the occupancy schedule graphic.
3. Holidays shall be programmed so that they shall need a minimum of manual adjustment year to year and can easily be modified at front end if necessary.
4. All schedule programming shall reside in local controllers, but shall be configurable from the front end.

M. Coil Freeze Protection.

1. Heating and cooling coils and any other equipment provided as a part of this project which are circulating water (not required for glycol coils) or are otherwise subject to water freeze damage, subject to the following, that have any percentage of unheated outside air entering them, shall have coil freeze protection.

2. Mixed outside and return air and the preconditioned discharge air from air to air energy recovery units shall be considered unheated for this purpose.

3. The first stage of coil freeze protection shall incorporate analog input temperature sensing at the expected freeze location. Sensing devices may be immersion style return water temperature sensor piped as close as practical to the outlet of the coil (within the rooftop unit if applicable), surface temperature sensors on the coil surface at the expected freeze location, or other comparable devices approved as applicable to the circumstances. Include details of freeze protection scheme for all such equipment in submittal. When the sensed temperature is above 60ºF (adj.), the coil control valve shall be under space temperature control. If at any time the expected freeze location sensed temperature drops below 60ºF (adj.), the control valve shall temporarily open to raise that coil's return water temperature to above 80ºF (adj.), and the EMCS shall report an alarm to the OWS

4. The second stage of coil freeze protection shall be the low limit freeze stat air temperature sensors with the sequence defined under safeties, above.

3.9 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
2. Test and adjust controls and safeties.
3. Test each point through its full operating range to verify that safety and operating control set points are as required.
4. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.

5. Test each system for compliance with sequence of operation.
6. Test software and hardware interlocks.

C. DDC Verification:

1. Verify that instruments are installed before calibration, testing, and loop or leak checks.

2. Check instruments for proper location and accessibility.

3. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.

4. Check flow instruments. Inspect tag number and line and bore size, and verify that inlet side is identified and that meters are installed correctly.

5. Check pressure instruments, piping slope, installation of valve manifold, and self-contained pressure regulators.

6. Check temperature instruments and material and length of sensing elements.

7. Check control valves. Verify that they are in correct direction.

8. Check air-operated dampers. Verify that pressure gages are provided and that proper blade alignment, either parallel or opposed, has been provided.

9. Check DDC system as follows:

a. Verify that DDC controller power supply is from emergency power supply, if applicable.
b. Verify that wires at control panels are tagged with their service designation and approved tagging system.
c. Verify that spare I/O capacity has been provided.
d. Verify that DDC controllers are protected from power supply surges.

D. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

3.10 ADJUSTING

A. Calibrating and Adjusting:

1. Calibrate instruments.

2. Make three-point calibration test for both linearity and accuracy for each analog instrument.

3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.

4. Control System Inputs and Outputs:

    a. Check analog inputs at 0, 50, and 100 percent of span.
    b. Check analog outputs using milliampere meter at 0, 50, and 100 percent output.
    c. Check digital inputs using jumper wire.
    d. Check digital outputs using ohmmeter to test for contact making or breaking.
    e. Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.

5. Temperature:

    a. Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
    b. Calibrate temperature switches to make or break contacts.

6. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.

7. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.

8. Provide diagnostic and test instruments for calibration and adjustment of system.

9. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.

B. Adjust initial temperature and humidity set points.

3.11 SYSTEM TESTING AND COMMISSIONING

A. Test complete control system for control device operation prior to the systems acceptance. Demonstrate complete sequence of operations to Architect's and Owner's representatives.

1. Verify operation of system inputs and outputs, control loops and/or software programming, timing functions, operator entered constants, facilities management functions, etc., and observe that they perform their intended functions. Generate check out data sheets for each system so verified.

2. Field verify analog input calibration, analog output operation, digital input function, digital output operation, and coordination of system inputs and outputs between system graphics and field devices for schematic accuracy. Coordinate device testing with Testing and Balancing Agency – refer to section 23 05 93 – Testing, Adjusting, and Balancing for HVAC for additional information. Generate check list of all devices, keyed with descriptive locations and functions, along with complete calibration, testing, and coordination data, certified by Contractor and TAB agency.

3. Provide complete values and points logs, printed with hourly values for one week, demonstrating correct control functions and programming.

B. When above procedure has been completed and control systems are operating satisfactorily, produce and submit a report of entire systems performance for review, including all data described above. Submit three copies to the Architect's Representative advising them that the control system is 100% complete and operates in accordance with the Contract Documents.

3.12 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 23 09 00

SECTION 23 21 13 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes pipe and fitting materials, special-duty hydronic systems fittings, equipment, valves, and specialties, and joining methods for the following:

1. Hydronic Systems piping.
2. Air conditioning condensate drain piping.
3. Air-vent piping.

B. Related Sections include the following:

1. Section 23 05 23 - General Duty Valves for Hydronic Piping.
2. Section 23 05 29 - Hangers and Supports for HVAC components.
3. Section 23 09 00 – Instrumentation and Control for HVAC.

1.3 PERFORMANCE REQUIREMENTS

A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature:

1. Steel and Copper Hydronic Piping: 125psig at 250 deg F.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Above Grade Piping
2. Pipe Fittings.
3. Dielectric Fittings.

1.5 CLOSEOUT SUBMITTALS

A. Field quality-control test reports.
B. Operation and Maintenance Data: For air control devices, hydronic specialties, and special-duty valves to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with all applicable sections of the following:

1. ANSI / ASME B 31.9: "Building Services Piping".
2. ASME "Boiler and Pressure Vessel Code", Section IX, "Welding and Brazing Qualifications".
3. Building Code of New York State.
4. ANSI / ASME B31 – “Code for Pressure Piping”.

B. Installer Qualifications:

1. Grooved Mechanical and Pressure Seal Joint Quality Control:

a. Installer Certification: Provide installers trained in and familiar with the installation of the mechanical joint systems, certified by the approved joint manufacturer as having been trained and qualified to join piping with manufacturer’s system.

b. Single Source: Obtain mechanically joined piping system components from single approved manufacturer for each system type, grooved or pressed.

c. Proper Tools: Fabricate and install joints using the proper tools, actuators, rolls, cutters, jaws, rings, etc., as manufactured and instructed by the approved manufacturer.

d. Manufacturer’s Inspection: Certify grooved system installation for compliance with manufacturer’s recommendations.

2. Weld and Braze Qualification Records: Maintain and sign certified records of approved procedures used and approved qualified workers employed for welded and brazed joints performed as a part of Contract Work. Ensure all building services piping welding and brazing work can be traced to a specific procedure and welder.

3. Inspection and Examination by Owner, Remedy by Contractor: Owner reserves right to examine, inspect, and test all piping using visual, radiographic, or other recognized testing methods to determine compliance with specified quality control requirements and requirements of applicable regulatory agencies.

a. Cost of Owner’s testing of acceptable installation provided at Owner’s expense
b. Repair piping installations not passing Owner’s quality inspection testing using approved method or replace at no additional cost.
c. Cost of initial testing of piping not conforming to specified requirements and any retesting of repairs or replacement work shall be deducted from Contract Sum.

C. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 01.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Refer to Part 3 for Piping Applications Article.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Anvil International, Inc.
2. Cerro Flow Products, Inc.
3. Mueller Industries, Inc.
4. S. P. Fittings; a division of Star Pipe Products.
5. Viega LLC
6. Victaulic Company of America.

C. Copper Tubing: ASTM B 88, Annealed or Drawn Temper, Types M, L, and K.

D. Copper Tube Fittings:

1. Solder Fittings

a. Tees, Elbows, Reducers, Adapters: ANSI B16.22 streamlined pattern wrought copper or ANSI B16.18 cast bronze; solder end connections; ASTM B62.
b. Unions: Solder type, cast bronze, ground joint, Class 150.
c. Cast Bronze Flanges: ANSI B16.24 Class 150 solder connection flanges, raised ground face, ANSI pattern drilled and spot faced bolt holes.

2.2 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper-alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials, designed to join dis-similar metallic piping materials with dis-similar metals separated by dielectric material in a configuration to minimize galvanic corrosion of the less noble piping material.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Advance Products & Systems, Inc.
2. Capitol Manufacturing Company.
3. Central Plastics Company.
4. Elster-Perfection Corporation.
5. Hart Industries International, Inc.
6. Lochinvar Corporation.
7. Pipeline Seal and Insulator, Inc.
8. Precision Plumbing Products, Inc.
9. Sioux Chief Manufacturing Company, Inc.
10. Victaulic Company of America.

11. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
12. Zurn Plumbing Products Group; AquaSpec Commercial Products Division.

C. All Materials: Suitable for system fluid, pressure, and temperature.

D. Dielectric Nipples:

1. Galvanized steel nipple with insert of noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

E. Dielectric Couplings:

1. Galvanized-steel coupling with insert of noncorrosive thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

F. Dielectric Unions:

1. Factory-fabricated union assembly, for 250-psig minimum working pressure at 180 deg F.

G. Dielectric-Flange Kits:

1. Flange assembly kit for field assembly. Include full-face or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, steel backing washers, and appropriately sized bolts and heavy pattern nuts. Provide bolts of length as required for full engagement in nuts, of higher strength if undersized for bolt sleeves as required to maintain system working pressure.

2.3 VALVES

A. Isolation, Check, Balancing, Vent, and Drain Valves: Comply with requirements specified in Section 23 05 23 -General-Duty Valves for HVAC Piping
B. Automatic Temperature-Control Valves, Actuators, and Sensors: Comply with requirements specified in Section 23 09 00 - Instrumentation and Control for HVAC.

2.4 HYDRONIC PIPING ACCESSORIES

A. Pipe Sleeves:

1. Sleeve 6-Inches Diameter and Smaller: Schedule 40 galvanized, welded steel pipe, ASTM A53, Grade A.

2. Sleeves Larger than 6-inches: Galvanized sheet metal, 10 gauge, round tube with welded longitudinal joint.

3. Sleeves Installed In Masonry Or Cold Formed Metal Framing/Gypsum Board Construction: Galvanized sheet metal, 20 gauge, round tube with welded longitudinal joint.

B. Escutcheons: Chrome plated, stamped steel, hinged, split-ring escutcheons, with setscrew. Inside diameter closely fits pipe outside diameter or outside diameter of pipe insulation where piping is insulated. Outside diameter completely covers opening in floor, wall, or ceiling.

1. Manufacturer: Manufacturers offering acceptable products include Grinnell.

C. Mechanical Sleeve Seals: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to fill annular space continuously between pipe and sleeve. Connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

1. Manufacturer: Manufacturers offering acceptable products include Thunderline Corp.

2.5 HYDRONIC PIPING SPECIALTIES SPECIFIED ELSEWHERE

A. General Duty Valves: as specified in Section 23 05 23.
B. Hangers and Supports: as specified in Section 23 05 29.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Closed Loop Hydronic Piping (heating or cooling), aboveground:

1. Type L drawn-temper copper tubing with wrought-copper fittings, and soldered, pressure sealedor brazed joints.

B. Air-Vent Piping:

1. Inlet: Same as service where installed.
2. Outlet: Type K, annealed-temper copper tubing with soldered or flared joints.

C. Air-Conditioning Condensate Gravity Drain Piping:

1. Type M or L, drawn-temper copper tubing, wrought-copper drain fittings, and soldered joints.
2. Schedule 40 PVC or CPVC plastic pipe, DWV style fittings, and solvent-welded joints.

3.2 PIPING INSTALLATIONS

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated piping locations and arrangements were used to size piping, calculate friction loss, expansion compensation, pump sizing, fill volume, and other design considerations. Install piping generally as indicated unless deviations to layout are approved on Coordination Drawings.

B. Select system components with pressure rating equal to or greater than system operating pressure.

C. Install piping in concealed locations except in equipment rooms and service areas, unless otherwise indicated on drawings: install in walls, pipe chases, utility spaces, above ceilings, etc.

D. Install piping orthogonal to building walls as possible within constraints required for sloped drainage, non-orthogonal building construction, etc. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install fittings for changes in direction and branch connections, unless otherwise specified.

1. Branches two or more sizes smaller than main may be weld-o-let welded to steel pipe and brazed to copper using listed mechanically formed outlets similar to “T-drill”.

2. Minor offsets in copper fin-tube piping required to segment enclosures along curved exterior walls may be created by smooth bends in annealed type L or K copper tube. Do not bend fin element.

3. Mitered elbows, "shaped" nipples, and job fabricated reductions are not acceptable.

4. Where corridors or other general construction meets at angles other than standard pipe fitting angles, provide custom bend angle elbows to match general construction and maintain piping orthogonal to building.

F. Install piping so as to provide for positive drainage and air elimination.

1. Install straight piping free of sags and bends. Do not install bent piping – remove from site.

2. Install gravity drain lines at uniform slope down in direction of flow. Maintain maximum slope feasible up to one quarter inch rise per foot of run, but not less than 1% (approximately one eight inch per foot). Where height restrictions do not allow for minimum required slope, provide for pumped condensate removal as shown.

3. Install pressurized pumped flow piping at a uniform grade of 0.2 percent upward in direction of flow or at otherwise indicated slopes.

4. Avoid local high and low points where possible.

5. Install branch connections out the top of mains to serve equipment above mains, and out the bottom of mains to serve equipment below, or otherwise as required to provide drainage and venting with a minimum of drain and vent fittings.

6. Provide eccentric pipe size reducers and increasers, installed so as to allow for both positive drainage and air elimination. In general, where piping is sloped up in direction of flow, reduce pipe sizes with level side up and increase pipe sizes with level side down.

G. Install piping allowing for proper servicing of hydronic systems.

1. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

2. Install piping and specialties with sufficient clearance to allow application of specified insulation.

3. Install valves with sufficient clearance and orientation to permit both ease of operation and servicing.

4. Install dis-assemble able unions, flanges, or mechanical joints on equipment side of isolation valve**,** as required to remove and service all serviceable components without system drain-down or cutting piping. Install unions and flanges in piping,.

   a. Provide unions for NPS 2 and smaller, flanges for NPS 2-1/2" and larger.

   b. Install adjacent to control valves, at final connections of equipment, as required to adjust threaded pipe joints after fixed (non-rotatable) joints are made, and elsewhere as indicated.

   c. Install out of the line of coil pull, tube bundle removal access space, etc.

   d. Install so sensor wires, thermometers, gauges, etc., need not be rotated, removed, or disconnected to service equipment.

   e. Install within two feet of control valves with no elbows between valve and union as required for ease of replacement.

   f. One dis-assemble able fitting may be used for two components (ex., both control valve and equipment service) if they are separated by no soldered, brazed, or welded elbows and no more than three feet of pipe.

H. Identify piping as specified in Section 23 05 53 - Identification for HVAC Components.

I. Install sleeves for piping penetrations of walls, ceilings, and floors.

J. Install escutcheons for exposed piping penetrations of walls, ceilings, and floors.

K. Install sleeve seals for piping penetrations of concrete walls and slabs.

3.3 PIPE JOINT CONSTRUCTION

A. General Pipe Joint Construction:

1. Cut all pipe ends square.
2. Ream ends of pipes and tubes removing burrs past original pipe wall to restore full pipe ID.
3. Remove scale, slag, dirt, and debris from both inside and outside of piping and fittings before assembly.
4. Remake leaking joints using new materials.

B. Soldered Joints:

1. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook,"

2. Square cut tubing to correct length required to fill sockets.

3. Ream ends and clean surfaces of oils, grease, and oxidation to bright finish with fine sand cloth, cleaning pads, or special wire brush.

4. Apply thin film of solder flux to both surfaces to be joined. Do not clean, flux and assemble joint more than 3 hours before soldering, and do not use acid core, paste type solder, or solder flux combinations.

5. Remove heat-sensitive portions of components prior to soldering. Provide wet rag strip heat sink wrapped around stem and seat of valves and protect all components for soldering heat damage. Replace any components with any evidence of heat damage.

6. Heat joint uniformly and rapidly and fill completely with solder while minimizing external and internal over-soldered dripping.

7. Disassemble joints for inspection of solder penetration as directed. Remake faulty joints at no additional cost.

C. Brazed Joints:

1. Comply with the procedures contained in AWS "Brazing Manual", using qualified processes and brazing operators according to Part 1 "Quality Assurance" Article.
2. Remove stems, seats, and packing of valves and accessible internal parts at piping specialties before brazing.
3. Fill the pipe and fittings with an inert gas (i.e. nitrogen or carbon dioxide) during brazing to prevent formation of scale.
4. Heat joints using oxyacetylene torch. Heat to proper and uniform temperature.
5. Completely fill sockets with braze materials, and make neat fillets on butt joints.

3.4 HYDRONIC SPECIALTIES INSTALLATION

A. At each system local or global low point, both in piping and heat transfer elements, and as required for complete system drainage, install drain consisting of a tee fitting and drain valve as described in Section 23 05 23 – General Duty Valves for HVAC Piping.

B. At each system local or global high point, both in piping and heat transfer elements, at the end of each horizontal run before a drop in elevation, and elsewhere as required for complete and serviceable venting of system air, install vent consisting of a tee fitting and air vent as described in Section 23 05 23 – General Duty Valves for HVAC Piping.

C. Install AC condensate termination strainers where AC condensate drips to any exterior point of indirect waste disposal.

D. Install all components of Energy Management and Control System (EMCS) into hydronic systems as required for complete EMCS installation and as required by this section maintaining integrity if hydronic systems. Coordinate all locations and quantities with contractor responsible for the EMCS – refer to Section 23 09 00 – Instrumentation and Control for HVAC.

1. Install control valves in accessible locations close to connected equipment or as otherwise shown, with dis-assemble able connections.

2. Install wells for pressure, temperature, and other sensors as shown on details and as called for by the sequence of operations.

E. Install pressure / temperature test ports (P/T plugs) at the supply and return of every heat transfer element, and as otherwise called for on drawings.

3.5 VALVE APPLICATIONS

A. Install General Duty Valves (isolation valves, check valves, balancing valves, air vent valves, and drain valves) as specified in Section 23 05 23 – General Duty Valves for HVAC Piping.

3.6 HANGERS AND SUPPORTS

A. Hanger, support, and anchor devices are specified in Section 23 05 29 "Hangers and Supports for HVAC Components". Comply with the following requirements for maximum spacing of supports.

3.7 TERMINAL EQUIPMENT CONNECTIONS

A. Size supply and return piping run-outs to equipment connections same as shown on the drawings. Where connecting to existing piping run-outs, use same size as existing unless shown otherwise. Transition to equipment connection size close to equipment. If equipment connection size is smaller than piping shown, transition to piping size shown immediately with no elbows (except reducer elbows) or other fittings closer to the equipment than the required transition fitting.

3.8 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.

2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.

3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.

4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.

5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.

2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.

3. Isolate expansion tanks and determine that hydronic system is full of water.

4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A in ASME B31.9, "Building Services Piping."

5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.

6. Prepare written report of testing.

C. Perform the following before operating the system:

1. Open manual valves fully.
2. Inspect pumps for proper rotation.
3. Set makeup pressure-reducing valves for required system pressure.
4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
5. Set temperature controls so all coils are calling for full flow.
6. Verify lubrication of motors and bearings.

END OF SECTION 23 21 13

SECTION 23 31 00 - DUCTWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sheet metal duct materials and construction.
2. Sheet metal duct fittings materials and construction.
3. Ductwork ancillary components materials and construction.

B. Related Sections

1. Section 23 05 29 – Hangers and Supports for HVAC Components.
2. Section 23 07 00 – HVAC Insulation.
3. Section 23 37 00 - Air Outlets and Inlets
4. Division 23 sections covering fans and air handling equipment.

1.3 DEFINITIONS

A. Aspect Ratio: The ratio of duct width to height.

B. Hydraulic Radius: The ratio of duct cross section area to perimeter, or practically, a term used to define flow resistance of duct with differing aspect ratios, with resistance to flow being approximately proportional to hydraulic radius.

C. NRC: Noise Reduction Criteria

D. Offset: A change in the duct centerline location but not direction occurring within one piece of duct.

E. RGD: Registers, Grilles, and/or Diffusers

F. STC: Sound Transmission Class

1.4 PERFORMANCE REQUIREMENTS

A. Provide duct system able to withstand the loads and stresses described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and these contract documents.
B. Fabricate ductwork able to withstand the forces imposed by the support and restraint system.

1.5 SUBMITTALS

A. Comply with requirements of SECTION 01 33 00 - Submittals and as modified below.

B. Identify in writing, any proposed deviations from contract Drawings and Specifications.

1. Highlight all changes from plans required by obstructions and job conditions.

2. Bring any proposed deviations from contract plans and specifications to Architect's attention in writing, by separate letter attached to submittal with proposed deviations, along with samples for clarification, demonstrating benefit to Owner.

C. Product Data: Submit for approval annotated Shop Construction Standards showing upgrades as required for conformance in detail to specifications for all factory and shop fabricated air ducts, components, and accessories.

1.6 CLOSEOUT SUBMITTALS

A. Contract Closeout Submittals: Comply with requirements of SECTION 01 77 00 – Closeout Procedures, including submission of operating and maintenance instructions as item in "Operating and Maintenance Data" manual described in that section.

B. Field quality-control reports – duct leakage, duct cleanliness.

1.7 QUALITY ASSURANCE

A. Provide ductwork by experienced and approved workers specializing in sheet metal fabrication and installation in accordance with the stricter of the below referenced standards and the requirements outlined in these contract documents.

B. Referenced Standards

1. The latest editions of the publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

2. American Society of Civil Engineers (ASCE):

a. ASCE7 Minimum Design Loads for Buildings and Other Structures

3. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

a. ASHRAE / ANSI 62.1 – Ventilation for Acceptable Indoor Air Quality.
b. ASHRAE / ANSI 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings

4. American Welding Society (AWS)

a. AWS D1.1, "Structural Welding Code - Steel," for hangers and supports.
b. AWS D1.2, "Structural Welding Code - Aluminum," for aluminum supports.
c. AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

5. American Society for Testing and Materials (ASTM):

   a. A167 99 Standard Specification for Stainless and Heat Resisting Chromium Nickel Steel Plate, Sheet, and Strip

   b. A653-09 Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy coated (Galvannealed) by the Hot-Dip process

   c. A1011-09a Standard Specification for Steel, Sheet and Strip, Hot rolled, Carbon, structural, High-Strength Low-Alloy, High Strength Low-Alloy with Improved Formability, and Ultra-High Strength

   d. B209 07 Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate

   e. C1071-05e1 Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)

   f. D6386 Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting

   g. D7803 Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating

   h. E84-09a Standard Test Method for Surface Burning Characteristics of Building Materials

6. National Fire Protection Association (NFPA):

   a. 90A Standard for the Installation of Air Conditioning and Ventilating Systems

7. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):

   a. HVAC Duct Construction Standards, Metal and Flexible
   b. HVAC Air Duct Leakage Test Manual

8. Underwriters Laboratories, Inc. (UL):

   a. 181 Factory Made Air Ducts and Air Connectors

PART 2 - PRODUCTS

2.1 DUCT MATERIALS

A. General Material Requirements:

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated.

2. Provide sheet metals per mill specs and free of pits, voids, seam or roller marks, stains, discolorations, inadvertent bends and kinks, and other imperfections.

B. Standard Supply, Return and Exhaust: Galvanized steel, ASTM A-653/653M G90, lock forming quality, unless otherwise specified.

C. Standard Supply, Return and Exhaust duct which will be exposed to view in the finished project and will not be externally insulated or painted: Galvannealed steel, ASTM A-653/653M G90, lock forming quality, unless otherwise noted.

D. Standard Supply, Return and Exhaust duct which will be exposed to view in the finished project and will be painted: Galvannealed steel, ASTM A-653/653M G90, lock forming quality, prepared for painting via mill phosphatizing and subsequent heat treatment in accordance with ASTM D6386 and ASTM D7803 as applicable, unless otherwise noted.

E. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials, and use stainless steel fasteners.

2.2 RECTANGULAR DUCTS AND FITTINGS

A. Conform to appropriate SMACNA rectangular duct reinforcement tables and figures for the velocity-pressure classification duct construction required as defined in part three of this document, and additionally as follows.

1. Seal all joints and seams in accordance with SMACNA seal classification required for duct in question.

a. Additionally, seal field assembled longitudinal seams for seal class B duct.

2. Transverse Joints: in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure for "Rectangular Duct/Transverse Joints".

a. For all duct requiring reinforcement, provide SMACNA T-24 or T-25 type flanged duct connection system at traverse joints.

1) Joints may be factory manufactured slip on type or integrally shop fabricated onto the duct sheet metal on machinery designed for that purpose. Corner closure pieces are required at each corner.

2) Manufacturers: Subject to compliance with requirements, available manufacturers offering pre-manufactured slip on reinforcement products that may be incorporated into the Work include, but are not limited to, the following:

a) Ductmate Industries, Inc, or equal.
b) Lockformer TDC or equal.
c) Nexus PDQ type G or J or equal.

3. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

4. Tie rods are not permitted on duct or plenums narrower than 72". Where an option for tie rod or heavier gauge sheet metal / shorter joint length / higher category reinforcement is presented in table, the heavier, shorter, more reinforced duct with no tie rods is required.

B. Offsets:

1. Where offset dimension is equal to or less than 0.2 times duct dimension in plane of offset, offset may be angled at maximum 15 degrees (SMACNA type 1).

2. Where offset dimension is greater than 0.2 times duct dimension in plane of offset (example: 10 x 20 duct offset in plane of 10" dimension greater than 2 inches), offset to consist of paired curved elbows, each of the required angle, combined into one fitting (SMACNA type 3).

   a. Conform to elbow requirements as indicated below.
   b. Offset may be replaced with paired curved elbows if required for installation, otherwise provide combined fitting.

C. Transitions of shape or cross section:

1. Reductions in cross section shall have a maximum included cone angle of 60 deg., with a maximum single side angle of 45 deg. from axial, unless otherwise specified in writing.

2. Transformations of section without a net reduction of cross section shall have no section of reduced hydraulic radius nor any local expansion of more than 15 deg. net included cone angle, as defined by ASHRAE and SMACNA.

3. Expansion sections, unless specifically drawn and noted otherwise, shall have:

   a. No section of reduced hydraulic radius
   b. No section of local expansion of more than 15 deg. net included cone angle.
   c. No single side expansion angle of more than 15 deg. from axial unless otherwise specified in writing.

D. Elbows:

1. Make all changes in direction (as opposed to offsets above where direction remains the same) regardless of angle with elbow fittings unless specifically drawn and noted otherwise.

2. Curved Rectangular Elbows:

   a. Along critical pressure drop paths, provide curved rectangular elbows.

      1) Critical pressure drop paths shall be as indicated on drawings or if not indicated shall be considered to be entire duct run from air handling unit along mains to or from furthest terminal. Systems with more than one main branch shall be considered to have more than one critical pressure drop path.

      2) Provide critical path elbows with throat radius not less than dimension of duct in plane of radius or use smaller inner radius elbows with splitter vanes such that the ratio of inner to outer radius of curvature of any section of the elbow shall not be less than 1/2.

   b. Along non-critical pressure drop paths, curved rectangular elbow radius requirements may be relaxed to a throat radius not less than one half the dimension of the duct in plane of radius or use smaller inner radius with splitter vanes such that the ratio of inner to outer radius of curvature of any section of the elbow shall not be less than 1/3.

   c. Construct all curved elbows of increasing or decreasing cross section in accordance with critical pressure drop path criteria.

   d. Fabricate splitter vanes per SMACNA Duct Manual construction standards.

3. Mitered rectangular elbows

   a. Only elbows not along critical pressure drop path may be of curved or mitered construction.
   b. Mitered rectangular elbows with angle of bend under 15 deg. may have miter at duct end similar to SMACNA type 1 offset.
   c. Provide turning vanes in mitered rectangular elbows with angle of bend over 15 degrees.
   d. Mitered elbows with angle of bend over 100 deg. or less than 80 deg. shall not use commercially available 90 deg. turning vanes

4. Double Wall Turning Vanes

   a. Provide for mitered rectangular elbows of equal inlet and outlet or increasing cross section

   b. Blades of hollow double wall construction, with smaller radius sheet metal form nested outside larger radius form, tapering down gradually to and welded at double thickness edge, designed for specific spacing and alignment to minimize separation of flow and pressure drop through air duct elbows.

   c. Properly spaced to result in constant cross-section area between blades: smaller radius blades to have closer spacing

   d. Maximum spacing 3 inch, unless otherwise approved.

   e. Acoustical type where called for or where installed in acoustically lined ductwork.

f. Provide products by one of the following:

1) Titus or equal
2) Elgen or equal
3) Hardcast or equal.

5. Single Wall Turning Vanes

a. Provide in mitered rectangular elbows of increasing or decreasing cross section and those with a turning angle greater than 100 degrees or less than 80 degrees.

b. Blades of single wall 16 gauge construction with leading and trailing edges aligned to the direction of flow, installed per SMACNA Duct Manual standards so as to provide smooth area transition. Maximum spacing 3 inch, unless otherwise approved.

E. Duct Branches:

1. Install branches, inlets, and outlets so that air turbulence is reduced to a minimum and air volume properly apportioned. Install airflow adjustment devices at all junctions to permit adjustment of the amount of air entering or leaving the branch.

2. Where a duct branch is to handle more than 25 percent of the air handled by the duct main, use a complete elbow as specified, assembled into a single fitting with the main duct. Size the separate branch and remaining main as shown on the drawings, and partition the division of the combined duct such that each of the branch and main have the same velocity, with cross sectional area proportional to the respective airflow. Join the leading / trailing edge where the branch and main meet airtight via welding or brazing.

3. Where a duct branch is to handle less than 25 percent of the air handled by the duct main, construct the branch connection with a 45 degree side take-off with volume damper in branch line close to takeoff. Round branches off of rectangular main, use 45 deg. entry takeoff with integral transition to round.

a. Supply: increase duct dimension on upstream side of branch by 25 percent, minimum 4 inch.
b. Return: increase duct dimension on downstream side of branch by 25 percent, minimum 4 inch.
c. Multiple flow direction takeoffs: provide twin entries or bell mouths.

4. Where an air-diffusion device is shown as being installed in close proximity to (less than one main duct width) the side, top, or bottom of a duct, provide a commercially manufactured vaned volume extractor fitting to allow adjustment of the air quantity and to provide an even flow of air across the device it services.

F. Duct Entries

1. Wherever air does not enter the duct system from grilles, registers, or louvers, but instead enters directly from an enclosed or exposed plenum space, provide a duct entry transition with a minimum area ratio of inlet to nominal duct size of 2:1 unless otherwise specifically shown and noted.

2. Duct entry may be angled (pyramidal or conical) or with bell-mouth radius.

   a. Provide angled duct entries with a maximum single side angle to axial of 30 deg. Any combination of sides, top, and bottom may be angled (or conical for round duct) to suit space restrictions, but maintain the specified area ratio.

   b. Provide bell-mouthed entries with radius as required maintaining the specified area ratio.

3. Provide entry grille or if not shown, provide at minimum 1/2 inch welded wire mesh (WWM) secured over the large side of the opening of all duct entries.

2.3 DUCTWORK ANCILLARY COMPONENTS

A. In general, duct accessories associated with specialized requirements which are called out and / or scheduled on the drawings are specified in this section. The ancillary components included in this section are generally required in all air duct systems, need not be specifically called for on the drawings other than by specification or standard symbols and abbreviations, and are required to be detailed in the shop standards submittal.

B. Duct Connectors

1. Flange Connectors

   a. Refer to flange reinforced transverse joint system described under duct construction above. Flanged connections to system components other than adjacent duct sections may be fabricated similar to a transverse joint. If required to connect to equipment or components of different configuration provide flanged connector custom fabricated of reinforcement shapes as specified.

   b. Material: Match adjacent duct.

C. Airflow Adjusters:

1. Single Blade Volume and Splitter Dampers:

   a. Construction per SMACNA Duct Manual and as noted below.

   b. Materials: Match associated duct corrosion resistance requirements.

   c. Provide double wall airfoil blade dampers where duct velocity is over 1000 fpm nominal.

   d. Maximum blade width 12 inches.

   e. Multiple dampers or manufactured multi-blade damper above 600 square inches duct cross section.

f. Bearings and Adjusters:

1) Heavy duty quadrant adjusters with 12 gauge offset handle, captive bolt/wing nut lock in 2” minimum radius slot, split clamp with bolt on 3/8” shaft up to 300 square inch duct, ½” shaft for duct up to 600 square inch cross section.

2) Closed end bearings for duct rated for 2" WG and above.

3) Standoff under quadrant placing quadrant outside of specified duct insulation. Insulate between duct and quadrant.

4) When occurring in acoustically lined ducts, install with insulated "build-outs" per Duct Manual.

2. Multi-blade Manual Volume Dampers:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Air Balance Inc.; a division of Mestek, Inc.
2) American Warming and Ventilating; a division of Mestek, Inc.
3) Flexmaster U.S.A., Inc.
4) McGill AirFlow LLC.
5) Nailor Industries Inc.
6) Ruskin Company.
7) Trox USA Inc.
8) Vent Products Company, Inc.

b. Materials: Match associated duct corrosion resistance requirements.

c. Standard leakage rating.

d. Suitable for horizontal or vertical applications.

e. Frames:

1) Hat-shaped channels 0.064-inch minimum thickness.
2) Mitered and welded corners.
3) Flanges for attaching to walls and flangeless frames for installing in ducts.

f. Blades:

1) Opposed-blade design standard unless otherwise noted.
2) Stiffen damper blades for stability.
3) Formed single thickness blades allowed up to 1000 feet per minute (fpm) design duct velocity; provide airfoil blades above 1000 fpm.
4) Galvanized-steel, 0.064 inch thick.

g. Blade Axles: full length of damper blades, bearings at both ends of operating shaft.

h. Bearings: Oil-impregnated bronze, molded synthetic, or stainless-steel sleeve bearing as applicable.

i. Tie Bars and Brackets: Galvanized steel.

j. Damper Hardware:

1) Zinc-plated, die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
2) Include center hole to suit damper operating-rod size.
3) Include elevated platform for insulated duct mounting.

k. Jackshaft:

1) Provide as required for adjusting multi section multi-blade dampers simultaneously.

2) Size: 1-inch diameter.

3) Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.

4) Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

3. Vaned Volume Extractors

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Variturn RXVA by Carnes, Inc.
2) Model AG-45 / AG-225 by Titus Inc.

b. Factory assembled gang-operated parallelogram mounted single wall turning vanes, designed to be mounted between main and branch ducts at branch duct connections and vary the flow rate extracted to branch air while minimizing turbulence and associated pressure drop.

c. Galvanized steel construction installed with sheet metal screws provides stable operation up to 2500 feet per minute main or branch duct velocity.

d. Single wall radius formed turning vanes with flat trailing and leading edges provide uniform air distribution across the branch duct and overlap in closed position for tight close-off. Vanes spaced no greater than one inch on center up to 18 inch length (measured in direction of main duct airflow) or no greater than two inches on center up to 36 inch length.

e. Fully adjustable from closed (zero protrusion into main duct, zero branch duct flow rate), to fully open (30 degree protrusion into main duct).

f. Where extractor vane length is less than dimension of main duct, provide branch duct with side extensions fully enclosing sides of extractor up to the full open position.

1) Where installed in horizontal duct and the bottom of the main and branch ducts are not in the same plane, provide extension support foot at end of bottom side extension.

g. Provide with adjusting mechanism that securely locks in adjusted position and unlocks allowing for smooth infinite adjustment from closed to open.

1) For extractors up to 18 inches long serving branch ducts provide with internal crank linkage operated by heavy duty manual quadrant and 3/8 inch square shaft.

2) For extractors over 18 inches long serving branch ducts, provide with double wire rod push-pull mechanism secured with welded stud, formed steel captive washer and wing nut.

3) For extractors serving immediately adjacent registers, provide with screw gear operated internal crank linkage operated by key through register face.

D. Duct Access Control

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following. Note not all manufacturers offer all products:

a. American Warming and Ventilating; a division of Mestek, Inc.
b. Carnes.
c. Cesco Products; a division of Mestek, Inc.
d. Ductmate Industries, Inc.
e. Flame Gard, Inc.
f. Flexmaster U.S.A., Inc.
g. Greenheck Fan Corporation.
h. KEES, Inc.
i. Lloyd Industries, Inc.
j. Metal Form Manufacturing, Inc.
k. McGill AirFlow LLC.
l. 3M
m. Nailor Industries Inc.
n. Price Industries.
o. Ventfabrics, Inc.
p. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

2. General Purpose Duct-Mounted Service Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."

a. Door:

1) Double wall, rectangular.
2) Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
3) Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
4) Fabricate doors airtight and suitable for duct pressure class.

b. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.

c. Number of Hinges and Locks:

1) Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
2) Access Doors up to 18 Inches Square: Two hinges and two sash locks.
3) Access Doors up to 24 by 48 Inches: Three hinges and two compression latches.
4) Access Doors Larger Than 24 by 48 Inches: Four hinges and two compression latches with outside and inside handles.

3. Instrument Test Access Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

2.4 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.

2. Tape Width: 4 inches.

3. Sealant: Modified styrene acrylic.

4. Water resistant.

5. Mold and mildew resistant.

6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.

7. Service: Indoor and outdoor.

8. Service Temperature: Minus 40 to plus 200 deg F.

9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.

10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.

2. Type: S.

3. Grade: NS.

4. Class: 25.

5. Use: O.

6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

2.5 HANGERS AND SUPPORTS

A. Provide complete system of Air Duct Hangers and Supports as required by the Air Duct systems included. Refer to Section 23 05 29 – “Hangers and Supports for HVAC Components” for details of Hanger and Support requirements for Air Ducts and associated components.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions under which duct work is to be installed for compliance with requirements for proper installation.

1. Check all drawings for detailed information and locations and field verify all conditions affecting installation.
2. Notify Architect in writing of any conditions detrimental to proper and timely installation.
3. Obtain Architect's approval before fabrication of any changes in size required by obstructions and job conditions.
4. Proceed with installation only after unsatisfactory conditions have been corrected in an acceptable manner.
5. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 DUCT FABRICATION

A. Fabricate and install as shown on Drawings and in manner coordinated with all construction requirements.

B. Sizes shown on plans are clear inside duct dimensions representing the design hydraulic radius of the duct. Generally, fabricate ductwork of sizes shown on plans. During field verification, confirm that duct of aspect ratio shown fits within general construction constraints coordinated with all other trades. Adjust aspect ratio, joint spacing, reinforcement, etc., as required during coordination process to fit duct of equivalent hydraulic radius where shown. If duct of reduced hydraulic radius is required due to field conditions, submit RFI for direction before proceeding.

C. Fabricate all ductwork to the SMACNA pressure classification reinforcement standards.

D. Deliver and store all duct with duct interior clean and all openings sealed with film designed for the purpose of keeping uninstalled duct clean. Unless section of duct is being actively extended during construction, keep all openings and RGD properly sealed and prevent entrance of dust, dirt, construction debris, etc.

E. Extend all access openings, damper rods, and levers to outside of external insulation for convenience of operation and maintenance.

F. Provide all necessary transitions, fittings, aspect ratio changes, etc., as required to install duct work. Where aspect ratio changes are required to fit within structural or other existing construction constraints, provide duct of equal or larger hydraulic radius.

3.3 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install concealed in general construction unless otherwise specified or indicated on Drawings.

C. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

D. Provide all necessary openings, sleeves, hanger inserts, chases, recesses, etc., in general construction work. Coordinate duct openings provided by others in ample time to avoid delays.

E. Provide collars to trim all duct openings in general construction work.

F. Make final ductwork connections to equipment where indicated on the drawings.

G. Install ductwork in all spaces as high as possible and in locations to avoid interference with recessed lights, piping, general construction, etc.

H. Install round and flat-oval ducts in maximum practical lengths.

I. Install ducts with fewest possible joints.

J. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

K. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

L. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

M. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

N. Route ducts to avoid passing through transformer vaults, electrical equipment rooms and enclosures, and stairwells.

O. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

P. Where duct passes through exterior walls and roofs from interior to exterior, provide water and airtight penetration detailing as required, preserving the thermal, moisture, and vapor penetration resistance of the surrounding assembly.

Q. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.4 DUCT SEALING

A. Make system air tight / water tight as required and approved, replacing any poor joints or careless work. Fabricate ductwork to the following SMACNA leakage standards:

1. Seal Class B – 2 inch w.g. and less general supply, return, and exhaust ductwork.

3.5 HANGER AND SUPPORT INSTALLATION

A. Comply with the requirements of the following:

1. SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
2. Section 23 05 29 – Hangers And Supports for HVAC Components.

B. Comply with the additional requirements below:

1. SMACNA load tables do not provide for external loads on duct: provide for 200 lb external load on all duct hangers and supports. Increase hanger and support sizes from SMACNA tables accordingly:

   a. Minimum band size 20ga. x 1 inch.

   b. Hanger bands to extend down sides and turn under bottom 1 inch minimum for all duct sizes. Minimum (2) #10 sheet metal screws per hanger (one each on side and bottom), (2) screws minimum on sides for duct over 12 inches tall, 12 inches on center max.

2. Hangers Exposed to View:

   a. Rectangular duct: threaded rod and angle or channel supports.
   b. Round duct: twin half round bands 14 ga min., and threaded rods.

3. Provide hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

4. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

3.6 PAINTING

A. Paint interior of ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.

C. Duct system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.8 START UP

A. Air Balance: Comply with requirements in Section 23 05 93 - "Testing, Adjusting, and Balancing for HVAC."

END OF SECTION 23 31 00

SECTION 23 34 00 - HVAC FANS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Centrifugal roof ventilators.
2. Ceiling-mounted ventilators.

1.3 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base fan-performance ratings on actual Project site elevations.
B. Operating Limits: Classify according to AMCA 99.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also include the following:

1. Certified fan performance curves with system operating conditions indicated.
2. Certified fan sound-power ratings.
3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
4. Material thickness and finishes, including color charts.
5. Dampers, including housings, linkages, and operators.
6. Roof curbs.
7. Fan speed controllers.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

2. Wiring Diagrams: For power, signal, and control wiring.

1.6 CLOSEOUT SUBMITTALS

A. Field quality-control reports.
B. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.
C. UL Standards: Power ventilators shall comply with UL 705.

1.8 COORDINATION

A. Coordinate size and location of structural-steel support members.
B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

PART 2 - PRODUCTS

2.1 ROOFTOP CENTRIFUGAL EXHAUST FANS

A. Unit Description: UL listed exhaust fan specifically designed for outdoor installation and service, shipped fully assembled and factory tested prior to shipment.

1. Housing:

a. Spun 16 gauge minimum weather tight marine grade aluminum two piece upper housing, with reinforced rolled edges. Down-blast, up-blast, or wall mounted out-blast type housing as scheduled.

b. Quick release stainless steel latches to provide access to motor compartment without use of tools.

c. Fully welded aluminum curb cap

d. Rubber grommeted internal wiring passages unless otherwise specified.

e. Provide aluminum nameplate riveted to housing exterior with manufacturer, model, cfm, static pressure, and electrical characteristics all permanently engraved or stamped.

2. Impellers: Backward inclined, non-overloading, statically and dynamically balanced all aluminum construction, including hubs. Impeller shall overlap a spun aerodynamic inlet cone. Direct drive as shown on Drawings.

3. Power Assemblies:

    a. Motor and drive isolated from discharge air stream in forced-air cooled compartment.

    b. Power Assembly mounted on minimum 14 gauge plated steel structure, supported on housing with rubber isolators loaded in combination shear and compression.

    c. Motors:

        1) Refer to Section 23 05 13 Common Electrical requirements for HVAC Components for additional information.

        2) Constant Speed Operation: Open drip-proof type with sealed, permanently lubricated ball bearings; pre-wired through to disconnect switch mounted under fan cover with sufficient legs to break all leads to motor.

            a) Motors, wiring, and disconnects serving fume hood exhaust fans and other potentially flammable exhaust streams shall be UL listed and in accordance with NEC for explosion proof construction.

            b) Single Phase: Electronically commutated motor (ECM) as manufactured by General Electric. Motor shall be of permanent magnet, brushless DC premium efficiency design with variable speed electronic controller capable of maintaining constant speed, torque, and/or cfm as required by service, capable of accepting 0-10vdc or 4-20mA speed control signal from building management system. Adjustable slow start and gradual speed changes, permanently lubricated ball bearings, and extra quiet operation are all included.

4. Accessories / options as scheduled:

    a. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.

    b. Bird Screen: Removable, 1/2-inch mesh, aluminum or brass wire.

    c. Motorized Dampers: Parallel-blade dampers mounted in curb base or ductwork as shown on the drawings with electric actuator; wired to close when fan stops. Refer to Section 23 09 00 for damper specifications.

    d. Factory fabricated insulated roof curb meeting the requirements above and of Section 23 05 29 – Hangers and Supports for HVAC Components.

    e. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.

5. Manufacturers: Cook, Greenheck, Penn Ventilator, Twin Cities, or Approved Equal.

2.2 CEILING-MOUNTED VENTILATORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Breidert Air Products.
2. Carnes Company.
3. Greenheck Fan Corporation.
4. Loren Cook Company.
5. PennBarry.

B. Housing: Steel, lined with acoustical insulation.

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.

D. Grille: Painted aluminum, louvered grille with flange on intake and thumbscrew attachment to fan housing.

E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

F. Accessories:

1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light.
3. Isolation: Rubber-in-shear vibration isolators.

2.3 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 Section "Common Electrical Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 26 Sections.

B. Enclosure Type: Totally enclosed, fan cooled.

2.4 SOURCE QUALITY CONTROL

A. Certify sound-power level ratings according to AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

B. Certify fan performance ratings, including flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating." Label fans with the AMCA-Certified Ratings Seal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install power ventilators level and plumb.
B. Secure roof-mounted fans to roof curbs with cadmium-plated hardware.
C. Ceiling Units: Suspend units from structure; use steel wire or metal straps.
D. Support suspended units from structure using threaded steel rods and elastomeric hangers having a static deflection of 1 inch.
E. Install units with clearances for service and maintenance.
F. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."

3.3 CONNECTIONS

A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories.
B. Install ducts adjacent to power ventilators to allow service and maintenance.
C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Verify that shipping, blocking, and bracing are removed.

2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.

3. Verify that cleaning and adjusting are complete.

4. Verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation.

5. Adjust damper linkages for proper damper operation.

6. Verify lubrication for bearings and other moving parts.

7. Verify that manual and automatic volume control dampers in connected ductwork systems are in fully open position.

8. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.

9. Shut unit down and reconnect automatic temperature-control operators.

10. Remove and replace malfunctioning units and retest as specified above.

C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Prepare test and inspection reports.

3.5 ADJUSTING

A. Adjust damper linkages for proper damper operation.
B. Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
C. Replace fan as required to achieve design airflow.
D. Lubricate bearings.

END OF SECTION 23 34 00

SECTION 23 37 00 – AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior Inlets:

a. Grilles

2. Exterior Outlets and inlets:

a. Air louvers
b. Goose Neck Roof Top hoods

1.3 SYSTEM DESCRIPTION

A. Design Requirements

1. Grilles: Provide all exhaust grilles required for all systems.

2. Air Louvers: Provide AMCA-rated louvers for all fresh air intake and exhaust openings, except as otherwise shown or specified in Contract Documents. Cross- reference dimensions of each louver shown on heating drawings with those on the architectural drawings. Notify architect in writing of any discrepancies prior to submitting on louvers.

3. Goose Neck: Provide exhaust openings as shown or specified in Contract Documents. Cross-reference dimensions of each gooseneck shown on heating drawings with those on the architectural drawings. Notify architect in writing of any discrepancies prior to submitting on equipment.

1.4 PERFORMANCE REQUIREMENTS

A. Interior Outlets and Inlets: Provide outlets and inlets with aspiration ability, temperature mixing, and velocity traverses and decay with distance, throw, pressure drop, and noise criteria ratings equal to or better than specified products.

1.5 SUBMITTALS

A. Comply with requirements of SECTION 01 33 00 - Submittals and as modified below.

B. Product Data: Submit manufacturer's product literature, technical specifications, performance data, installation instructions, and similar information required to demonstrate compliance with specified requirements. Annotate all selected options, cross referenced to specification and drawing designations. Include tabulated data for all proposed outlets and inlets, showing size, type, cfm, aspiration ability, water entrainment, temperature mixing, and velocity traverses and decay with distance, throw, pressure drop, noise criteria ratings and any other applicable data demonstrating performance equal to or better than specified products.

C. Shop Drawings: Submit shop drawings showing sizes, construction details, mounting details, capacity, and air flow characteristics for all equipment. Include complete tabulated schedules as indicated below for each of grille, Louvers, and gooseneck.

1. Grilles: Include complete tabulated schedule showing locations for each, type, size, capacity as shown on Drawings, and performance data for each grille furnished, including throw and noise criteria ratings. Indicate selections on data.

2. Air Louvers, Goosenecks: Include complete tabulated schedule showing locations for each Louver, Gooseneck Hoods, showing type, size, wall and/or roof rough opening size, capacity as shown on Drawings, and performance data for each including pressure drop and water entrainment specifications. Include all this data on coordination drawings and special Mechanical Penetrations of General Construction Envelope coordination drawing.

D. Contract Closeout Submittals: Comply with requirements of SECTION 01 77 00, including submission of operating and maintenance instructions as item in "Operating and Maintenance Data" manual described in that section.

1.6 SEQUENCING AND SCHEDULING

A. Deliver Exterior Outlets and Inlets (Louvers, Gooseneck Hoods) to project in sufficient time for installation in walls as wall construction progresses.

1. Coordinate unit selection to meet requirements of other equipment and installation details (automatic dampers, back draft dampers, etc.).
2. Verify all opening sizes, locations, and mounting arrangements prior to installation.

PART 2 - PRODUCTS

2.1 GRILLES

A. General

1. Provide grilles with border systems that are compatible with adjacent wall and ceiling systems, and that are specifically manufactured to fit into ceiling modules with accurate fit and adequate support. Refer to general construction drawings and specifications for details of adjacent systems.

2. All performance criteria equal to or better than design make as specified and tagged on drawings.

3. Provide factory baked white enamel finish for steel materials and clear or color anodizing for aluminum material as base bid standard finish unless otherwise specified or noted.

4. Provide products by one of the following:

   a. Krueger or equal.
   b. Price or equal.
   c. Anemostat or equal.

B. Grilles

1. TYPE "G-C": Single deflection wall return grille; vertical or horizontal vanes, fixed at 0 degrees or 35 degrees (as noted on drawings), with 3/4 inch spacing between blades; aluminum or steel construction as required to match adjoining ductwork. Similar to Krueger “S80" or “S580”.

2.2 AIR LOUVERS

A. Intake and Exhaust Louvers (Fixed Type)

1. Standard Construction Requirements:

   a. Factory constructed high performance drainable (frame, blades, and head as scheduled) aluminum louvers with storm resistant blades of AMCA rated performance equal to or better than the design make.

   b. Frame and blades constructed of extruded aluminum, alloy 6063-T5. Nominal wall thickness of 0.081 inches, depth to be 6 inches as noted on drawings.

   c. Blade angle of 37-1/2 degrees, centered nominally at 5-3/32 inches for the 4 inch deep and at 5-29/32 inch for 6 inch deep louvers. Hidden vertical supports shall allow continuous line appearance up to 120 inches.

   d. Stainless Steel 1/2 inch mesh x 0.063 inch bird screen secured in a removable frame with SS tamperproof fasteners, on exterior face of louver. Finish same as louver.

   e. Extended sills constructed of aluminum, alloy 6063 – T5 with a nominal wall thickness of 0.060 inches in a style selected by Architect.

   f. Provide welded construction for all factory assembled louver components. Provide stainless steel fasteners for all field assembled components.

   g. Size, type and location as shown on drawings.

h. Provide scheduled factory finish as detailed below.

1) Kynar: Provide factory applied and baked resin-based paint coating, minimum 70% fluoropolymer (PVDF) similar to Kynar 500 or Hylar 5000 as manufactured by the Valspar Corporation. Coating shall meet all performance requirements of AAMA 2605 and ASCA 96. Color as selected by Architect from manufacturer's full range of standard or premium colors including minimum 16 "standard" colors and 12 "premium" colors.

i. Provide products by one of the following, with performance as scheduled:

1) Greenheck Model ESD-603 or equal.
2) Similar model by Ruskin, or equal.
3) Similar model by Construction Specialties, Inc. or equal.

2.3 ROOF TOP HOODS

A. Gooseneck Style Roof Top Hoods

1. Factory or shop fabricate according to SMACNA's "HVAC Duct Construction Standards" and as otherwise detailed on drawings.
2. Heavy gauge (0.060 inch) aluminum construction. Any mechanical fasteners stainless steel.
3. Curb: Provide factory fabricated curb as specified in Section 23 05 29, minimum 12 inches high.
4. Bird Screening: Aluminum, 1/2-inch- square mesh, 0.063-inch wire or Stainless-steel, 1/2-inch- square mesh, 0.047-inch wire.
5. Capacities, size and Characteristics as indicated on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine conditions under which air outlets and inlets are to be installed and notify a Architect in writing of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected in an acceptable manner.

1. Air Louvers: Coordinate unit selection to meet other equipment and installation details (automatic dampers, back draft dampers, etc.). Verify all opening sizes, locations and mounting arrangements prior to installation.

3.2 INSTALLATION

A. Install air outlets and inlets in strict accordance with manufacturer's recommended installation instructions for applications shown on Drawings.

B. Grilles: Install all grilles in accordance with manufacturer's installation instructions and SMACNA installation manual at locations indicated on Drawings.

1. Adjust each type of grille as required to achieve even air distribution throughout occupied space, generally free of objectionable drafts and dead air pockets. Demonstrate adjustments of distribution to Owner and additionally adjust as requested by Owner's representative during or subsequent to initial adjustments. As grille adjustment and Testing and Air Balancing work affect each other, make preliminary adjustment to all grilles prior to balancing, and make final grille adjustment during TAB work in cooperation with TAB agency. Refer to Section 23 05 93 – TESTING, ADJUSTING, AND BALANCING FOR HVAC for more detail.

2. Provide final balancing in accordance with SECTION 23 05 93.

3. Furnish to Owner, with receipt, 3 operating keys for each type of air outlet and inlet that requires them.

C. Air Louvers: Comply with manufacturer's specifications and recommendations for assembly and installation of air louver units, hardware, operators, and other components.

1. Set units plumb, level, and true to line, without warp or rack of frames. Anchor securely in place. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials. Use stainless steel fasteners.

2. Make suitable provision for thermal expansion in assembly of groups of units.

3. Set head, jamb, and sill members in bed of compound as shown, or with joint fillers or gaskets as shown to provide weather tight construction.

4. Provide suitable gaskets or coating where dissimilar metals are in contact.

5. Clean aluminum surfaces promptly after installation of units. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and other moving parts.

D. Goosenecks

1. Provide roof curbs in sufficient time to coordinate with construction schedule.

2. Verify all opening sizes, locations, and mounting arrangements prior to installation. Provide structural support frame around all roof deck penetrations 12 inches x 12 inches and larger, unless specifically indicated otherwise elsewhere on the Contract Documents.

3. Comply with applicable requirements of SECTION 23 05 29 – Hangers and Supports for HVAC Components.

4. Comply with manufacturer's requirements for securing to curbs. Use appropriate weatherproof gasketing and stainless-steel fasteners as required meeting loading requirements specified above.

END OF SECTION 23 37 00

SECTION 23 82 00 – TERMINAL HEATING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of Terminal Heating and Cooling Equipment, associated accessories, and their installation:

1. Fin Tube Radiation (FTR).

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, and furnished specialties and accessories for each unit type and configuration.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Plans, elevations, sections, and details.
2. Details of anchorages and attachments to structure and to supported equipment.
3. Wiring Diagrams: Signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

A. Field quality-control test reports.

B. Operation and Maintenance Data: For cabinet unit heaters, fin tube radiation, and unit heaters, to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Maintenance schedules and repair part lists for motors, coils, integral controls, and filters.

1.6 QUALITY ASSURANCE

A. 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.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 HOT-WATER FINNED TUBE RADIATORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Rittling, a div. of Hydro-Air Components.
2. Slant/Fin.
3. Sterling Hydronics, a Mestek company.

B. Performance Ratings: Rate baseboard radiators according to Hydronics Institute's "I=B=R Testing and Rating Standard for Baseboard Radiation."

C. Fin Radiation: Complete enclosure of heavy-duty, institutional grade construction, continuous supporting channel and back plate, heating element, hangers and accessories as required; factory-boxed and tagged by room number and securely anchored to building in a manufacturers approved manner. Enclosures to run from wall-to-wall, unless otherwise indicated on Drawings, and provided with all necessary corner pieces, end caps, column enclosures, butt joint trims, wall sleeves, and all access doors required.

1. Heating Elements:

a. Element constructed of seamless drawn copper tubing mechanically expanded into aluminum full collar or full temper embedded fins of size shown and specified.

b. Provide tube size 3/4” through 1-1/4” as required by flow rate. Use same fin tube element tube size as pipe size shown leading to fin tube on drawings.

c. Provide elements in lengths, sizes, and capacities as shown on drawings.

1) For all fin tube shown with 5-1/2” nominal enclosure or where noted as high capacity element, provide element with forty 4” x 4” aluminum fins per foot with bare single element nominal capacity of 950 btu/ft-hr. at 65 deg. F entering air temperature and hot water at EWT 180 deg. F, LWT 160 deg. F

2. Fin Tube Element and Enclosure types:

a. Type FTB: Wall mounted slope top enclosure nominally 5-1/2” deep x 18” high (unless noted otherwise), with stamped slotted sloped front supply grille.

3. Element Supports: Swinging, ball bearing, or sliding type designed to allow for expansion. Supports must allow free noiseless movement of pipe and elements.

4. Enclosures:

   a. Complete enclosures to run from wall-to-wall unless otherwise shown and noted on plans.

   b. Materials:

      1) General service: ASTM A-653/653M-94 G90 lock forming quality galvanized steel, prepared for painting via mill phosphatizing in accordance with ASTM A2092, unless otherwise noted.

   c. Material gauges:

      1) 16 ga.: General service.

   d. Provide continuous enclosure back plate and back hanger channel of 20 ga. roll formed material same as cover, configured for positive support of cover and element. Include continuous urethane foam dirt seal between wall and channel.

   e. Gusset braced cover construction with stamped outlet and inlet of configuration described above. Provide cover support brackets spaced as recommended by manufacturer but on center distances not greater than 4'. Provide brackets within 6" of end of cover and within 6" (on both sides) of each joint between sections or corner joints. All fasteners shall be concealed or tamper resistant. Fasteners shall match enclosure materials.

   f. Provide matching die formed end caps, inside and outside corner pieces, wall sleeves, internal end plates, column enclosures, butt strips, valve compartments, riser chases, access doors and other accessories as shown on drawings and as required to fabricate neat, complete installation.

   g. Enclosures and all trim accessories shall be phosphatized and painted inside and out with one coat of baked on alkyd enamel primer, then finished with baked enamel in color selected by Architect.

5. Valve Access Panel:

   a. 12" wide minimum, full enclosure height access door with tamper resistant closure. Provide for reasonable service access where any of the following must be within enclosure (typical):

      1) Isolation valve.
      2) Air vent or drain.
      3) Shut off valves, unions, P/T plugs, etc.
      4) Temperature control valve.

b. Alternatively, provide nominally 24” wide section of enclosure at location of piping specialties, with tamper resistant fasteners designed and installed to facilitate ease of repeated maintenance.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive equipment for compliance with requirements for installation tolerances and other conditions affecting performance.
B. Examine roughing-in for piping and electrical connections to verify actual locations before unit installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install equipment in compliance with NFPA 90A.
B. Install equipment level and plumb.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties. Specific connection requirements are as follows:

1. Install piping adjacent to machine to allow service and maintenance.

2. Unless otherwise indicated, install shutoff valve and union or flange at each connection.

3. Connect piping to equipment using specialties as detailed on drawings, with at minimum isolation valves, unions, and P/T test ports supply and return, with control valve on return as specified.

B. Ground and wire equipment according to the stricter of manufacturer’s and Division 26 requirements.

3.4 FIELD QUALITY CONTROL

A. Ensure Manufacturers provide:

1. Thorough instruction of installing Contractor’s personnel in installation of units.
2. Instruction for Owner's personnel in operation and care of equipment.
3. Maintenance brochure.
4. Adjustment of air discharge pattern to suit each room as directed and approved.

B. Perform the following field tests and inspections and prepare test reports:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

C. After installing equipment, inspect for damage to finish. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

D. Remove and replace malfunctioning and damaged units and retest as specified above.

END OF SECTION 23 82 00

SECTION 26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section and to all of Divisions 26.

1.2 SUMMARY

A. Section Includes:

1. General requirements applicable to components and systems included in Electric Contract.

B. Products Installed but Not Furnished Under This Section

1. Make electrical connections to equipment shown on Drawings and furnished by other Contractors. Obtain approved wiring diagrams and location drawings for roughing in and final connections from Contractor furnishing equipment.

1.3 REFERENCES

A.	AIA	American Institute of Architects
B.	ADA	Americans with Disabilities Act
C.	AISC	American Institute of Steel Construction
D.	ANSI	American National Standards Institute
E.	ASTM	ASTM International
F.	IBC	International Building Code
G.	IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)
H.	IES	Illuminating Engineering Society of North America
I.	NEC	National Electrical Code
J.	NEMA	National Electrical Manufacturers' Association
K.	NETA	International Electrical Testing Association
L.	NFPA	National Fire Protection Association
M.	UL	Underwriters' Laboratories, Inc.

1.4 DEFINITIONS

A. “Existing”: Equipment depicted on Drawings with an “E” designation denotes existing equipment to remain.

B. "Relocate": Equipment depicted on Drawings with an "RL" designation denotes existing equipment to relocate. Disconnect equipment, remove circuitry to a point beyond demolition and tag for reuse, store equipment for reuse and reinstall as specified in Contract Documents. Modify/extend circuitry to new equipment locations and reconnect. The Contractor is responsible for protecting equipment from damage during removal, storage and reinstallation.

C. "Replace": Equipment depicted on Drawings with an "R" designation denotes existing equipment to replace. Refer to relevant Project Manual Specification for additional information and requirements.

1.5 SYSTEM DESCRIPTIONS

A. Inspection of Existing Systems: Inspect each existing system scheduled for modification in presence of Authorized Owner's Representative and issue a deficiency report to Owner and Architect listing conditions found prior to any removals, relocations, or additions. Modified systems include (but are not limited to):

1. Power distribution.
2. Lighting.
3. Sound system.
4. Public Address System
5. Emergency lighting.

B. Design Requirements - Provide complete systems, properly tested, balanced, and ready for operation including necessary details, items and accessories although not expressly shown or specified, including (but not limited to):

1. Wiring and raceway for work specified in Project Manual and shown on Drawings.

2. Electrical devices and equipment for work specified in Project Manual and shown on Drawings.

3. Systems included, but not limited to:

a. Electrical distribution.
b. Electrical connections.
c. Lighting.
d. Sound systems.
e. Public Address System
f. Emergency lighting.

C. Electric Layouts: Arrange panels; disconnect switches, enclosed breakers, equipment, raceways, and similar components neatly, orderly and symmetrically. Provide 3/4-inch fire treated, gray painted plywood backboards for surface mounted panels, disconnect switches, enclosed breakers, and similar equipment. Arrangements shown on Drawings are diagrammatic only; provide and adjust raceways, wiring, and other components as required.

D. Power Interruptions and Scheduled Outages: Coordinate scheduling of all power interruptions and outages with Owner. Confirm with Owner prior to interruption of power, which building systems are considered critical and must remain operational during the interruption. If a scheduled power outage is to extend beyond one standard workday, provide temporary power to operate critical building systems (including, but not limited to fire alarm system, security system, building access control system, and building energy management control system).

1.6 SUBMITTALS

A. General Division 26 submittal requirements:

1. Comply with requirements of SECTION 01 33 00 – SUBMITTAL PROCEDURES and as modified below.

2. Product Data: Submit product data for items listed in individual technical section. Clearly identify manufacturer, pertinent design, function, materials, construction and performance data specifically addressing specification description and Contract Document requirements of item. Strike out products that are not applicable to item being submitted, where more than one product is indicated on manufacturer product literature.

   a. Cover Sheet: Attach cover sheet, identified in Section 01 33 00, to Product Data of each item submitted. Provide cover sheet for only one type of item with related accessories, equipment with related components. Do not combine unrelated items under the same cover sheet.

   b. Specified Equivalent Product Data: Submit manufacturer's product information including product literature, technical specifications and descriptions, performance data and, and similar items to demonstrate compatibility with Basis-of-Design Equipment as specified in the "Part 2 – Products" of each technical section.

3. Shop Drawings: Submit detailed drawings for electrical equipment layouts, showing exact sizes and locations for approval before beginning work.

   a. Do not proceed with installation of systems in each area until agreement is reached with all concerned on exact arrangements for each room or area, unless otherwise directed by Architect. If Contractor proceeds prior to resolving conflicts, Contractor shall modify installed Work as required to permit other systems to proceed with a coordinated installation.

   b. Specified Equivalent Drawings: Submit detailed drawings of proposed Specified Equivalents, indicating proposed installation of equipment and showing maintenance clearances, required service removal space other pertinent revisions to arrangement and configuration shown in Contract Documents.

4. Samples: On all submittals, indicate standard factory color and factory finish surfaces. Where more than one color is available, selection will be made by Architect from manufacturer's full range of colors. Electronically transmitted color samples are not acceptable.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sleeves and sleeve seals. Include rated capacities, and furnished specialties and accessories.

1. Penetration firestopping materials.
2. Penetration firestopping assembly drawings.

1.8 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Codes and Standards: Comply with applicable Federal, State and local building and electrical codes, laws, ordinances, and regulations, and comply with applicable NFPA, National Electrical Code and utility company requirements and regulations. Provide Underwriters Laboratories Seal on all materials.

2. Permits and Inspections: Obtain approvals, tests, and inspections required by Architect, Engineer, local electrical inspector, agent or agency specified in Project Manual, or National, State, or local codes and ordinances.

   a. Schedule electrical inspection by an agency acceptable to the local authority having jurisdiction and submit final inspection certificate to Architect.
   b. Furnish materials and labor necessary for tests and pay costs associated with tests and inspections.
   c. Conduct tests under load for load balancing and where required by codes, regulations, ordinances, or technical Specification.

3. Electrical Components, Devices, and Accessories: UL Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.9 DELIVERY, STORAGE AND HANDLING

A. Storage and Protection:

1. Take precautions to store materials and products to protect finishes and not permit dust and dirt to penetrate equipment.
2. Replace equipment damaged beyond reasonable repair as required by Architect.
3. Refinish any equipment with marks, stains, scratches, dents, and other aesthetic damage that doesn't impede operation of equipment as required by Architect.

1.10 COORDINATION OF WORK

A. New Construction:

1. Openings, Chases, Recesses, Sleeves, Lintels and Bucks (required for admission of Electric Contract systems and components): Coordinate requirements with General Contractor for inclusion in General Contract. Furnish necessary information (e.g. locations and sizes) to General Contractor in ample time for installation of systems and components included in Electric Contract.

2. Anchor Bolts: Deliver to Contractor responsible for General Work anchor bolts required for Electric Contract construction that are to be installed in construction included in General Contract.

3. Locate settings, check locations as installation in General Contract progresses, and provide templates or holding fixtures as required to maintain proper accuracy.

B. Existing Construction:

1. Unless otherwise specified, employ Contractor responsible for General Work for all cutting, patching, repairing and replacing of general work required for installation of systems and components included in Electric Work. Secure approval from Architect's representative before cutting.

2. Anchor Bolts: Deliver to Contractor responsible for General Work anchor bolts required for Electric Work construction that are to be installed in construction included in General Contract. Provide templates or holding fixtures as required to maintain proper accuracy.

3. Access Doors: Provide access doors shown on Drawings, or as required for access to pull boxes, junction boxes, relays and other electrical devices requiring periodic inspection, adjustment or maintenance, where located above or within inaccessible walls or ceilings, and including cutting and patching of adjacent walls and ceilings to match existing materials and finishes.

1.11 ALTERATION PROCEDURES

A. In locations where existing devices are indicated to be disconnected and removed and existing power circuit or communications cable is not scheduled to be reused:

1. Remove circuit conductors back to source.

2. Modify panel directory for that circuit.

3. Remove all existing exposed and unexposed accessible raceway.

4. Provide blank cover plates or wall infill (as indicated on plans) and as described below:

a. For single gang and multi-gang switch boxes in public or occupied spaces; stainless steel coverplates.

b. For single gang and multi-gang boxes in un-occupied spaces; stainless steel, galvanized steel or PVC coverplates.

c. For boxes larger than standard switch boxes in public or occupied spaces; remove existing box and provide wall infill, matching existing sub-surface and finished surface conditions. Paint wall to match surrounding finishes.

d. For boxes larger than standard switch boxes in un-occupied spaces; 18 gage galvanized sheet metal coverplate with machined edges. Prime and paint to match surrounding finish conditions.

5. Patch and paint existing walls where disturbed by the electrical work.

B. In locations where existing devices are to remain in place, ensure circuits feeding such devices remain operational. Modify existing circuits as required to allow new construction to occur and to maintain necessary circuitry to existing devices for complete and proper operation.

C. In locations where entire existing system is being removed or modified:

1. Refer to individual system specification sections for documentation and inspection requirements prior to any alteration work on any system.
2. Take all necessary measures to ensure that down time will not compromise safety.
3. Notify Owner, Architect and other Contractors not less than 2 weeks prior to interruptions in service.
4. Coordinate work schedule to minimize duration of system outage during hours when building is occupied.

PART 2 - PRODUCTS

2.1 PENETRATION FIRESTOPPING

A. Submit Manufacturers Product Data Sheets for each type of product selected. Certify that Firestop Material is free of asbestos and lead paint, and complies with local regulations.

1. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

B. Submit system design listings, including illustrations from qualified testing and inspection agency that is applicable to each firestop configuration.

C. Submit a project specific Penetration Firestopping Schedule indicating where each firestop configuration will be used.

2.2 GROUT

A. Description: ASTM C 1107, Grade B, non-shrink, non-metallic, high strength grout, suitable for interior and exterior, above and below grade applications.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

2.3 SEALANTS

A. Comply with requirements for sealants in non-fire rated penetrations specified in Section 07 92 00 "Joint Sealants."

B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Building Systems; Omniplus.
b. Dow Corning Corporation; 786 Mildew Resistant.
c. GE Advanced Materials - Silicones; Sanitary SCS1700.

2.4 ACCESS DOORS

A. Comply with requirements for access doors specified in Section 08 31 13 “Access Doors and Frames” for product requirements.

2.5 PAINT AND FINISHES

A. Refer to Division 09 for painting and finishing.

PART 3 - EXECUTION

3.1 CUTTING AND PATCHING

A. Do not cut waterproofed floors or walls for admission of any equipment or materials and do not pierce any structural members without written permission from Architect.

B. Furnish and install sleeves, inserts, panels, raceways, boxes, and similar infrastructure., ahead of general construction work and maintain Contractor personnel at Site during installation of general construction work to be responsible for and to maintain these items in position.

C. Unless otherwise noted elsewhere in Contract Documents, bear expense of cutting, patching, repairing or replacing of work of other trades made necessary by any fault, error or tardiness on part of Electrical Contract or damage done by Electric Contract. Employ and pay Contractor whose work is involved.

3.2 GROUTING

A. Mix and install grout for electrical equipment base bearing surfaces, other equipment base plates, and anchors.
B. Clean surfaces that will come into contact with grout.
C. Provide forms as required for placement of grout.
D. Avoid air entrapment during placement of grout.
E. Place grout, completely filling equipment bases.
F. Place grout on concrete bases and provide smooth bearing surface for equipment.
G. Place grout around anchors.
H. Cure placed grout.

3.3 SEALANTS

A. Install sealants according to the requirements specified in Section 07 92 00 "Joint Sealants."

3.4 FIRESTOPPING

A. Install firestopping according to the requirements specified in Section 07 84 13 "Penetration Firestopping."

B. Applied Fireproofing:

1. Coordinate the installation of hangers, supports and accessories from the structural steel with the fireproofing installation. Install all hangers and supports prior to installation of fireproofing.

2. Repair or replace existing fireproofing removed as a part of Electrical Work installation.

    a. Employ the services of an approved fireproofing contractor to repair or replace the fireproofing by patching any areas that have been removed or damaged due to the installation of work after the completion of the fireproofing.

C. Repaired or replacement fireproofing shall match the fireproofing adjacent to the repaired area. All warranties shall be maintained.

3.5 ACCESS DOORS

A. Install access doors according to the requirements specified in Section 08 31 13 "Access Doors and Frames.".

END OF SECTION 26 05 00

SECTION 26 05 01 – HAZARDOUS MATERIAL DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section and to all of Divisions 26.

1.2 SUMMARY

A. Section Includes:

1. Selective removal and subsequent off-site disposal of the following hazardous waste:

   a. PCB containing light ballasts.
   b. Mercury containing fluorescent light tubes.

2. Quality assurance requirements including personnel training and certification.

3. Requirements for transport and disposal of hazardous waste materials by legal and appropriate means.

1.3 REFERENCES

A. Regulatory Requirements

1. United States Environmental Protection Agency (EPA)

   a. 40 CFR 260 - Hazardous waste management system: General
   b. 40 CFR 261 - Identification and Listing of Hazardous Waste.
   c. 40 CFR 262 - Standards Applicable to Generators of Hazardous Waste.
   d. 40 CFR 263 - Standards Applicable to Transporters of Hazardous Waste
   e. 40 CFR 264 - Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
   f. 40 CFR 265 - Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
   g. 40 CFR 266 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
   h. 40 CFR 268 - Land Disposal Restrictions
   i. 40 CFR 270 - EPA Administered Permit Programs: The Hazardous Waste Permit Program
   j. 40 CFR 761 - Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, and Use Prohibitions.

2. United States Department of Transportation (DOT)

   a. 49 CFR 171 - General Information, Regulations, and Definitions.

b. 49 CFR 172 - Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements.
c. 49 CFR 173 - Shippers - General Requirements for Shipments and Packaging.
d. 49 CFR 174 - Carriage by Rail.
e. 49 CFR 175 - Carriage by Aircraft.
f. 49 CFR 176 - Carriage by Vessel.
g. 49 CFR 177 - Carriage by Public Highway.
h. 49 CFR 178 - Specifications for Packaging.
i. 49 CFR 179 - Specifications for Tank Cars.
j. 49 CFR 180 - Continuing Qualification for Maintenance of Packaging.

3. New York State Department of Environmental Conservation (DEC)

a. 6 NYCRR 360 - Solid Waste Management Facilities
b. 6 NYCRR 364 - Waste Transporter Permits
c. 6 NYCRR 370 - Hazardous Waste Management System: General.
d. 6 NYCRR 371 - Identification and Listing of Hazardous Wastes.
e. 6 NYCRR 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities.
f. 6 NYCRR 373-1 - Hazardous Waste Treatment, Storage and Disposal Facility Permitting Requirements.
g. 6 NYCRR 373-2 - Final Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities.
h. 6 NYCRR 373-3 - Interim Status Standards for Owners and Operators of Hazardous Waster Facilities.
i. 6 NYCRR 376 - Land Disposal Restrictions.

1.4 HAZARDOUS WASTE GENERATOR STATUS

A. Owner is a Small Quantity Generator as defined by 6 NYCRR 371 and 40 CFR 26. Schedule removal, on-site storage, and transport as required to maintain Owner's status as a Small Quantity Generator.

B. Owner is a Conditionally Exempt Small Quantity Generator as defined by 6 NYCRR 371 and 40 CFR 26. Schedule removals, on-site storage, and transport as required to maintain Owner's status as a Conditionally Exempt Small Quantity Generator.

1.5 DEFINITIONS

A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain Owner's property.

1.6 SUBMITTALS

A. Comply with requirements of SECTION 01 33 00 – Submittal Procedures and as modified below.

B. Proposed Schedule: Submit schedule indicating proposed sequence of operations for removal and disposal to Owner's Representative for review prior to start of removal operations. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.

1. Provide detailed sequence of removals to ensure uninterrupted progress of Owner's on-site operations, including starting and ending dates for each activity.
2. Coordinate with Owner's continuing occupation of portions of existing building and with Owner's partial occupancy of completed new addition or structure, as applicable.
3. Include details for use of elevator and stairs and locations of temporary partitions and means of egress.

C. Photographs or Videotapes: Obtain photographs or videotape recordings of existing conditions of structure surfaces and equipment to remain and adjacent structures and site improvements that might be misconstrued as damage related to removal operations. Submit photographs or videotapes to Owner's Representative prior to start of Work.

D. Transport and Disposal Data

1. Prior to removal, transport or disposal, submit copies of:

a. Valid Waste Transporter Permit, issued by New York State Department of Environmental Conservation.

b. Written communication from designated treatment, storage or disposal facility that it:

1) Is authorized to receive and dispose of waste products generated by this Project;
2) Has capacity to receive and dispose of waste products generated by this and;
3) Will provide or assure that ultimate disposal method indicated on manifest for particular hazardous waste(s) will be followed.

c. Instruction regarding requirements for distribution of waste manifest as completed at time of shipment.

2. Post Disposal Submittals

a. Completely executed waste manifest.

b. Documentation of Hazardous Waste Determination, consisting of:

1) Test results;
2) Waste analyses or
3) Other hazardous waste determination information.

c. Landfill Records: Submit landfill records indicating receipt and acceptance of hazardous waste(s) by landfill facility licensed to accept hazardous waste(s).

E. Quality Control Submittals

1. Qualifications Certification: Submit written certification or similar documentation signed by applicable subcontractor, Contractor and manufacturer (where applicable) indicating compliance with applicable "Qualifications" requirements specified below in "Quality Assurance" article.

1.7 QUALITY ASSURANCE

A. Qualifications

1. Hazardous Material Disposal Subcontractor: Engage experienced firm that has successfully completed hazardous material disposal similar to that indicated for this Project and provides training as required by USEPA, USDOT, NYSDEC and OSHA.

B. Pre-Disposal Conference - Prior to beginning hazardous material disposal, conduct conference at Site to review requirements and conditions for hazardous material disposal with attendance by at least the following:

1. Contractor's representative.
2. Hazardous material disposal subcontractor representative, if applicable.
3. Owner's representative.
4. Architect's representative.

1.8 PROJECT SITE

A. Existing Conditions

1. Building Occupancy: Owner will occupy portions of building immediately adjacent to areas of hazardous material removal operations. Conduct removal operations in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of removal activities that will affect Owner's normal operations.

2. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during hazardous material removal operations.

a. Do not interrupt utilities service occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

b. Maintain fire protection services during removal operations.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Labeling and Packaging Materials: Provide labeling and packaging materials as required by 49 CFR 173 Shippers - General Requirements for Shipments and Packaging.

B. Hazardous Waste Disposal Vehicles: Provide vehicles for transporting hazardous waste possessing valid Industrial Waste Hauler Permit and equipped with appropriate placards affixed as prescribed by United States Department of Transportation regulations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions (by Hazardous Material Disposal subcontractor): Examine conditions under which hazardous material disposal is to be conducted in coordination with Hazardous Materials Disposal Installer and notify affected Contractors and Architect in writing of any conditions detrimental to proper and timely hazardous material disposal. Do not proceed with disposal until unsatisfactory conditions have been corrected in manner acceptable to Hazardous Material Disposal Installer.

1. When Hazardous Material Disposal Installer confirms conditions as acceptable to ensure proper and timely installation and to ensure requirements for applicable warranty or guarantee can be satisfied, submit to Architect written confirmation from applicable Installer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to Hazardous Material Disposal Installer.

2. Survey existing conditions and coordinate with hazardous material disposal requirements indicated to determine extent of hazardous material disposal required.

3. Inventory and record condition of items to be removed and reinstalled and items to be removed and salvaged.

4. Survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during hazardous material disposal operations.

B. Perform additional surveys as hazardous material disposal progresses to detect hazards resulting from hazardous material disposal activities.

3.2 REMOVAL, PACKAGING, TRANSPORTATION AND DISPOSAL PROCEDURES

A. Removal: Remove light ballasts and fluorescent light tubes whole and intact. Do not release PCBs or mercury to the environment.

B. Packaging: Package, label, and mark all hazardous waste materials in accordance with applicable requirements of 49 CFR 173, 178 and 179.

C. Temporary On-Site Storage and Protection: Provide storage on site of hazardous materials removed from service and scheduled for disposal to prevent damage or vandalism.

D. Hazardous Waste Determination: Provide analysis required by Treatment, Storage or Disposal facility to document hazardous waste determination.

E. Hazardous Waste Manifests

1. Maintain manifest from date of transport until date of disposal, destruction or recycling.

2. Return fully executed manifests to Owner within 60 days of date waste accepted by initial transporter.

3. Use following type of manifest as applicable:

a. If waste is to be disposed of in New York State or if waste is to be disposed of in state not requiring use of specific manifest form, use New York State Uniform Hazardous Waste Manifest;

b. If the waste is to be disposed of in state other than New York State and that state requires use of specific manifest form, use manifest required by state where waste is to be disposed in lieu of New York State Uniform Hazardous Waste Manifest.

4. Complete manifest and deliver to Owner for review and signature.

5. Retain copies of manifest required to remain with hazardous waste shipment and deliver remaining copies to Owner.

6. Advise Owner regarding required distribution of manifest, both verbally and in writing.

F. Disposal - Transport hazardous waste to treatment or disposal facility that:

1. Is permitted, licensed or registered by state to dispose of hazardous waste;

2. Has interim status to dispose of hazardous waste;

3. Is authorized to manage hazardous waste under Resource Conservation and Recovery Act (RCRA) or

4. Is facility which:

a. Beneficially uses or reuses, or legitimately recycles or reclaims its waste; or
b. Treats its waste prior to beneficial use or reuse, or legitimate recycling or reclamation.

3.3 ADJUSTING/CLEANING

A. At least weekly, remove from building site debris, rubbish, and other materials resulting from hazardous material disposal operations.

1. If additional hazardous materials are encountered during hazardous material disposal operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

2. Burning of removed materials not permitted on Project Site.

3. Transport materials removed and legally dispose off-site.

B. Sweep building broom clean at end of each workday and on completion of hazardous material removal operations.

C. Upon completion of hazardous material removal, remove tools, equipment, and demolished materials from Site. Remove protections and leave interior areas broom clean. Change filters on air-handling equipment to remain.

END OF SECTION 26 05 01

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Building wires and cables rated 2000 V and less.
2. Connectors, splices, and terminations rated 2000 V and less.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Senator Wire & Cable Company.
5. Southwire Company.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Comply with UL 1277, UL 1685, and NFPA 70 for Type TC-ER cable used in VFC circuits.

E. Conductors: Copper complying with NEMA WC 70/ICEA S-95-658.

1. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN/THWN-2 and Type XHHW-2.

F. Cable: Comply with NEMA WC 70/ICEA S-95-658 for metal-clad cable, Type MC with ground wire.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.
6. Ideal Industries/Buchanan

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1. Conductors No. 8 AWG and smaller: Screw on, wing nut wire connectors with fixed square wire threads and wide throated skirt. UL 486C Listed.

2. Conductors No. 6 AWG to 3/0 AWG: Bolt on type or crimped type compression, seamless copper connectors using hand or hydraulic tool, color coded to wire size. Connector shall be electro-tin plated to resist electrolytic corrosion. UL 486A and UL 486B Listed.

3. Conductors No. 4/0 AWG and larger: Compression type solderless connector, long barrel seamless copper with minimum 2 pressure points per conductor. Fully compatible with industry standard crimping tool-die sets. Color coded to wire size and electro-tin plated to resist electrolytic corrosion. UL 486A Listed.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Branch Circuits: Copper, stranded.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway

B. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

C. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Wire and Cable Installation: Install all wire and cable in approved raceway with exit light circuits, emergency lighting circuits, and special systems wiring installed in separate raceways. Use UL approved lubricants for wire pulling. Tag all feeders, subfeeders, special system wiring and branch circuit wiring at each pull box, junction box, and gutter space indicating point of origin and termination. Install green grounding wire in all raceways for connection to equipment, motors, transformers, and similar equipment. Install low voltage cables as detailed in individual sections.

B. Splices and Terminations: Make all splices accessible. Insulate all splices, taps, and connections to insulation value of conductor. Follow all instructions and recommendations of splice material manufacturer. Terminate low voltage cables with termination blocks as described in individual sections.

1. Common Neutral Conductor: Do not use common neutral for multiple branch circuits.

C. Pull all conductors together where more than one is being installed in raceway.

D. Do not exceed maximum pulling tension of wire being installed. Use pulling compound or lubricant, where necessary. Use compound that will not deteriorate conductor or insulation.

E. Use pulling means, including fish tape, cable or rope that cannot damage raceway or wire.

F. Replace wiring damaged during installation.

G. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

H. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

I. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

J. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

K. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

L. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

M. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."

N. Metal Clad Type "MC" Cable:

1. Install MC cable, parallel and perpendicular to surfaces or structural members following surface contours, where possible.

2. Do not use MC cable for home runs (from panel to first device in branch circuit).

3. Do not install exposed metal clad cable in any areas, including mechanical and electrical spaces.

4. Do not penetrate floor slabs with MC cable.

5. Metal clad cable may be used for switch, receptacle, light fixture, device and fixture branch circuit wiring above ceilings and in walls beyond corridor walls.

6. MC cable shall include a neutral, whether used or not, to a light switch location.

7. Above corridor ceilings, use MC cable for 6 foot light fixture whips.

8. Maintain a clearance of at least 6 inches from hot water and other high temperature pipes and telecommunications conduits, and at least 12 inches from unshielded telecommunications cables.

9. Support MC cable every 6 feet, and within 1 foot of every box, fitting, and cable termination. Do not support MC cable on hung ceilings or on ceiling support wires. The use of cable ties to support MC cable is prohibited.

10. Use MC cable in branch circuit wiring in movable metal partitions and movable gypsum partitions. Install conductors in accordance with partition manufacturer's recommendations.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

D. Splices:

1. Dry Locations:

2. Conductors No. 8 AWG or Smaller: Use spring type pressure connectors or indent type pressure connectors with insulating jackets (except where special type splices are required).

3. Conductors No. 6 AWG or Larger: Use un-insulated indent type pressure connectors. Fill indentations with electrical filler tape and apply insulation tape to insulation equivalent of the conductor, or insulate with heat shrinkable splices.

4. Gutter Taps in Panelboards: Install gutter tap, fill indentations with electrical filler tape and apply insulation tape to insulation equivalent of the conductor, or insulate with gutter tap cover.

5. Damp Locations: As specified for dry locations, except apply moisture sealing tape over entire insulated connection (moisture sealing tape not required if heat shrinkable splices are used).

6. Wet Locations: Use un-insulated indent type pressure connectors and insulate with resin splice kits or heat shrinkable splices. Exception: Totally enclosed splices above ground protected in NEMA 3R, 4, 4x enclosures may be spliced as specified for damp locations.

E. Terminations:

1. Conductors No. 10 AWG or Smaller - Use terminals for:

F. Connecting control and signal wiring to terminal strips.

G. Connecting wiring to equipment designed for use with terminals.

1. Conductors No. 8 AWG or Larger - Use compression or mechanical type lugs for:

H. Connecting cables to flat bus bars.

I. Connecting cables to equipment designed for use with lugs.

1. For Conductor Sizes Larger than Terminal Capacity on Equipment: Reduce larger conductor to maximum conductor size that terminal can accommodate (reduced section not longer than one foot). Use compression or mechanical type connectors suitable for reducing connection.

J. Provide insulated green ground conductor for each branch and feeder circuit.

K. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.

L. All connections and terminations installed according to manufacturer’s recommendations.

M. All bolted or screw-type terminations specifically torqued to setting specified by manufacturer.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 07 84 13 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. Perform each of the following visual and electrical tests:

B. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.

C. Test bolted connections for high resistance using one of the following:

1. A low-resistance ohmmeter.
2. Calibrated torque wrench.
3. Thermographic survey.

D. Inspect compression applied connectors for correct cable match and indentation.

E. Inspect for correct identification.

F. Inspect cable jacket and condition.

G. Insulation-resistance test on each conductor with respect to ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.

H. Continuity test on each conductor and cable.

I. Uniform resistance of parallel conductors.

1. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.

J. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

K. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.

L. Cables will be considered defective if they do not pass tests and inspections.

M. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Grounding and bonding systems and equipment.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: No. 6, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.3 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless, Non-reversible compression or exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

F. Cable-to-Cable Connectors: Non-reversible compression or exothermic-type, copper or copper alloy.

G. Conduit Hubs: Mechanical type, terminal with threaded hub.

H. Ground Rod Clamps: Non-reversible compression or exothermic-type, copper or copper alloy.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install stranded conductors for all sizes unless otherwise indicated.

B. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

1. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

C. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 LABELING

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.

B. Install labels at the telecommunications bonding conductor and grounding terminal bar and at the grounding electrode conductor where exposed.

1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.

a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare and submit all test and inspection reports.

D. Report measured ground resistances that exceed the following values:

1. Substations and Pad-Mounted Equipment: 5 ohms.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 26 05 26

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.
B. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of [**five**] times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.
2. Trapeze hangers. Include Product Data for components.
3. Steel slotted channel systems. Include Product Data for components.
4. Equipment supports.

1.6 QUALITY ASSURANCE

A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.

4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

5. U-Channel Strut Systems: Provide 16 gauge steel U-channel strut system for supporting electrical equipment of types and sizes indicated with 9/16-inch diameter holes at 8 inches on center on top surface, with standard galvanized or PVC finish and following fittings that mate and match with U-channel:

a. Luminaires hangers.
b. Channel hangers
c. End caps
d. Beam clamps
e. Wiring stud.
f. Thin-wall raceway clamps.
g. Rigid conduit clamps.
h. Raceway hangers.
i. U-bolts.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

        1) Cooper B-Line, Inc.; a division of Cooper Industries.
        2) Empire Tool and Manufacturing Co., Inc.
        3) Hilti Inc.
        4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

6. Toggle Bolts: All-steel springhead type.

7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

2.3 MANUFACTURED SUPPORTING DEVICES

A. General: Provide supporting devices, complying with manufacturer's standard materials, design and construction in accordance with published product information, and as required for complete installation, and as specified in this Section. Where more than one type of device meets indicated requirements, select device according to Contractor's option.

1. Fasteners:

a. Standard Bolts and Nuts: ASTM A 307, Grade A, regular hexagon head.
b. Lag Bolts: FS FF-B-561, square head type.
c. Machine Screws: FS FF-S-92, cadmium plated steel.
d. Machine Bolts: FS FF-B-584 heads; FF-N-836 nuts.
e. Wood Screws: FS FF-S-111 flat head carbon steel.
f. Plain Washers: FS FF-W-92, round, general assembly grade carbon steel.
g. Lock Washers: FS FF-W-84, helical spring type carbon steel.
h. Toggle Bolts: Tumble-wing type; FS FF-B-588, type, class and style as required to sustain load.
i. Stainless Steel Fasteners: Type 302 for interior Work; Type 316 for exterior Work.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

E. Install hangers, supports, clamps and attachments to support raceway properly from building structure. Arrange for grouping of parallel runs of horizontal raceways to be supported together on trapeze type hangers where possible.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, as permitted in NFPA 70.

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 (90 kg).

D. Fasteners

1. Materials:

   a. Dry Locations: Use cadmium or zinc coated anchors and fasteners.
   b. Damp and Wet Locations: Use hot dipped galvanized or stainless steel anchors and fasteners.
   c. Corrosive Atmospheres or Other Extreme Environmental Conditions: Use fasteners made of materials suitable for conditions.

2. Types (unless otherwise specified or indicated):

   a. Use cast-in-place concrete inserts in fresh concrete construction for direct pull-out loads such as shelf angles or fabricated metal items and supports attached to concrete slab ceilings.

   b. Use anchoring devices to fasten items to solid masonry and concrete when anchor is not subjected to pull out loads, or vibration in shear loads.

   c. Use toggle bolts to fasten items to hollow masonry and stud partitions.

E. Attachment Devices

1. Make attachments to structural steel or steel bar joists wherever possible. Provide intermediate structural steel members where required by support spacing.

2. Make attachments to steel bar joists at panel points of joists.

3. Do not drill holes in main structural steel members.

4. Use "C" beam clamps for attachment to steel beams

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.

6. To Light Steel: Sheet metal screws.

7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate

8. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

F. Raceway Support

1. Use pipe straps and specified method of attachment where raceway is installed proximate to surface of masonry construction.

2. Use hangers secured to surface with specified method of attachment where raceway is suspended from the surface.

3. Use "C" beam clamps and hangers where raceway is supported from steel beams.

4. Use channel support system supported from structural steel for multiple parallel raceway runs.

5. Where raceways are installed above ceiling, do not rest raceway directly on runner bars, T-bars, etc.

   a. Raceway Sizes 2-1/2 Inches and Smaller: Support raceway from ceiling supports or from construction above ceiling.
   b. Raceway Sizes Over 2-1/2 Inches: Support raceway from beams, joists, or trusses above ceiling.

G. Luminaire Support

1. Do not support luminaires from ceilings or ceiling supports unless specified or indicated on Drawings.

   a. Comply with NEC, Article 410.36 – Means of Support.
   b. Support luminaires with hanger rods attached to beams, joists, or trusses-of largest standard diameter-that fits in mounting holes of luminaires.
   c. Where approved, channel supports may span and rest upon lower chord of trusses and be used to support luminaires.
   d. Where approved, channel supports may span and be attached to underside of beams, joists, or trusses and be used to support luminaires.

2. Use 2 nuts and 2 washers on lower end of each hanger rod to hold and adjust luminaires (one nut and washer above top of luminaires housing, one nut and washer below top of luminaires housing).

    a. Where adequately supported outlet box is specified to support luminaires or be used as one point of support, support box so that box may be adjusted to bring face of outlet box even with surface of ceiling.

3. Ceiling Mounted Luminaires: Provide at least following number of supports with additional supports when recommended by luminaires manufacturer or shown on Drawings.

    a. Support individual luminaires less than 2 feet long at 2 points.

    b. Support continuous row luminaires less than 2 feet wide at points equal to number of luminaires plus one. Uniformly distribute points of support over row of luminaires.

    c. Support individual luminaires 2 feet or wider at 4 corners.

    d. Support continuous row luminaires 2 feet or wider at points equal to twice number of luminaires plus 2. Uniformly distribute points of support over row of luminaires.

    e. Use adequately supported outlet box as one point of support for luminaires weighing less than 50 pounds.

    f. Support recessed mounted luminaires directly from suspension system of suspended acoustical ceilings and securely fasten luminaires to framing members of ceiling using lock clips, wirelashing or leveling supports. Support each luminaires weighing more than 50 pounds (including lamps) independent of suspended ceiling grid.

4. Wall Mounted Luminaires: Provide at least following number of supports with additional supports when recommended by luminaires manufacturer or shown on Drawings.

    a. Support individual luminaires 2 feet long or less at 2 points.
    b. Support individual luminaires over 2 feet long at 3 points.
    c. Support continuous row luminaires at points equal to twice number of luminaires. Uniformly distribute points of support.
    d. Adequately supported outlet box may be used as one point of support for luminaires weighing less than 50 pounds

H. Channel Support System: Channel supports may be used, as approved, to accommodate mounting of equipment with following material and finish.

1. Dry Locations: 16-gage steel channel support system with standard finish.
2. Damp and Wet Locations: 16-gage steel channel support system with hot dipped galvanized or PVC finish

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 5 – Metal Fabrications for site fabricated metal supports.
B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

    1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.
B. ENT: Electrical nonmetallic tubing.
C. EPDM: Ethylene-propylene-diene terpolymer rubber.
D. FMC: Flexible metal conduit.
E. GRC: Galvanized rigid steel conduit
F. LFMC: Liquidtight flexible metal conduit.
G. LFNC: Liquidtight flexible nonmetallic conduit.
H. NBR: Acrylonitrile-butadiene rubber.
I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For wireways and fittings, hinged-cover enclosures, and cabinets, custom enclosures, cabinets, and boxes.

1. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

1.5 QUALITY ASSURANCE

A. 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.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT, TUBING AND FITTINGS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. O-Z Gedney; a unit of General Signal.
7. Wheatland Tube Company.

B. Galvanized Rigid Steel Conduit (GRC): Rigid, hot dipped galvanized steel with galvanized threaded malleable iron fittings and bushings with insulated throat (galvanized steel). ANSI C80.1 and UL 6.

C. Electrical Metallic Tubing (EMT): Metallic galvanized steel tube with galvanized steel compression or setscrew type fittings and bushings with insulated throat (galvanized steel). ANSI C80.3 and UL 797.

D. Flexible Metal Conduit (FMC): Flexible, interlocked aluminum metal strip with galvanized screw-in type steel fittings. UL 1.

E. Liquid Tight Flexible Metal Conduit (LFMC) : Liquid-tight flexible metal raceway with single, flexible, continuous, interlocked and double-wrapped steel core galvanized inside and outside, coated with liquid tight jacket of flexible polyvinyl chloride (PVC). UL 360.

F. Fittings:

1. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

2. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.

3. Fittings for EMT:

a. Material: Steel
b. Type: Setscrew or compression.

4. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

G. Joint Compound for Rigid Steel Conduit: Listed for use in cable connector assemblies and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. CertainTeed Corp.; Pipe & Plastics Group.
6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. Thomas & Betts Corporation.
12. RACO; a Hubbell Company.

B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. RNC: NEMA TC 2, UL 651,Type EPC-40-PVC**,** with matching fittings by same manufacturer as the conduit.

D. ENT: Comply with NEMA TC 13 and UL 1653.

E. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

F. LFNC: UL 1660.

G. Fittings for LFNC: UL 514B.

H. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, UL 870 and NEMA 250, Type 1, 12, 3R, as indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type or as indicated with manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

C. Outlet Boxes

1. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

2. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy**,** Type FD, with gasketed cover.

3. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

4. Materials

a. Recessed Applications and Exposed Applications in Unfinished Spaces: Galvanized, stamped steel.

b. Boxes in stud walls shall be 4” square, 2 1/8” deep boxes with raised covers for power circuits. Provide “Far-Side” box support to keep box alignment parallel with wall face.

c. Boxes in masonry walls shall be 3 ½” deep masonry boxes, single or multigang as required

d. Concrete and Wall in Wet Locations: Heavy duty cast aluminum, thermoset protective silver grey finish, with threaded mounting posts.

e. Weatherproof Outlet Boxes: Corrosion-resistant cast metal weatherproof outlet wiring boxes of appropriate type, shape, size and depth, with threaded conduit ends and cast metal face plates with cover suitably configured for each application~~,~~ and including face plate gaskets and corrosion resistant fasteners. Do not compromise outlet weatherproof integrity when attachment plug is inserted.

f. Junction and Pull Boxes: Galvanized code gauge sheet steel boxes with screw-on covers, of appropriate type, shape and size suitable for box location and installation with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

5. Size: As required for number and size of raceways and conductors. Depth to suit wall depth and device installed.

6. Covers: Design and style for each type, outlet, junction box, etc.; NEMA rated for each location.

D. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic.

E. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Raceway Installation: Securely support raceway from building construction, separately from outlet boxes and junction boxes. Secure to masonry surfaces with expansion anchors. Use galvanized hanger rods, inserts and hangers. Conceal all raceway runs except in mechanical rooms, storage room ceilings, and areas above suspended ceilings. Run exposed raceway neatly, parallel and level, to ceilings, walls and floors. Make necessary offsets and bends to comply with construction. Install expansion fittings at all building expansion joints. Support all raceways with clamps per National Electric Code

1. GRC Installation: Use GRC in concrete slabs, below concrete slabs, below grade, damp locations, exterior locations and in hazardous locations. Where exposed leaving concrete slabs, extend minimum 6 inches above and below slabs. Use GRC elbows when penetrating concrete slab from PVC raceway below or in slabs.

2. RNC: Use for underground applications, in slabs, and below slabs. Provide rigid raceway when extending through slabs. Install in accordance with requirements of Article 352 of NEC. Make solvent-cemented joints in accordance with recommendations of manufacturer.

3. EMT: Use EMT for non-hazardous, dry locations above grade. As a minimum, use EMT in corridor ceilings, for home runs and in all unoccupied exposed interior areas. Surface mounted EMT shall not be used in finished areas without written permission from the Architect or Owner.

4. FMC: Use flexible metal conduit for final connections to motors, step-down transformers, vibrating machines, etc. Terminate with clamp type connectors and anti-short bushing. Maximum length of three feet.

5. LFMC: Use a maximum of two feet of liquid tight flexible conduit for connection of motors and for other electrical equipment where subject to movement and vibration and also where subjected to one or more of the following conditions:

    a. Exterior location.
    b. Moist or humid atmosphere where condensate can be expected to accumulate.
    c. Corrosive atmosphere.
    d. Subjected to water spray.
    e. Subjected to dripping oil, grease or water

6. LFNC: Use a maximum of three feet of liquid tight flexible nonmetallic conduit for connection to video cameras and other electrical equipment with extreme bending requirements and also where subjected to one or more of the following conditions:

    a. Exterior location.
    b. Corrosive atmosphere.

7. All non-metallic or flexible conduit shall contain a separate grounding conductor in addition to the circuit conductors.

8. Complete raceway installation before starting conductor installation.

9. Do not secure branch circuit wiring to ceiling support wires. Provide independent support wires dedicated only to electrical raceways.

10. Use roughing-in dimensions of electrically operated units furnished by supplier. Set conduit and boxes for connection to units only after receiving dimensions and after checking location with other trades.

11. Provide nylon pull cord in empty raceways. Test empty raceways with ball mandrel. Clear any raceway that rejects ball mandrel. Restore raceway and surrounding surfaces to original condition.

12. Fasten raceway terminations in sheet metal enclosures by 2 locknuts and terminate with bushing. Install locknuts inside and outside of enclosure.

13. Do not cross pipe shafts or ventilating duct openings with raceways.

14. Keep raceways at least 6 inches from parallel runs of flues, hot water pipes or other sources of heat. Wherever possible, install horizontal raceway runs above water and steam piping.

B. Concealed Raceways

1. Paint raceway threads in metallic raceways installed underground, in floors below grade, or outside with corrosion-inhibiting compound before assembling couplings. Draw coupling and raceway sufficiently tight to ensure water tightness.

2. For floors-on-grade, install raceways under concrete slabs.

3. Install underground raceways minimum of 18 inches below finished grade.

4. Provide raceway in furniture and any other cavity to effectively create a raceway system from the ceiling space to the outlet.

5. Stub-ups to Above Recessed Ceilings:

   a. Use EMT for raceways.
   b. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

C. Install raceways to avoid damage or penetration of structural members. Avoid horizontal or cross runs in building partitions or sidewalls.

D. For raceway larger than 2 inches, provide minimum 2 inches between raceways vertically penetrating elevated concrete slabs. Provide fire-stopping and spray-on fireproofing at locations where raceways penetrate surface of floor slab that is part of fire rating required for construction.

E. Change from ENT to GRC before rising above floor. Arrange stub-ups so curved portions of bends are not visible above finished slab.

F. Exposed Raceways

1. Use exposed raceway on exterior surfaces and interior finished spaces only when raceway type and routing are approved by Owner.

2. Install exposed raceway in unfinished spaces, crawl spaces, pipe spaces, or in areas with existing exposed raceway. In areas where walls/ceilings are to be painted, exposed raceways shall be painted to match.

3. Install exposed raceways and extensions from concealed raceway systems neatly, parallel with, or at right angles to walls of building.

4. Do not run raceway through walls with plaster finish or through masonry walls or floors. Install pipe sleeves for raceway runs through these areas.

5. Install exposed raceway to avoid interfering with ceiling inserts, lights or ventilation ducts or outlets.

6. Support exposed raceways using hangers, clamps or clips. Support raceways on each side of bends and space not more than 6 ft. O.C. for 1-inch raceway and not more than 8 ft. O.C. for 1-1/4-inch raceway.

7. Provide exposed raceways for outlets on waterproof walls and set anchors supporting raceway in waterproof cement.

8. Support multiple raceway runs on trapeze style assemblies. Do not support raceway or cable from pipe, ductwork, or other raceway systems.

9. Apply exposed raceways requirements specified above to raceways installed in space above hung ceilings and in crawl spaces.

10. Do not install raceway directly on floors.

G. Minimum Raceway Size: 1/2-inch (16-mm)

H. Surface Raceways: Surface Raceways are only to be used when concealed raceways are not possible with cutting/sawcutting and patching and with Owner's approval. With Owner's approval, use surface raceways in finished spaces to conceal new cabling that cannot be installed above accessible ceiling or within walls. Use surface raceway only when raceway type and routing are approved by Architect and Owner's representative. Securely support from building construction and secure to masonry surfaces with expansion anchors. Mount at heights at locations shown on Drawings; obtain approval from Architect and Owner's representative for all routing not indicated on Drawings. Do not run surface raceway through walls with plaster finish or through masonry walls or floors. Install pipe sleeve with junction boxes or adapter fittings for raceway runs through these areas. In existing construction, run raceway along top of baseboards, taking care to avoid telephone and other signal wiring around doorframes and other openings. Run raceway on ceiling or walls perpendicular to or parallel with walls and floors.

I. Raceways for Future Use (Spare Raceways and Empty Raceways): Draw fish tape through raceways in Architect's presence to demonstrate that raceway is clear of obstructions. Leave pulling-in line in each spare and empty raceway.

J. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Provide locknuts for securing raceway to metal enclosure with sharp edge for digging into metal and ridged outside circumference for proper fastening.

2. Provide bushings for terminating raceways smaller than 1-1/4 inches with flared bottom and ribbed sides with smooth upper edges to prevent injury to cable insulation.

3. Install insulated type bushings for terminating raceways 1-1/4 inches and larger with flared bottom and ribbed sides and with upper edge with phenolic insulating ring molded into bushing.

4. Provide screw-type grounding terminal for standard or insulated type bushing.

5. Provide miscellaneous fittings such as reducers, chase nipples, 3-piece unions, split couplings and plugs specifically designed for their particular application.

K. Expansion-Joint Fittings:

1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C) and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).

2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:

a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.

4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.

5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

L. Fittings and Accessories Installation

1. Use zinc electroplate or hot dipped galvanized steel fittings and accessories in conjunction with ferrous raceways in dry and damp locations.

2. Use hot dipped galvanized fittings and accessories in conjunction with ferrous raceways in wet locations.

3. Use caps or plugs to seal ends of raceways until cable is installed (to exclude foreign material).

4. Use deflection fittings where raceways cross expansion joints that move in more than one plane.

5. Use 2 locknuts and insulated bushing (plastic bushing on 1/2-inch raceway and 3/4-inch raceway) on end of each raceway entering sheet metal cabinet or box in dry or damp locations. Terminate raceway ends within cabinet/box at same level.

6. Use watertight hub on end of each raceway entering cabinets or boxes (in wet locations) not constructed with integral threaded hubs.

7. Specific Applications:

   a. Galvanized Rigid Conduit: Use threaded fittings and accessories. Use 3-piece raceway coupling where raceway cannot be rotated.
   b. Flexible Metal Raceway: Use flexible metal raceway connectors.
   c. Liquid Tight Flexible Metal Raceway: Use “seal-tite” connectors.

8. Rigid Nonmetallic Raceway, Metal Raceway, and Wireways: Use manufacturer's standard fittings and accessories.

3.2 EXISTING RACEWAYS

A. Conditions for Re-Use of Existing Raceways:

1. Existing raceway is adequately sized for new cables.
2. Remove existing cables.
3. Demonstrate to Architect that existing raceway is clear of obstructions and in good condition.
4. Install insulated bushings to replace damaged or missing bushings. Replace non-insulated bushings with insulated bushings on raceway sizes 1 inch and larger.

3.3 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on drawings or in this article are stricter.

B. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:

1. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

3.4 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 05 33

SECTION 26 05 44 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sleeves for raceway and cable penetration of walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

B. Related Requirements:

1. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 “Penetration Firestopping”.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product specified.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

E. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel.

2. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).

b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Advance Products & Systems, Inc.
b. CALPICO, Inc.
c. Metraflex Company (The).
d. Pipeline Seal and Insulator, Inc.
e. Proco Products, Inc.

2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of raceway. Include type and number required for raceway material and size of raceway.

3. Pressure Plates: Stainless steel.

4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 GROUT

A. Description: Non-shrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
D. Packaging: Premixed and factory packaged.

2.4 SILICONE SEALANTS

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

2. Sealant shall have VOC content of 40 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

3. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:

a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 07 92 00 "Joint Sealants."

b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.

4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.

5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between raceway and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
B. 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.
C. Secure nailing flanges to concrete forms.
D. Using grout, seal the space around outside of sleeve-seal fittings.

3.4 SLEEVE INSTALLATION FOR FIRE RATED ASSEMBLY PARTITIONS

A. Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

B. Maintain indicated fire rating of walls, partitions, ceilings and floors at raceway penetrations. Install sleeves and sleeve seals with appropriate firestop materials. Comply with Division 07 Section “Penetration Firestopping”.

END OF SECTION 26 05 44

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Warning labels and signs.
5. Instruction signs.
6. Equipment identification labels.
7. Miscellaneous identification products.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1.
B. Comply with NFPA 70.
C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
D. Comply with ANSI Z535.4 for safety signs and labels.
E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

G. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.2 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

F. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.3 FLOOR MARKING TAPE

A. 2-inch-wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.4 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.5 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.

3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

2.6 EQUIPMENT IDENTIFICATION LABELS

A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
B. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
C. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.7 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one-piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one-piece, self-locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one-piece, self-locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.8 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

I. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Cables within Buildings: Identify raceways and the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:

1. Emergency Power.
2. Exit lights
3. Power.
4. UPS.

B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.

b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

C. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

D. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.

E. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

F. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

G. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels:

1. Comply with 29 CFR 1910.145.

2. Identify system voltage with black letters on an orange background.

3. Apply to exterior of door, cover, or other access.

4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:

    a. Power transfer switches.
    b. Controls with external control power connections.

H. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

I. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.

J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

    a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.

    b. Outdoor Equipment: Engraved, laminated acrylic or melamine label, Stenciled legend 4 inches high.

    c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

    d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

    a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.

    b. Enclosures and electrical cabinets.

    c. Access doors and panels for concealed electrical items.

    d. Switchgear.

    e. Switchboards.

f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.

g. Substations.

h. Emergency system boxes and enclosures.

i. Enclosed switches.

j. Enclosed circuit breakers.

k. Enclosed controllers.

l. Variable-speed controllers.

m. Push-button stations.

n. Power transfer equipment.

o. Contactors.

p. Remote-controlled switches, dimmer modules, and control devices.

END OF SECTION 26 05 53

SECTION 26 08 00 - COMMISSIONING OF ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1. See especially Section 01 08 00, “General Commissioning Requirements” for general commissioning process requirements and Commissioning Coordinator responsibilities.

1.2 SUMMARY

A. Section includes commissioning process requirements for Lighting Control Systems, which are described in more detail in the technical specification 26 09 23 Lighting Control Devices.

1.3 DEFINITIONS

A. CxA: Commissioning Authority.

1.4 SUBMITTALS

A. Submittals shall comply with the requirements of the Construction Contract Clauses, Section 01 33 00 "Submittal Procedures" and the individual sections specifying the work.
B. Prefunctional Checklists of readiness.
C. Prefunctional Checklists of completion of installation, prestart, and startup activities.
D. Certificates of readiness and completion of installation.
E. Test and inspection reports and certificates.
F. Corrective action documents.
G. Functional Performance Test Procedures

1.5 QUALITY ASSURANCE

A. Lighting Control Testing Technician Qualifications: Technicians to perform Lighting Control Construction Prefunctional Checklist verification tests and demonstrations, functional performance tests and demonstrations shall have the following minimum qualifications:

1. Journey-level or equivalent skill level in Electrical Testing or Installation. Vocational School four-year program graduate or an Associate’s degree in electrical systems, or similar field. Degree may be offset by three years' experience in servicing electrical systems in the HVAC or Electrical industry.

1.6 CONTRACTOR'S RESPONSIBILITIES

A. Provide Electrical work in accordance with contract document requirements for Lighting Control Systems.

B. Perform commissioning tests at the direction of the CxA.

C. Attend construction phase coordination meetings.

D. Attend testing, adjusting, and balancing review and coordination meeting.

E. Participate in Lighting Control systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

F. Provide information requested by the CxA for final commissioning documentation.

G. Provide measuring instruments and logging devices to record test data and provide data acquisition equipment to record data for the complete range of testing for the required test period.

1.7 CxA'S AUTHORITY

A. Provide Project-specific construction checklists and commissioning process test procedures for actual Lighting Control systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.

B. Directing commissioning.

C. Verify testing, adjusting, and balancing of Work are complete.

D. Provide test data, inspection reports, and certificates in Systems Manual.

1.8 COMMISIONING DOCUMENTATION

A. Provide the following information to the CxA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for Lighting Control system to be verified and tested.
4. Prefunctional Checklists certifying that installation, prestart checks, and startup procedures have been completed.
5. Prefunctional Checklists certifying that Lighting Control systems, subsystems, equipment, and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.
8. Verification of testing and adjusting reports.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

A. Certify that Lighting Control systems have been installed, calibrated, and started and are operating according to the Contract Documents.
B. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.2 GENERAL TESTING REQUIREMENTS

A. The CxA in cooperation with the Electrical Contractor shall prepare detailed testing plans, procedures, and checklists for Lighting control systems.

3.3 LIGHTING CONTROL SYSTEMS FUNCTIONAL TESTING PROCEDURES

A. Lighting Control System Functional Testing and Acceptance Procedures:

1. Occupancy Sensor Controls:

a. Certify that the occupant sensor has been located and aimed in accordance with manufacturer recommendations.

b. Each occupancy sensor shall be tested, where applicable.

1) Verify the correct operation of occupant sensor controls status indicators.
2) Verify the controlled lights turn off or down to the permitted level within the required time.
3) Verify the lights turn on to the permitted level when an occupant enters the space for auto-on occupant sensor controls.
4) Verify the lights turn on only when manually activated for manual-on occupancy sensors.
5) Verify the lights are not incorrectly turned on by movement in adjacent areas or by HVAC operation.

2. Daylight Responsive Controls

a. Verify control devices have been properly located, field calibrated and set for accurate setpoints and threshold light levels.
b. Verify daylight controlled lighting loads adjust to light level set points in response to available daylight.
c. Verify the locations of calibration adjustment equipment are readily accessible to authorized personal.

B. Provide documentation and certification to the CxA.

C. Lighting Control systems are shown on the contract drawings.

END OF SECTION 26 08 00

SECTION 26 09 23 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standalone daylight-harvesting switching controls.
2. Indoor occupancy sensors.

B. Related Requirements:

1. Section 26 27 26 "Wiring Devices" for and manual light switches.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.
2. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of lighting control device to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 DAYLIGHT-HARVESTING SWITCHING CONTROLS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Leviton Manufacturing Co., Inc.
2. Steinel

B. Ceiling-Mounted Switching Controls: Solid-state, light-level sensor unit, with separate power pack, to detect changes in indoor lighting levels that are perceived by the eye.

C. Electrical Components, Devices, and Accessories:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F (0 to 49 deg C).

3. Sensor Output: Contacts rated to operate the associated power pack, complying with UL 773A. Sensor is powered by the power pack.

4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.

5. General Space Sensors Light-Level Monitoring Range: 10 to 200 fc (108 to 2152 lux), with an adjustment for turn-on and turn-off levels within that range.

6. Atrium Space Sensors Light-Level Monitoring Range: 100 to 1000 fc (1080 to 10 800 lux), with an adjustment for turn-on and turn-off levels within that range.

7. Skylight Sensors Light-Level Monitoring Range: 1000 to 10,000 fc (10 800 to 108 000 lux), with an adjustment for turn-on and turn-off levels within that range.

8. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling.

9. Set-Point Adjustment: Equip with deadband adjustment of 25, 50, and 75 percent above the "on" set point, or provide with separate adjustable "on" and "off" set points.

10. Test Mode: User selectable, overriding programmed time delay to allow settings check.

11. Control Load Status: User selectable to confirm that load wiring is correct.

12. Indicator: Two digital displays to indicate the beginning of on-off cycles.

2.2 DAYLIGHT-HARVESTING DIMMING CONTROLS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Leviton Mfg. Company Inc.
2. Steinel

B. System Description: Sensing daylight and electrical lighting levels, the system adjusts the indoor electrical lighting levels. As daylight increases, the lights are dimmed.

1. Lighting control set point is based on two lighting conditions:

a. When no daylight is present (target level).
b. When significant daylight is present.

2. System programming is done with two hand-held, remote-control tools.

a. Initial setup tool.
b. Tool for occupants to adjust the target levels by increasing the set point up to 25 percent, or by minimizing the electric lighting level.

C. Ceiling-Mounted Dimming Controls: Solid-state, light-level sensor unit, with separate controller unit, to detect changes in lighting levels that are perceived by the eye.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Sensor Output: 0- to 10-V dc to operate electronic dimming ballasts. Sensor is powered by controller unit.
3. Power Pack: Sensor has 24-V dc, Class 2 power source, as defined by NFPA 70.
4. Light-Level Sensor Set-Point Adjustment Range: 20 to 60 fc (120 to 640 lux).

2.3 INDOOR OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Leviton Manufacturing Co., Inc.
2. Steinel

B. General Requirements for Sensors: Wall- or ceiling-mounted, solid-state indoor occupancy sensors with a separate power pack.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.

3. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.

4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.

5. Mounting:

   a. Sensor: Suitable for mounting in any position on a standard outlet box.
   b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
   c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

6. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.

7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lux); turn lights off when selected lighting level is present.

C. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.

2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).

3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

2.4 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

A. Wiring Method: Comply with Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch (13 mm).
B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
D. Splices, Taps, and Terminations: Make connections only in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

A. Identify components and power and control wiring according to Section 26 05 53 "Identification for Electrical Systems."

1. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.

2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Lighting control devices will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.

3.7 DEMONSTRATION

A. Coordinate demonstration of products specified in this Section with demonstration requirements for controls.
B. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 26 09 23

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Snap switches.

1.3 DEFINITIONS

A. GFCI: Ground-fault circuit interrupter.
B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
C. UTP: Unshielded twisted pair.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
2. Cord and Plug Sets: Match equipment requirements.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.6 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand (Pass & Seymour).

B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranded building wire.
2. Devices shall comply with the requirements in this Section.

2.3 STRAIGHT-BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cooper; 5351 (single), CR5362 (duplex).
b. Hubbell; HBL5351 (single), HBL5352 (duplex).
c. Leviton; 5891 (single), 5352 (duplex).
d. Pass & Seymour; 5361 (single), 5362 (duplex).

2.4 GFCI RECEPTACLES

A. General Description:

1. Straight blade, non-feed-through type.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.

3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cooper; VGF20.
b. Hubbell; GFR5352L.
c. Pass & Seymour; 2095.
d. Leviton; 7590.

2.5 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Single Pole:

1) Cooper; AH1221.
2) Hubbell; HBL1221.
3) Leviton; 1221-2.
4) Pass & Seymour; CSB20AC1.

C. Key-Operated Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cooper; AH1221L.
b. Hubbell; HBL1221L.
c. Leviton; 1221-2L.
d. Pass & Seymour; PS20AC1-L.

2. Description: Single pole, with factory-supplied key in lieu of switch handle.

2.6 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035-inch- (1-mm-) thick, satin-finished, Type 302 stainless steel.
3. Material for Unfinished Spaces: Galvanized steel.

4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

C. Cover Plates:

1. Stainless Steel Cover Plates: Type 302 or 304, satin finish, 0.040 inch thick, accurately die cut, protected with release paper. Flush mounting plates shall be beveled with smooth rolled outer edge. Surface mounting plates shall be beveled and pressure formed for smooth edge to fit box. Single and combination plates as required to match types and sizes of specified wiring devices.

2. Weatherproof Cover Plates: Receptacles in wet locations shall be installed with a hinged outlet cover/enclosure clearly marked “Suitable For Wet Locations While in Use” and “UL Listed”. There must be a gasket between the enclosure and the mounting surface, and between the hinged cover and the mounting plate/base to assure proper seal. The installation shall be in compliance with NEC Article 410-57(b). Specification Grade die cast aluminum (copper free alloy 360)as manufactured by Hubbell Corp. (or approved equal).

3. Dust Tight Cover Plates: Receptacles in non-hazardous, high dust environments shall be installed with a gasketed, spring door cover that closes tightly automatically to protect receptacle from dust and dirt when not in use. With plug inserted, a heavy-duty gasket in the throat of the receptacle shall seal around the plug body to keep out dust and dirt. The cover shall be suitable for mounting to standard FS/FD surface or flush mounted boxes. Suitable for all NEMA configuration receptacles and toggle switches. Appleton FSK-W series or approved equal.

D. Material for unfinished spaces: Galvanized steel.

2.7 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.
2. Wiring Devices Connected to Emergency Power System: Red.

B. Wall Plate Color: For plastic covers, match device color.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.

2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.

2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

4. Existing Conductors:

   a. Cut back and pigtail, or replace all damaged conductors.
   b. Straighten conductors that remain and remove corrosion and foreign matter.
   c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.

2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.

3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.

4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.

5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.

6. Use a torque screwdriver when a torque is recommended or required by manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

8. Tighten unused terminal screws on the device.

9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical. Group adjacent switches under single, multigang wall plates.

3.2 GFCI RECEPTACLES

A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

A. Comply with Section 26 05 53 "Identification for Electrical Systems."

B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.

2. Percent Voltage Drop under 15-A Load: A value of 5 percent or higher is unacceptable.

3. Ground Impedance: Values of up to 2 ohms are acceptable.

4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.

5. Using the test plug, verify that the device and its outlet box are securely mounted.

6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

C. Wiring device will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 26 27 26

SECTION 26 51 19 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Downlight.
2. Surface mount, linear.
3. Exit Signs
4. Germicidial
5. Materials.
6. Luminaire support.

B. Related Requirements:

1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.3 DEFINITIONS

A. CCT: Correlated color temperature.
B. CRI: Color Rendering Index.
C. Fixture: See "Luminaire."
D. IP: International Protection or Ingress Protection Rating.
E. LED: Light-emitting diode.
F. Lumen: Measured output of lamp and luminaire, or both.
G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Arrange in order of luminaire designation.

2. Include data on features, accessories, and finishes.

3. Include physical description and dimensions of luminaires.

4. Include emergency lighting units, including batteries and chargers.

5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.

6. Photometric data and adjustment factors based on laboratory tests, complying with IES "Lighting Measurements Testing and Calculation Guides" for each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project ES LM-79and IES LM-80.

    a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

    b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.6 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications:

1. Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

2. Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

B. Provide luminaires from a single manufacturer for each luminaire type.

C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.8 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:

a. "USE ONLY" and include specific lamp type.
b. Lamp diameter, shape, size, wattage, and coating.
c. CCT and CRI.

C. Recessed luminaires shall comply with NEMA LE 4.

D. California Title 24 compliant.

2.2 DOWNLIGHT

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Utopia.
2. Zaniboni
3. HE Williams

B. Nominal Operating Voltage: 120 V -277 V ac.

C. Lamp:

1. Minimum lumens - refer to luminaire schedule.

2. Minimum allowable efficacy of 90.

3. CRI of 80 CCT of 3500k.

4. Rated lamp life of 50,000 hours to L70.

5. Dimmable from 0-10 percent to zero percent of maximum light output.

6. Internal driver.

7. User-Replaceable Lamps:

a. Bulb shape complying with ANSI C78.79.

b. Lamp base complying with ANSI C81.61.

8. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.
2. powder-coat finish.
3. Universal mounting bracket.
4. Integral junction box with conduit fittings.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

F. Diffusers and Globes:

1. Fixed lens.
2. Batwing light distribution.
3. UV-stabilized acrylic
4. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
5. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

G. Standards:

1. ENERGY STAR certified.

2. RoHS compliant.

3. UL Listing: Listed for damp location.

4. Recessed luminaires shall comply with NEMA LE 4.

5. Internal driver.

6. User-Replaceable Lamps:

a. Bulb shape complying with ANSI C78.79.
b. Lamp base complying with ANSI C81.61

7. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

H. Housings:

1. Extruded-aluminum housing and heat sink.
2. Clear anodized finish.
3. With integral mounting provisions.

I. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

J. Diffusers and Globes:

1. Tempered Fresnel glass.
2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
3. Glass: Annealed crystal glass unless otherwise indicated.
4. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

K. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.3 SURFACE MOUNT, LINEAR

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Utopia.
2. Coronet
3. Barbican

B. Nominal Operating Voltage: 120 V – 277 V ac.

C. Lamp:

1. Refer to luminaire schedule.

2. Minimum allowable efficacy of 90 lm/W.

3. CRI of 80 CCT 3500K.

4. Rated lamp life of 50,000hours to L70.

5. Dimmable from 0-10 percent to zero percent of maximum light output.

6. Internal driver.

7. User-Replaceable Lamps:

   a. Bulb shape complying with ANSI C78.79.
   b. Lamp base complying withANSI C81.61

8. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.
2. Powder-coat finish.
3. With integral mounting provisions.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during re-lamping and when secured in operating position.

F. Diffusers and Globes:

1. UV-stabilized acrylic
2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
3. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

G. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.4 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.

2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

a. Battery: Sealed, maintenance-free, nickel-cadmium type.

b. Charger: Fully automatic, solid-state type with sealed transfer relay.

c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

f. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.

g. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

3. Master/Remote Sign Configurations:

a. Master Unit: Comply with requirements above for self-powered exit signs and provide additional capacity in battery for power connection to remote unit.

b. Remote Unit: Comply with requirements above for self-powered exit signs, except omit power supply, battery, and test features. Arrange to receive full power requirements from master unit. Connect for testing concurrently with master unit as a unified system.

2.5 GERMICIDAL

A. Provide certified high-intensity antimicrobial wavelengths of 405 nanometers continuous surface cleaning wherever lighting touches inclusive of the following details:

1. Cable, suspended or wall mount
2. Automatic dimming (0-10V)..
3. Offered with emergency circuit.
4. Removable/replaceable electronics module.
5. Antimicrobial protection combined with white light.
6. CRI of 85, R9 of 10
7. Complies with IEEE C62.41 for surge endurance up to 2.5KV.
8. LED boards with patented single-diode technology that meets international standards for continuous and unrestricted use around people.
9. Compatible with AC (line voltage) driven TLED lampstops the growth of and kills viruses, bacteria, fungi, yeast, mold and mildew with visible light 24 hour recharge time.

2.6 LUMINAIRE SCHEDULE

A. Refer to Luminaire Schedule on Drawings.

2.7 LUMINAIRE SUPPORT

A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
C. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage.
D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and re-lamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaires:

1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

F. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of two locations, spaced near corners of luminaire.

G. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

3.6 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

C. Remove and replace with new, all broken glassware, plastic or fixtures damaged before final acceptance at no additional expense to Owner.

D. No allowance made for breakage or theft before final acceptance.

E. Immediately prior to occupancy, damp clean all diffusers, glassware, fixture trims, reflectors, lamps, and replace burned- out lamps.

3.7 STARTUP SERVICE

A. Verify all luminaires function in conjunction with lighting control system and perform as intended.

1. Illumination is adequate and measured satisfactorily.
2. Dimming performs satisfactorily in accordance with specification.
3. 1 Hour of training of Owner includes technical information about luminaires and is completed in conjunction with lighting control specification.

3.8 UTILITY REBATES

A. Provide Owner with all receipts for the light fixtures, luminaires, etc. eligible for current utility rebate programs at completion of Contract, allowing Owner to apply for rebates and schedule utility company inspections. Provide copy to Architect for record.

END OF SECTION 26 51 19

SECTION 28 31 11 - DIGITAL, ADDRESSABLE FIRE-ALARM and VOICE NOTIFICATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Scope:

1. At Cornwall Schools, extend existing fire alarm system as required to incorporate fire alarm work shown on the floor plans. Provide programming for all new devices.

B. Section Includes:

1. Manual fire-alarm boxes.
2. System smoke detectors.
3. Notification appliances.

1.3 REFERENCES

A. Comply with New York State Uniform Fire Prevention & Building Code.

B. Comply with U.S. Department of Justice – American Disabilities Act.

C. National Fire Protection Association Standards:

1. NFPA 70 - National Electrical Code.
2. NFPA 72 - National Fire Alarm Code.
3. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

D. Provide system and components listed by Underwriters Laboratories Inc. (UL) for use in fire protective signaling system under following standards as applicable:

1. UL 864 - UOJZ, APOU Control Units for Fire Protective Signaling Systems.
2. UL 268 - Smoke Detectors for Fire Protective Signaling Systems.
3. UL 268A - Smoke Detectors for Duct Applications.
4. UL 521 - Heat Detectors for Fire Protective Signaling Systems.
5. UL 228 - Door Holders for Fire Protective Signaling Systems.
6. UL 464 - Audible Signaling Appliances.
7. UL 1971 - Visual Signaling Appliances.
8. UL 38 - Manually Activated Signaling Boxes.
9. UL 1481 - Power Supplies for Fire Protective Signaling Systems.

1.4 DEFINITIONS

A. LED: Light-emitting diode.
B. NICET: National Institute for Certification in Engineering Technologies.
C. LOC: Local Operating Console.

1.5 SYSTEM DESCRIPTION

A. Non-coded, UL-certified addressable system, with automatic sensitivity control of certain smoke detectors and multiplexed signal transmission, dedicated to fire-alarm service only.

B. This work includes modification of fire alarm systems as described herein and on the contract drawings for the Cornwall Central School District. Include in the system wiring, raceways, pull boxes, outlet and mounting boxes, initiating devices, alarm notification appliances, and other accessories and miscellaneous items required for a complete operating system even though each item is not specifically mentioned or described. Provide systems complete and ready for operation.

C. Provide equipment, materials, installation, workmanship, inspection, and testing in strict accordance with the required and advisory provisions of NFPA 70, NFPA 72, except as modified herein. The system layout on the drawings show the intent of coverage and are shown in suggested locations. Submit plan view drawing showing device locations, terminal cabinet locations, junction boxes, other related equipment, conduit routing, wire counts, circuit identification in each conduit, and circuit layouts for all floors. Drawings shall comply with the requirements of NFPA 170. Final quantity, system layout, and coordination are the responsibility of the Contractor. A single fire alarm control panel is indicated with terminal cabinets at each floor, at each riser location.

1.6 SUBMITTALS

A. General Submittal Requirements:

1. Shop Drawings shall be prepared by persons with the following qualifications:

   a. Trained and certified by manufacturer in fire-alarm system design.
   b. NICET-certified fire-alarm technician, Level IV minimum.

B. Product Data: Submit manufacturer's documentation for all components of proposed fire alarm system required to demonstrate compliance with specified requirements, including (but not limited to) type, size rating, style, catalog number, manufacturer name, photograph, and catalog data sheet for each component.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
2. Include voltage drop calculations for notification appliance circuits with the system operating on battery power, with battery voltage to the system at 20 volts.

3. Include complete one-line riser diagrams showing all equipment locations and sizes, and point-by-point wiring diagram with type and number of all conductors.

4. Installer

    a. Fire Alarm installer with a minimum of two years of experience utilized to assist in the installation of fire alarm/voice notification devices, cabinets and panels]. An electrician shall be allowed to install wire, cable, conduit and backboxes for the fire alarm system/voice notification system. The Fire Alarm installer shall be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.Test Personnel

    b. Fire Alarm Technicians with a minimum of eight years of experience (NICET Level III or , IV) utilized to test and certify the installation of the fire alarm/voice notification devices, cabinets and panels. The Fire Alarm technicians testing the equipment shall be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

5. Manufacturer's Representative

    a. The fire alarm and voice notification equipment manufacturer's representative shall be present for the connection of wiring to the control panel. The Manufacturer's Representative shall be an employee of the manufacturer with necessary technical training (NICET Level III or, [IV])on the system being installed.

6. Manufacturer

    a. Components shall be of current design and shall be in regular and recurrent production at the time of installation. Provide design, materials, and devices for a protected premises fire alarm system, complete, conforming to NFPA 72, except as otherwise or additionally specified herein.

D. Regulatory Requirements

1. Requirements for Fire Protection Service

    a. Equipment and material shall have been tested by UL and listed in UL Fire Prot Dir or approved by FM and listed in FM APP GUIDE. Where the terms "listed" or "approved" appear in this specification, they shall mean listed in UL Fire Prot Dir or FM APP GUIDE. The omission of these terms under the description of any item of equipment described shall not be construed as waiving this requirement. All listings or approval by testing laboratories shall be from an existing ANSI or UL published standard.

2. Fire Alarm/Voice Notification System

    a. Furnish equipment that is compatible and is UL listed, FM approved, or listed by a nationally recognized testing laboratory for the intended use. All listings by testing laboratories shall be from an existing ANSI or UL published standard. Submit a unique identifier for each device, including the control panel and initiating and indicating devices, with an indication of test results, and signature of the factory-trained technician of the control panel manufacturer and equipment installer. With reports on preliminary tests, include printer information. Include the NFPA 72 Record of Completion and NFPA 72 Inspection and Testing Form, with the appropriate test reports.

3. Fire alarm Testing Services or Laboratories

    a. Construct fire alarm and fire detection equipment in accordance with UL Fire Protection Dir, UL Electrical Construction, or FM APP GUIDE.

4. Contractor performing fire alarm system work shall be a licensed New York State fire alarm contractor. Contractor shall provide Fire Alarm Installation Certification with fire alarm system submittal.

E. Field quality-control reports.

F. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.

3. Record copy of site-specific software.

4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:

    a. Frequency of testing of installed components.
    b. Frequency of inspection of installed components.
    c. Requirements and recommendations related to results of maintenance.
    d. Manufacturer's user training manuals.

5. Manufacturer's required maintenance related to system warranty requirements.

6. Abbreviated operating instructions for mounting at fire-alarm control panel.

7. Copy of NFPA 25.

1.7 QUALITY ASSURANCE

A. Source Limitations for Fire-Alarm/Voice Notification System and Components: Obtain fire-alarm/Voice Notification system from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. NFPA Certification: Obtain certification according to NFPA 72 by a Nationally Recognized Testing Laboratory (NRTL).

1.8 PROJECT CONDITIONS

A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Coordinate and comply with the requirements of the local Fire Marshall, or Authority Having Jurisdiction, concerning the fire alarm system shutdown plans, procedures, and fire watch plans that will be implemented for system interruptions during construction. All existing fire alarm devices shall remain active until new cabling and devices are installed. Temporary interruptions are allowed while work is being done on the system. Work shall be coordinated so that system is fully functional at the end of the workday. If system is not fully functional at end of workday, Contractor shall provide personnel for fire watch as required by local Fire Marshall and shall be responsible for all associated costs.

2. Notify Construction Manager and Owner no fewer than two days in advance of proposed interruption of fire-alarm service.

3. Do not proceed with interruption of fire-alarm service without Construction Manager and Owner’s written permission.

1.9 SEQUENCING AND SCHEDULING

A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until modifications have been tested and accepted. As new devices are installed, label them "NOT IN SERVICE" until it is accepted. Remove labels from new devices when put into service. Coordinate and comply with the requirements of the local Fire Marshall, or Authority Having Jurisdiction, concerning the fire alarm system shutdown plans, procedures, and fire watch plans that will be implemented for system interruptions during construction.

1.10 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Smoke Detectors: Quantity equal to 5 percent of amount of each type installed, but no fewer than 2 units of each type.

2. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but no fewer than 2 units of each type.
3. Audible and Visual Notification Appliances: Quantity equal to 5 percent of amount installed, but no fewer than 2 units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. NOTIFIER; a Honeywell company.
2. Compatible with NOTIFIER.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:

1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Duct smoke detectors.
5. Verified automatic alarm operation of smoke detectors

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm/voice notification appliances.
2. Identify alarm at fire-alarm control panel and remote annunciators.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Release fire and smoke doors held open by magnetic door holders.
5. Shut down heating, ventilating, and air-conditioning equipment.
6. Close smoke dampers in air ducts of designated air-conditioning duct systems.
7. Recall elevators to primary or alternate recall floors.
8. Activate emergency shutoffs for gas and fuel supplies.
9. Record events in the system memory.

C. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm/voice notification control panel.
4. Ground or a single break in fire-alarm control panel internal circuits.
5. Abnormal ac voltage at fire-alarm control panel.
6. Break in standby battery circuitry.
7. Failure of battery charging.

8. Abnormal position of any switch at fire-alarm/voice notification control panel or annunciator.

D. System Trouble and Supervisory Signal Actions: Annunciate at fire-alarm/voice notification control panel and remote annunciators.

2.3 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.

2. Detectors shall be two-wire type.

3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control panel.

4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.

5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.

6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.

7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control panel for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control panel.

   a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control panel for 15 or 20 deg F (8 or 11 deg C) per minute.
   b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control panel to operate at 135 or 155 deg F (57 or 68 deg C).
   c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control panel and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control panel, having the designated access level, shall be able to manually access the following for each detector:

   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).

2.4 NOTIFICATION APPLIANCES

A. Visual Notification Appliances

1. Visual notification appliances shall conform to the applicable requirements of UL 1971 and conform to the Architectural Barriers Act (ABA). The lens of the fire alarm strobe shall be located such that the entire lens is located not less than 2032 mm and not more than 2438 mm above the finished floor. Colored lens shall comply with UL 1638. The manufacturer shall have the color lens tested to the full UL 1971 polar plotting criteria, voltage drop, and temperature rise as stated in 1971. Fire Alarm Notification Appliances shall have clear high intensity optic lens, xenon flash tubes, and be marked "Fire" in red letters.

2.5 FIRE ALARM WIRE AND CABLE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Comtran Corporation.
2. Draka Cableteq USA.
3. Genesis Cable Products; Honeywell International, Inc.
4. Rockbestos-Suprenant Cable Corp.
5. West Penn Wire; a brand of Belden Inc.

B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.

C. Signaling Line Circuits: Twisted, shielded pair, or twisted, unshielded pair, not less than No. 16 AWG. Refer to fire alarm system manufacturer for recommended sizes and shielding requirements.

D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 16 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.

PART 3 - EXECUTION

3.1 VERIFICATION OF CONDITIONS (BY INSTALLER)

A. Verification of Conditions (by Installer): Examine conditions under which fire alarm system is to be installed in coordination with Installer of materials and components specified in this Section and notify affected Contractors and Architect in writing of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

1. When Installer confirms conditions as acceptable to ensure proper and timely installation and to ensure requirements for applicable warranty or guarantee can be satisfied, submit to Architect written confirmation from applicable Installer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to Installer.

3.2 PROTECTION

A. Protection: Provide dust covers on all detectors during construction.

3.3 EQUIPMENT INSTALLATION

A. Install fire alarm system in accordance with applicable provisions of NEC, NFPA-70, Article 760 - Fire Protective Signaling Systems.

1. Contractor performing fire alarm system work shall be a licensed fire alarm contractor. Contractor shall provide Fire Alarm Installation Certification with fire alarm system submittal.

2. Since existing fire alarm systems are being modified, Contractor performing fire alarm system work shall comply with the requirements of the local Fire Marshall concerning the fire alarm system shutdown plans, procedures, and fire watch plans that will be implemented for system interruptions during construction. All existing fire alarm devices shall remain active until new cabling and devices are installed. Temporary interruptions are allowed while work is being done on the system. Work shall be coordinated so that system is fully functional at the end of the workday. If system is not fully functional at end of workday, Contractor shall provide personnel for fire watch as required by local Fire Marshall and shall be responsible for all associated costs.

3. Provide all labor, materials, equipment and services to perform all operations required for complete installation of fire alarm system and related construction as shown on Drawings and specified in this Section.

4. Completely check, program and adjust all new and existing equipment on each system.

5. Label each addressable device with label indicating device's unique address. Label shall comply with Specification Section 26 05 53 Identification For Electrical Systems. Labels shall be installed so that they are visible without removing device from mounting base.

B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections by testing 100% of system and submitting complete test reports.

1. Connect new equipment to existing control panel in existing part of the building.

2. Connect new equipment to existing monitoring equipment at the supervising station.

3. Expand, modify, and supplement existing equipment as necessary to extend existing functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.

C. Manual Fire-Alarm Boxes:

1. Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.

2. Mount manual fire-alarm box on a background of a contrasting color.

3. The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.

D. Smoke- or Heat-Detector Spacing:

1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
3. For smoke detectors, smooth ceiling spacing shall not exceed 30 feet (9 m).
4. For heat detectors, smooth ceiling spacing shall not exceed 30 feet (9 m).
5. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
6. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffusers or return-air openings.
7. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture.

E. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.

F. In areas where detection and notification devices may be subject to physical damage, devices shall have protective wire guards as manufactured by Safety Technology International (www.sti-usa.com). All guards shall be listed for the fire alarm system devices and appliances protected.

G. Install all devices on exterior of building in weatherproof enclosures supplied by device manufacturer.

H. In new construction, install all devices flush or semi-flush mounted, unless otherwise authorized by Owner.

I. In existing construction, install all interior surface mounted devices on surface mounted back boxes supplied by device manufacturer.

J. In locations where new device is replacing existing, contractor shall coordinate removal/replacement to allow re-use of existing backbox/conduits if possible.

K. In existing construction all devices shall be flush mounted with circuit wiring concealed within wall.

L. In locations where building construction prohibits flush-mounted installations, provide surface raceway. At such locations obtain written authorization from Owner's representative or Architect prior to providing surface raceway device.

M. Demolition of existing system:

1. Disconnect and remove existing fire alarm devices as shown in plans, including all wiring, raceway, and controls.
2. Repair all damaged surfaces upon removal of existing devices and raceway. Repair and patch existing construction to match existing finishes.

N. Install all fire alarm pull stations at 48 inches AFF, to conform to ADA requirements.

O. Wire the Notification Appliance Circuits such that the audible alarm indicating devices can be turned off while the visual alarm notifications remain operational.

P. Locate audible/visible signaling devices in strict accordance with requirements of Americans with Disabilities Act (ADA).

Q. Where combination audible/visible units used, place strobe light lens 80 inches minimum and 96 inches maximum above floor level. In locations where ceiling height is less than 90 inches AFF, place strobe light lens 6 inches below ceiling.

3.4 WIRING

A. Install Type FPLP plenum rated fire alarm cable for all initiating circuit wiring and notification circuit wiring, sized in accordance with manufacturer's recommendations.

B. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or raceway as signaling line circuits.

C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

E. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

F. Install all plenum cable above corridor ceilings bundled and tie-wrapped at 5 foot intervals and hung in saddle rings or J-hooks, supported to structure at 5 foot intervals.

G. Cable shall not be considered properly supported by lying over top of conduits, piping, or building supports or bracing. Approved saddle rings or J-hooks must be used.

H. For wall mounted devices in existing construction where wiring cannot be concealed, all wiring shall be installed in surface metallic raceway from device location to accessible ceiling space.

I. Install all wiring in approved surface metallic raceway or EMT conduit in the following locations:

1. Unfinished areas (EMT conduit).
2. Exposed areas (Surface metallic raceway).
3. Where subject to damage.

3.5 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

B. Install framed instructions in a location visible from fire-alarm control panel.

3.6 ADJUSTING / CLEANING

A. Completely clean all smoke detectors, as instructed by authorized factory representative, when system is substantially complete and when authorized by Owner.

3.7 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by Owners Representative and authorities having jurisdiction.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.

a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.

b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. Perform 100 percent inspection and testing of all system devices.

    a. Provide complete panel real-time printout as documentation of device, date and time. Any acceptance test not accompanied by real-time printout requires retesting of entire system by Contractor, including both alarm activation tests and tests of supervisory circuit at each device.

    b. Provide inspection complying with requirements of applicable NFPA standards. Provide to Owner and Fire Sub Code Official complete typed list of every initiation, signaling, control, supervisory and auxiliary device with specific information regarding system address of device, location of device, date tested, manufacturer's model number, and serial number of all analog components, status of device and zone or point as related to system. Obtain from Owner, the Owner's room names/numbers that are to be assigned to each device.

    c. Take voltage readings at end of line of each alarm signal circuit to insure minimum operational levels.

    d. If voltage drop exceeds the minimum rating of the last device in the circuit, while under full circuit load, rewire circuits with appropriately heavier gage wire as required to comply with specified requirements.

3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.

4. Test visible appliances for the public operating mode according to manufacturer's written instructions.

5. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

D. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

E. Fire-alarm system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

G. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.8 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

END OF SECTION 28 31 11

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above and below-grade site improvements.
6. Disconnecting, capping or sealing, removing site utilities, and abandoning site utilities in place.
7. Temporary erosion and sedimentation-control measures.
8. Disposal of waste material.

1.3 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil (insitu): Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated on Drawings.

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS, GENERAL

A. General: Submit all informational submittals required by this Section concurrently.

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.7 CLOSEOUT SUBMITTALS

A. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.8 PROJECT CONDITIONS

A. Verification of Conditions: Examine conditions under which site clearing is to be accomplished and notify Construction Manager and Architect in writing of any conditions detrimental to proper and timely accomplishment. Do not proceed with site clearing until unsatisfactory conditions have been corrected.

B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

F. Do not direct vehicle or equipment exhaust towards protection zones.

G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

H. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 31 20 00 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree trunk at 54 inches above the ground.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction. Refer to Section 31 25 00, “Erosion and Sedimentation Controls”.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree or plant protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site according to requirements in Section 31 25 00 "Erosion and Sedimentation Controls."

B. Should any trees or shrubs be damaged which are to be saved, arrange to have such damage treated by a licensed arborist or tree surgeon.

C. Protect tree and shrub root systems from smothering. Do not store construction materials, debris, or excavated material within plant protection zone. Do not permit vehicular traffic or parking within plant protection zone. Restrict foot traffic to prevent excessive compaction of soil over tree, shrub and turf root systems.

D. Trees or shrubs which die because of the Contractor's failure to conform to the Drawings and specifications shall be evaluated by a qualified organization selected by the Owner's Representative. The removal and replacement of the tree, and the evaluation expenses shall be paid for by the Contractor. Contractor shall be required to replace the damaged tree with plant material of comparable size and quality (i.e. damaged 12" caliper Red Maple shall be replaced by three 4" cal. or four 3" cal. Red Maples). Substitutions for variety shall be approved by the Architect.

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Owner will arrange to shut off indicated utilities when requested by Contractor.

B. Locate, identify, and disconnect utilities indicated to be abandoned in place.

C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Construction Manager not less than ten working days in advance of proposed utility interruptions.

D. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots, obstructions, and debris to a minimum depth of 18 inches below exposed subgrade.
3. Use only hand methods for grubbing within protection zones.
4. Chip removed tree branches and stockpile in areas approved by Architect.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer in accordance with Section 31 20 00 "Earth Moving".

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Do not remove surplus topsoil from site.

D. Refer to Section 32 92 00 "Turfs and Grasses" for topsoil screening requirements.

E. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction including foundations, slabs, paving, curbs, gutters, retaining walls, aggregate base and other improvements.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically. Leave cut edge neat and square where existing material is cut to adjoin new work.

2. Remove asphalt concrete paving material to full depth and remove from site. Do not use asphalt materials for on-site fill.

3. Gravel and stone fill under removed sidewalks may be reused if suitable for the particular new use and if approved by the Architect.

4. Break up and completely remove miscellaneous concrete, such as small foundations. Remove concrete, retaining walls or foundations below grade to a minimum depth of 2'.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 10 00

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Preparing subgrades for foundations, slabs-on-grade, walks, pavements, turf and grasses and plants.
2. Structural Fill: For backfill under structures, pavements, concrete pads, etc.
3. Granular Fill: Sub base for interior concrete slabs-on-grade, asphalt paving, concrete paving, etc.
4. Subsurface drainage fill for foundation drains, underdrains, etc.
5. Excavating and backfilling for buildings and structures.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:

1. Section 01 32 00 - Construction Progress Documentation
2. Section 31 10 00 - Site Clearing
3. Section 33 41 00 – Storm Utility Drainage Piping

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Subbase: Granular aggregate layer supporting the slab-on-grade and pavement that also minimizes upward capillary flow of pore water.

G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Geotechnical Engineer.

2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.

3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Geotechnical Engineer or Architect. Unauthorized excavation, as well as remedial work directed by Geotechnical Engineer or Architect shall be without additional compensation.

H. Fill: Soil materials used to raise existing grades.

I. Hazardous Soil Materials: Soils that are contaminated with petroleum product and/or hazardous chemicals, waste or industrial waste.

J. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Rock Excavation: Track-mounted excavator rated at not less than 222-hp flywheel power with weight of 70,000 lbs or greater and a 30-in wide short-tip radius rock bucket. (Ratings are based on Caterpillar's "Model No. 330B".)

K. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

L. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below aggregate base, structural fill, drainage fill, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

N. Non-Granular Fill: Soil fill material used to raise existing grades in areas that do not require granular or structural fill.

O. Well-Graded: Soils containing a good range of all representative particle sizes between the largest and the smallest. All sizes must be represented, and no one size should be either overabundant or missing.

P. Poorly-Graded: Soils which either contain a narrow range of particle sizes or have some intermediate sizes lacking.

1.4 SUBMITTALS

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

B. Action Submittals:

1. Product Data: For each type of the following manufactured products required:

   a. Geotextiles.
   b. Warning tapes.

2. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

   a. Classification according to ASTM D 2487.
   b. Laboratory compaction curve according to ASTM D 1557**.**
   c. Submitted material testing and analysis shall demonstrate that no unsuitable soil groups are present.
   d. Submitted material testing and analysis shall demonstrate that no absorbent clays are present.

3. Verification of Conditions: Written confirmation from installer that installation of Earthwork Materials installed in accordance with specifications.

C. Informational Submittals:

1. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Qualified Installers as defined below:

1. Earthwork Contractor Experience Requirements: Provide a list of at least four Earthwork projects of comparable size, scope, and quality completed successfully by the proposed Sub Contractor within the past two years that includes the date completed, project Owner’s name and current contact information, including telephone numbers and e-mail addresses.

2. Turf Installer: Engage an experienced turf installation firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.

3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

B. Civil/Structural Preconstruction Conference: Attend Civil/Structural Preconstruction Conference.

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: If work includes improvements on adjoining property, written authorization for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

D. Do not commence earth moving operations until temporary and permanent erosion- and sedimentation-control measures, specified in Division 31 Section “Erosion and Sedimentation Control” are in place.

E. Do not commence earth moving operations until plant-protection measures specified in Division 31 Sections “Erosion and Sedimentation Control” and “Site Clearing” are in place.

F. The following practices are prohibited within tree- or plant-protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
8. Directing vehicle or equipment exhaust towards protection zones.
9. Heat sources, flames, ignition sources, and smoking within or near protection zones.

G. Existing Hazardous Materials:

1. If during the performance of the work suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. If present, hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Soil Materials:

1. General: Provide imported soil materials when sufficient satisfactory soil materials are not available from onsite excavations.
2. Topsoil: Refer to Turf and Grasses Specification, Division 32.

B. Hazardous Materials:

1. Provide fill materials that are not contaminated with petroleum product, hazardous waste or industrial waste.
2. Contamination above federal, state or local requirements is not acceptable. Materials with a visible sheen or petroleum odor shall be rejected.

C. Unsuitable Soils: (Includes excavated native and imported non-granular, granular and structural fill materials)

1. Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

a. Soils Materials shall not contain any absorbent aluminum phyllosilicates, including but not limited to: bentonite (sodium, calcium, or potassium), tonstein, montmorillonite, kaolinite. or other absorbent clays.

2. Unsuitable soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

3. Submitted material testing and analysis shall demonstrate that material classification meets ASTM-D2487 USC system criteria and that no unsuitable soil groups, or absorbent clays are present.

D. Non-Granular Fill: Material is to comply with NYSDOT requirements for Select Borrow and Select Fill with modifications shown below. This material is not allowed in areas where granular soils are required, including within the building footprint, below pavement areas or below a synthetic turf athletic field.

1. On-Site Non-Granular Fill

a. Submittal must be provided demonstrating that on-site soil material meets the criteria outlined in this Section for use as fill material.

b. Obtain approval of Architect before proceeding with use of on-site material.

c. Material is to have no particles greater than 3” in maximum dimension, no more than 70% by weight passing the #40 sieve and no more than 20% passing the #200 sieve.

d. Testing submitted is to demonstrate that proper compaction can be achieved as required in Part 3, Execution.

2. Imported Non-Granular Fill

a. Where quantity of approved non-granular fill materials required exceeds that available from on-site stock-piles, provide suitable material from off-site sources.

b. Obtain approval of Architect before proceeding with use of imported fill material.

c. Material is to have no particles greater than 3" in maximum dimension, no more than 70% passing by weight the #40 sieve and no more than 15% passing the #200 sieve.

d. Testing submitted is to demonstrate that proper compaction can be achieved as required in Part 3, Execution.

E. Structural Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand.

1. Type 1 Fill (NYSDOT ITEM No. 304.11 Granular Fill) gradation requirements:

Sieve Designation	**Percent by Weight Passing Square Mesh Sieves**
3 inch	100
2 inch	90 to 100
1/4-inch	30 to 65
#40	5 to 40
#200	0 to 10

F. Granular Fill: Import all granular fill types from off-site sources. Granular fill consists of stone, sand, and gravel, or blends of these materials, free of slag, complying with New York State Department of Transportation (NYSDOT) Standard Specification, Section 304, as modified below:

1. Type 2 Fill (NYSDOT ITEM No. 304.12 / Crushed / Blasted Ledge Rock Stone) Gradation Requirements.

Sieve Designation	**Percent by Weight Passing Square Mesh Sieves**
2 inch	100
1/4-inch	25 to 60
#40	5 to 40
#200	0 to 10

2. Type 4 Fill (NYSDOT ITEM No. 304.14 / Select Granular Fill) Gradation Requirements.

Sieve Designation	Percent by Weight Passing Square Mesh Sieves
2 inch	100
1/4-inch	30 to 65
#40	5 to 40
#200	0..... to 10

3. RCA Fill: Recycled Portland cement concrete aggregate which is the product of mechanical crushing, complying with the following gradation requirements. May be used in lieu of Granular fill, upon permission from the Architect.

Sieve Designation	Percent by Weight Passing Square Mesh Sieves
2 inch	100
1 inch	80 to 100
1/4-inch	50 to 85
#40	15 to 40
#200	0 to 10

a. Material Requirements:

1) Material is to be in accordance with current NYSDOT regulations for Recycled Portland Cement Concrete Aggregate (RCA).
2) Material is to be free from organic and other deleterious material.
3) Material may contain up to 5% by weight asphalt and / or brick.

G. Crushed Stone: Crushed stone to complying with New York State Department of Transportation (NYSDOT) Standard Specifications, Section 703-0201 which is product of mechanical crushing. Where indicated, provide the following fill materials, consisting of clean, free of slag, durable, sharp-angled fragments of rock of uniform quality. The crushed stone used as coarse aggregate for all items shall be obtained from sources conforming to the requirements of the NYSDOT as to sampling, testing methods, Quarry Reports and any other required procedures and complying with following requirements:

1. NYSDOT No. 1 Crushed Stone Gradation Requirements (NYSDOT 703-4 # 1 Stone):

Sieve Designation	Percent by Weight Passing Square Mesh Sieves
1 inch	100
1/2-inch	90 to 100
1/4-inch	0 to 15
#200	0 to 1

2. NYSDOT No. 2 Crushed Stone Gradation Requirements (NYSDOT 703-4 #2 Stone):

Sieve Designation	**Percent by Weight Passing Square Mesh Sieves**
1-1/2 inch	100
1 inch	90 to 100
1/2-inch	0 to 15
#200	0 to 1

H. Drainage Fill: Mixture of 50 percent NYSDOT No. 1 crushed stone and 50 percent NYSDOT No. 2 crushed stone, complying with New York State Department of Transportation Standard Specifications, Section 703-02.

Sieve Designation	**Percent by Weight Passing Square Mesh Sieves**
1-1/2 inch	100
1 inch	95 to 100
1/2-inch	25 to 60
# 4	0 to 10
# 8	0 to 5

I. Sand for general use and/or utility bedding: ASTM C 33; fine aggregate.

J. Sand for storm water quality sand filter: Clean (washed) AASHTO M-6/ASTM C-33 medium aggregate coarse concrete sand, with effective particle size (D10) between 0.3mm and 0.5mm, a uniformity coefficient (Uc) of < 4, and < 4% fines passing the 100 sieve.

K. Coarse Sand for Athletic Field Slit Drains: Approximate particle size of between 1.0 and 2.0 mm. When passed over a sieve, coarse sand will have:

1. Less than 5 percent retained on a #10 U S standard sieve,
2. Less than 5 percent passing a #30 U S standard sieve
3. In no case should more than 1 percent pass through a #50 U S standard sieve.

2.2 GEOTEXTILES

A. Separation/Filter Fabric - Nonwoven needle-punched polypropylene geotextile filter/separation fabric complying with the following:

Fabric Property	**Value**	**Test Method**
Grab Tensile Strength	120 lb	ASTM D 4632
Grab Tensile Elongation	50 percent	ASTM D 4632
Trapezoid Tear Strength	50 lbs	ASTM D 4533
CBR Puncture Strength	310 lbs min	ASTM D 6241
Apparent Opening Size	No. 70 sieve max	ASTM D 4751
Permittivity	1.7 sec^{-1}	ASTM D 4491
Flow Rate	135 gal min/ft^2	ASTM D 4491
UV Stability	70% after 500 hours	ASTM D 4355

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. TenCate Mirafi - 140N
    b. Amoco - 4547
    c. Geotex – 451

B. Soil Stabilization Fabric: Heavy duty, commercially manufactured woven polypropylene geotextile meeting the following properties:

Fabric Property	**Test Method**	**Unit**	**Typical Value**
Grab Tensile Strength	ASTM D 4632	lbs	200
Grab Tensile Elongation	ASTM D 4632	%	15
Trapezoidal Tear Strength	ASTM D 4533	lbs	75 min.
CBR Puncture Strength	ASTM D 6241	lbs	700
UV Resistant after 500 hours	ASTM D 4355	% Strength	70
Apparent Opening Size	ASTM D 4751	US Sieve	40
Permittivity	ASTM D 4491	sec^{-1}	0.05
Water Flow Rate	ASTM D 4491	$gal/min/ft^2$	4.0

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. TenCate Mirafi - 500X
    b. US Fabrics, Inc. - US 200
    c. Carthage Mills – FX-55
    d. Propex – 200 ST

C. Subsurface Drainage Geotextiles: Refer to Division 33 Section "Storm Utility Drainage Piping".

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine conditions under which earthwork is to be accomplished in coordination with Installer of materials and components specified in this Section and notify affected Prime Contractors and Architect in writing of any conditions detrimental to proper and timely accomplishment. Do not proceed with earthwork until unsatisfactory conditions have been corrected in manner acceptable to Installer.

1. When Installer confirms conditions as acceptable to ensure proper and timely installation and to ensure requirements for applicable warranty or guarantee can be satisfied, submit to Architect written confirmation from applicable Installer. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to Installer.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

1. Contractor is entirely responsible for strength and adequacy of bracing and shoring, and for safety and support of construction from damage or injury caused by lack of adequate protection or by movement or settlement.

2. Contractors are advised that they are required to comply with Occupational Safety and Health Administration's (OSHA) standards pertaining to excavation.

3. All excavations must be barricaded at all times using either traffic or A-Frame type barricades. Gaps between barricades may be up to 6-inches wide and must be blocked with caution tape.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.3 UNDERGROUND UTILITY SURVEY

A. An underground utility survey must be conducted prior to the start of any excavation. Call 811.

3.4 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.5 EXPLOSIVES

A. Explosives: Use of explosives is strictly prohibited.

3.6 SITE CLEARING

A. Refer to Division 31 Section "Site Clearing".

3.7 EXCAVATION, GENERAL

A. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Geotechnical Engineer. Changes in the Contract Time may be authorized for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.

    a. Intermittent drilling; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

2. Rock excavation includes removal and disposal of rock (refer to Definitions section: "Rock" paragraph above). Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:

    a. 24 inches outside of concrete forms other than at footings.
    b. 12 inches outside of concrete forms at footings.
    c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    e. 6 inches beneath bottom of concrete slabs-on-grade.
    f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.8 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

    a. See Structural Drawings for specific removal and replacement instructions if required.

2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps].

3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Protect trees and other plants in accordance with requirements in Division 1 Section "Temporary Facilities and Controls" and Division 31 Section “Erosion and Sedimentation Control”.

3.9 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.10 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches 6 inches (150 mm) deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe. Remove projecting stones and sharp objects along trench subgrade.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3. Cut and protect roots in accordance with standard nursery practice and Division 31 Section “Erosion and Sedimentation Control”.

3.11 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.
B. If Geotechnical Engineer determines that unsuitable soil is present, continue excavation and replace with compacted backfill or fill material as directed.

3.12 PROOF-ROLLING

A. Proof-roll subgrade below building slabs, concrete pads and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction and repeating proof-rolling in direction perpendicular to first direction with a minimum of six overlapping passes. Limit vehicle speed to 3 mph.

2. Excavate soft spots, unsuitable soils, and areas of excessive pumping or rutting, as identified by Geotechnical Engineer and as directed by Owner, and replace with compacted backfill or fill as directed. Notify Architect in writing of any required remediation.

3. Foundations: Proof-roll prior to excavation for foundations but after top soil is stripped.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities without additional compensation.

3.13 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. CLSM (flowable fill), per this specification section, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit in accordance with this Section unless otherwise directed by Geotechnical Engineer.

3.14 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.15 SOIL STABILIZATION FABRIC

A. Install soil stabilization fabric: After subgrade has been compacted and proof-rolled, install soil stabilization fabric as specified by the manufacturer, including the following:

1. Lay fabric in the direction of traffic.
2. Overlap fabric side to side and end to end a minimum of two feet.
3. Insure that fabric lies flat during fill placement.

3.16 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.17 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 03 Section "Cast-in-Place Concrete".

D. Trenches under Roadways: Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Division 03 Section "Cast-in-Place Concrete".

E. Backfill voids with satisfactory soil while removing shoring and bracing.

F. Place and compact initial backfill of subbase material or satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

G. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing.

H. Place and compact final backfill of satisfactory soil to final subgrade elevation.

I. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

J. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.18 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows. Refer to Part 2 for material requirements and specific conditions for the use of each type of soil material. All fill materials to be approved by Architect per requirements noted in Part 2.

1. Under grass and planted areas:

    a. Use satisfactory non-granular fill material.

2. Under walks, pavements and exterior slabs:

    a. Use Structural Fill below subbase layer and Type 2 granular fill for subbase layer.

3. Under steps and ramps

    a. Use structural fill below subbase layer and Type 2 granular fill for subbase layer.

4. Under building slabs:

    a. Use structural fill below subbase layer. For subbase, use No. 2 Crushed Stone. See Drawings for depth.

5. Under synthetic turf fields:

    a. Use Structural Fill or Granular Fill below subbase.
    b. For subbase requirements, refer to Synthetic Turf Fields Section.

6. Under footings and foundations:

    a. Use structural fill.

7. Under catch basins, manholes, vaults or other underground structures.

    a. Use structural fill or as noted on drawings.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.19 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry density.

3.20 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Maximum layer depth before compaction:

1. Under Pavement: Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

2. Place backfill and fill soil materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 8 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry weight density according to ASTM D 1557:

1. Under structures, building slabs, steps, synthetic turf and pavements, including running tracks and tennis courts:

a. Scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.

2. Under walkways:

a. Scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.

3. Under natural turf or unpaved areas:

a. Compact each layer of subgrade backfill or fill soil material at 85 percent. Compact all layers beneath the upper 2'-0" to at least 95 percent.

4. Utility trenches:

a. Compact each layer of initial and final backfill soil material at 85 percent.

5. Landscape Planting Areas:

a. Compact each layer of subgrade backfill or fill soil material at 75 percent.

6. Stone Dust:

    a. Compact each layer of material in accordance with the required compaction, minimum of 95 percent.

7. Under catch basins, manholes, vaults or other underground structures.

    a. Scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.

3.21 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge and within +0” / -1” tolerance of bottom of slab.

3.22 SUBSURFACE DRAINAGE

A. Drainage Tubing / Subdrainage Pipe: Specified in Division 33 Section "Storm Utility Drainage Piping”.

B. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench as shown in Drawings.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.

C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698 with a minimum of two passes of a plate-type vibratory compactor.

3.23 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place granular fill base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place granular fill base course under pavements and walks as follows:

1. Place base course material over subgrade under hot-mix asphalt pavement.

    a. If separation geotextile is shown in details, install on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.

2. Shape base course to required crown elevations and cross-slope grades.

3. Place base course 6 inches or less in compacted thickness in a single layer.

4. Place base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

5. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.24 SUB BASE FOR CONCRETE SLABS-ON-GRADE

A. Place sub base on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact sub base under cast-in-place concrete slabs-on-grade as follows:

1. Place sub base 8 inches or less in compacted thickness in a single layer.
2. Place sub base that exceeds 8 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 8 inches thick or less than 3 inches thick.
3. Compact each layer of sub base to required cross sections and thicknesses to not less than 95 percent of maximum dry density according to ASTM D 4254.

3.25 INSTALLATION OF SURFACE STONE MATERIAL

A. Place surface stone material (stone dust, cover stone, etc.) on subgrades free of mud, frost, snow, or ice.

B. Compact so that surface stone layer is consolidated. During installation avoid bringing subgrade material to the surface. If subgrade material becomes intermixed with surface stone, remove contaminated surface stone material and reinstall new surface stone.

3.26 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections unless otherwise noted.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Inspections and tests:

1. Geotechnical observations: Proof rolling procedures, site preparation, unsuitable soils removal, excavations, footing bearing, and fill placement.

2. Field Density Testing:

a. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Geotechnical Engineer.

b. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1) Fill under Footings: In each compacted fill layer, 1 compaction test for every 30 linear feet of wall may be taken. 1 compaction test may be made under each individual footing.

2) Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 50 feet or less of wall length, but no fewer than two tests.

3) Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2,000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

4) Tennis Court Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 1,000 sq. ft. or less of paved area, but in no case fewer than seven (7) tests per court.

5) Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.

c. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3. Laboratory testing for on-site fills:

a. ASTM D 1557 Modified Proctor compaction curve including sieve analysis.

3.27 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Geotechnical Engineer or Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.28 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 20 00

GEOTECHNICAL BORING MAPS AND LOGS

Appendix to Project Manual Section 31 20 00, EARTH MOVING


Legend
Cornwall Elementary School
Cornwall Elementary School
Geotech Map
KEY PLAN
INFILTRATION TEST
PAVEMENT BORING
P-10/IT-9
P-3
P-4
PV-2
B-14 (10')
P-5
P-8
P-6
P-7
Cornwall Elementary School
Cornwall Elementary School
N
200 ft
Google Earth

C.T. MALE ASSOCIATES

REPORT OF INFILTRATION TEST

Project:	CCSD Capital Project - Cornwall Elementary	Test No.:	IT-9
Client:	Tetra Tech	Job No.:	22.2632
Weather & Temperature:	Sunny, 63 F	Date of Test:	9/27/2022
Performed By:	J. Scheetz	Witness:	None

SUBSURFACE INFORMATION

Soil Types & Depths Encountered: See P-10 pavement core log

INFILTRATION TEST HOLE DATA

Depth to Bottom of Test Pit (Design Bottom of SMP): 0

Dimensions of Infiltration Hole: Depth: 24” Length: — Width: — Diameter: 4”

Presoak Drainage Time: None

TEST DATA

Time required for water level to drop 24 inches within 4” diameter PVC pipe or Drop Height after 1 Hour

Run No.	Start	End	Time	Drop Height (inches)
1	08:29	09:29	60 min	12
2	09:29	10:29	60 min	7.5
3	10:29	11:29	60 min	7
4	11:29	12:29	60 min	7

Remarks: Infiltration Rate Established @ **7 in/hr**

C.T. MALE ASSOCIATES

TEST BORING LOG

BORING NO.: B-14
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/29/2022 **FINISH DATE:** 9/29/2022
SHEET 1 OF 1

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Elementary School CTM OBSERVER: D. Landreville

DEPTH (FT.)	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	RECOVERY	SAMPLE CLASSIFICATION	NOTES
		1	1	2	1	2	3	20"	4" Topsoil	
									Brown, moist, loose, SILT, little fine sand (ML)	
		2	5	11	8	3	19	16"	Grades firm, Some fine Gravel	Rock fragments in sample
5		3	1	1	3	6	4	22"	Grades loose, Some Clay, little fine gravel, trace fine to coarse sand	
		4	14	43	30	46	73	24"	Grades very compact, Some fine Gravel, no clay	Rock fragments in sample
		5	16	30	>50		>50	24"		Rock fragments in sample
10									End of Test Boring @ 9.5'	
15										
20										
25										
30										

N = NO. OF BLOWS TO DRIVE 2" SAMPLER 12" WITH A 140 LB. WT. FALLING 30" PER BLOW

DRILLING CONTRACTOR: Core Down Drilling
DRILL RIG TYPE: Geoprobe 7822DT
METHOD OF INVESTIGATION: 3.25" ID HSA
Automatic Hammer

GROUNDWATER LEVEL

DATE	LEVEL	CASING	STABILIZATION TIME

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR C.T. MALE EVALUATION. IT IS MADE AVAILABLE TO AUTHORIZED USERS ONLY THAT THEY MAY HAVE ACCESS TO THE SAME INFORMATION AVAILABLE TO C.T. MALE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF SUCH AUTHORIZED USERS.

SAMPLE CLASSIFICATION BY:
D. Landreville

C.T. MALE ASSOCIATES

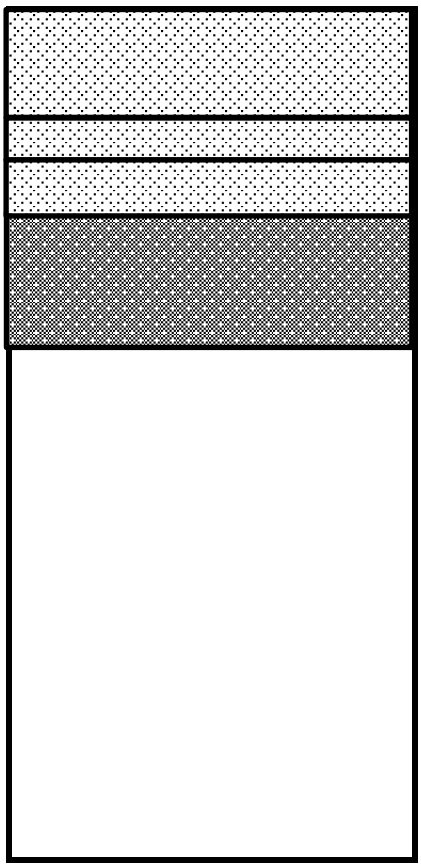
CONCRETE CORE LOG

CORE NO.: P-3
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/27/2022 **FINISH DATE:** 9/27/2022
SHEET 1 OF 1

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Elementary School CTM OBSERVER: J. Scheetz

TYPICAL CORE SECTION	DESCRIPTION
0"	
	2.5" Top Course
	1" Top Course
5"	1.5" Mac & Tar (Very Degraded)
	Crushed Stone Subbase
	Hand Auger Refusal w/ Spud Bar @ 8" on Cobble
10"	
15"	
20"	



General Notes:

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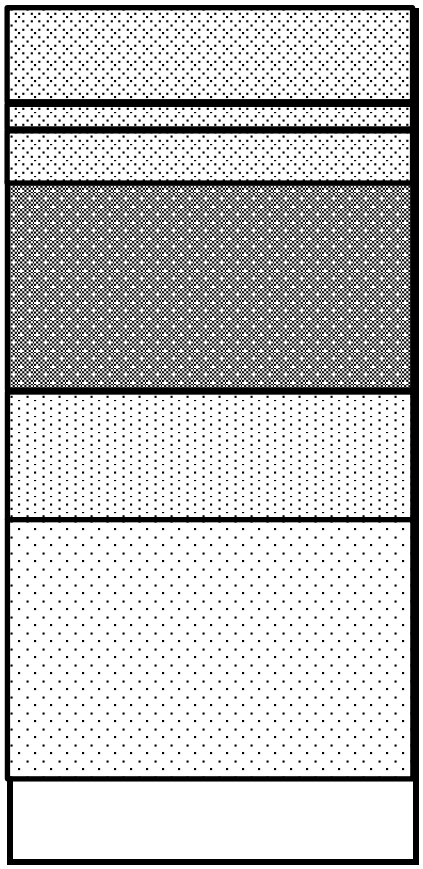
CONCRETE CORE LOG

CORE NO.: P-4
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/26/2022 **FINISH DATE:** 9/26/2022
SHEET 1 OF 1

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Elementary School CTM OBSERVER: J. Scheetz

TYPICAL CORE SECTION	DESCRIPTION
0"	
	2" Top Course
	0.5" Top Course
	1.25" Mac & Tar
5"	
	Crushed Stone Sub Base
	(Max Particle Size +/- 1 in)
10"	Brown, moist, fine to coarse GRAVEL, Some medium to coarse Sand
	Brown, moist, Organic SILT, little fine to medium sand
15"	
	Hand Auger Refusal @ 18" on Obstruction
20"	



General Notes:

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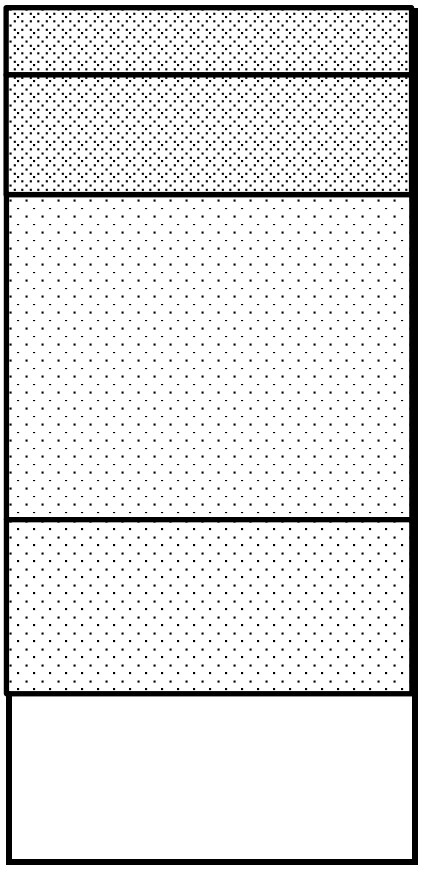
CONCRETE CORE LOG

CORE NO.:	**P-5**		
ELEVATION:		**DATUM:**	
LATITUDE:		**LONGITUDE:**	
START DATE:	**9/27/2022**	**FINISH DATE:**	**9/27/2022**
SHEET	**1 OF 1**		

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Elementary School CTM OBSERVER: J. Scheetz

TYPICAL CORE SECTION	DESCRIPTION
0"	
	1.5" Top Course
	3" Top Course
5"	
	Brown, moist, fine to coarse GRAVEL, Some fine to coarse Sand
10"	
	Gray, moist, CLAY, Some fine to coarse Gravel, little silt, trace fine to medium sand
15"	
	Hand Auger Refusal @ 16"
20"	



General Notes:

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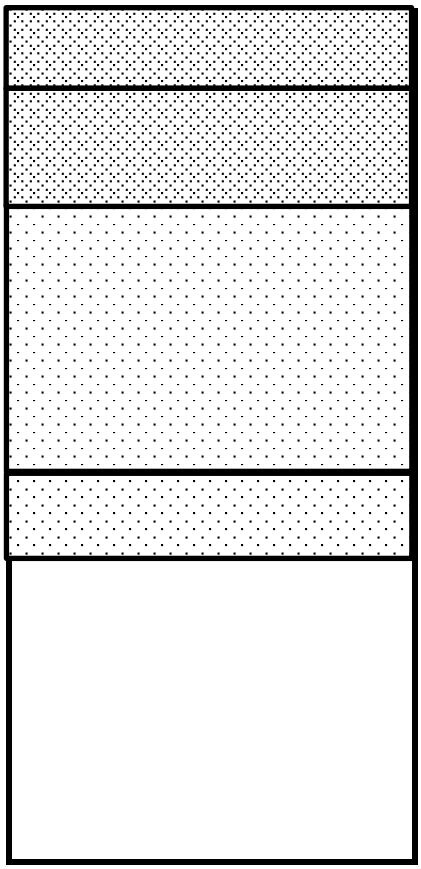
CONCRETE CORE LOG

CORE NO.: P-6
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/27/2022 **FINISH DATE:** 9/27/2022
SHEET 1 OF 1

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Elementary School CTM OBSERVER: J. Scheetz

TYPICAL CORE SECTION	DESCRIPTION
0"	
	2" Top Course
	2.75" Top Course
5"	
	Brown, moist, fine to coarse GRAVEL, Some fine to coarse Sand,
	trace silt
10"	
	Gray, moist, Slightly Organic CLAY, Some fine to coarse Gravel, trace
	silt, trace fine to medium sand
	Hand Auger Refusal @ 13" on Cobble
15"	
20"	



General Notes:

C.T. MALE ASSOCIATES

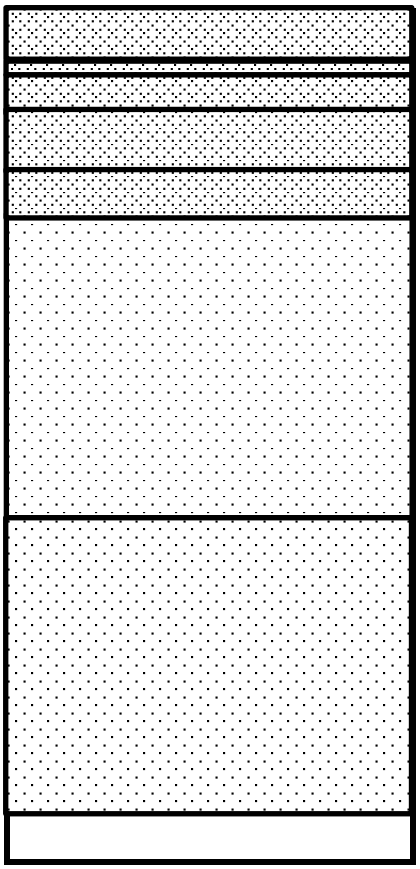
CONCRETE CORE LOG

CORE NO.: P-7
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/27/2022 **FINISH DATE:** 9/27/2022
SHEET 1 OF 1

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Elementary School CTM OBSERVER: J. Scheetz

TYPICAL CORE SECTION	DESCRIPTION
0"	
	1.25" Top Course
	0.25" Shim Course (Degraded)
	1" Top Course
	1.5" Top Course
5"	1" Binder Course
	Brown, moist, fine to coarse GRAVEL, Some fine to coarse Sand, trace silt
10"	
	Gray, moist, CLAY, Some Silt, little fine to coarse gravel, trace fine to coarse sand
15"	
20"	Hand Auger Refusal @ 19"



General Notes:

C.T. MALE ASSOCIATES

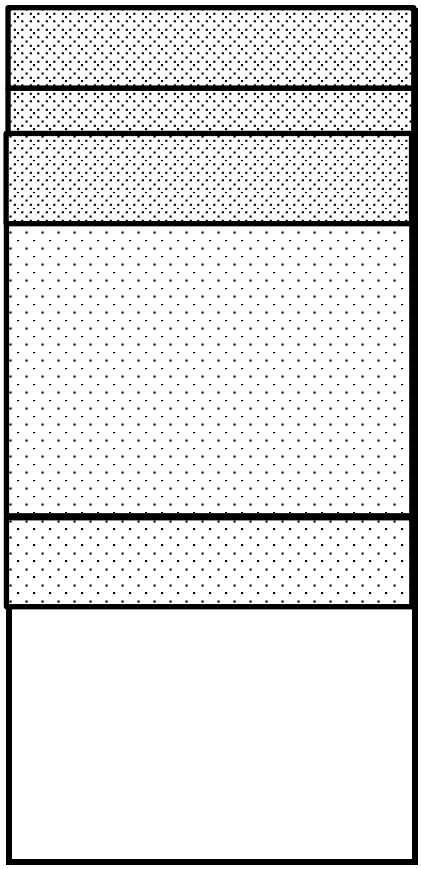
CONCRETE CORE LOG

CORE NO.: P-8
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/27/2022 **FINISH DATE:** 9/27/2022
SHEET 1 OF 1

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Elementary School CTM OBSERVER: J. Scheetz

TYPICAL CORE SECTION	DESCRIPTION
0"	
	2" Top Course
	1" Top Course (Very Degraded)
	2" Top Course
5"	
	Brown, moist, fine to coarse GRAVEL, Some fine to coarse Sand, little silt
10"	
	Gray, moist, CLAY
15"	Hand Auger Refusal @ 14"
20"	



General Notes:

C.T. MALE ASSOCIATES

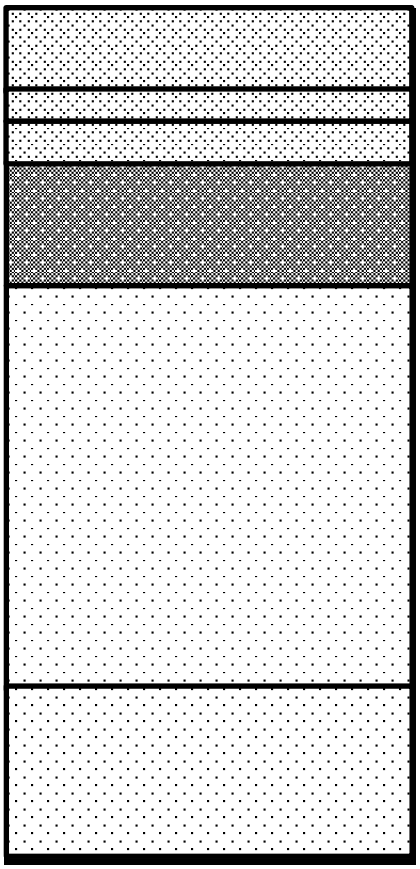
CONCRETE CORE LOG

CORE NO.: P-10
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/27/2022 **FINISH DATE:** 9/27/2022
SHEET 1 OF 1

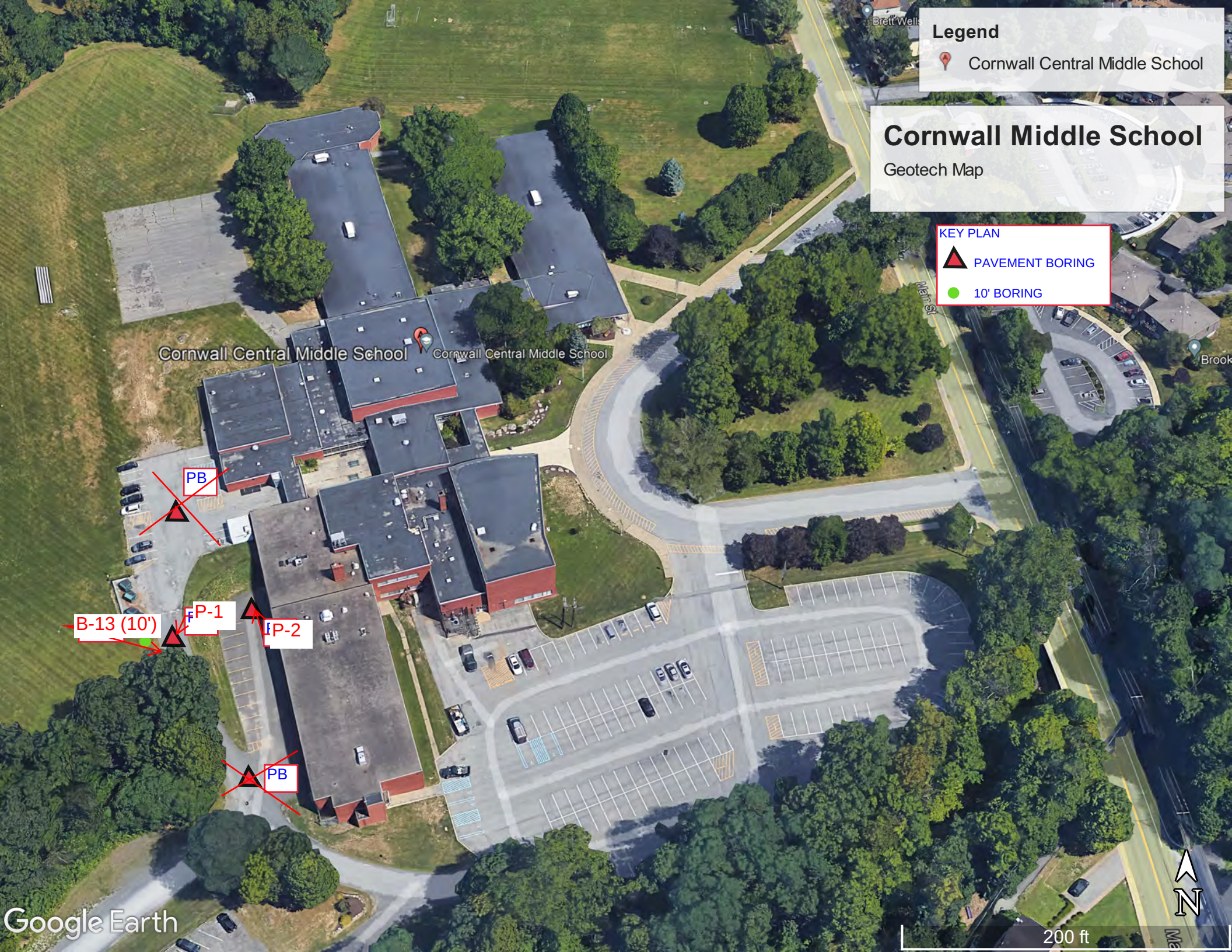
PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Elementary School CTM OBSERVER: J. Scheetz

TYPICAL CORE SECTION	DESCRIPTION
0"	
	2" Top Course
	0.5" Top Course
	1" Mac & Tar
5"	
	Crushed Stone Subbase
	Brown and gray, dry, fine to coarse GRAVEL, Some fine to coarse
	Sand, little clay, trace silt
10"	
15"	
	Grey, moist, fine to coarse GRAVEL, Some Clay, little fine to coarse
	sand, trace silt
20"	
	Hand auger terminated at 24" within similar soil as described above



General Notes: Infiltration test IT-9 completed within pavement core excavation


Legend
Cornwall Central Middle School
Cornwall Middle School
Geotech Map
KEY PLAN
PAVEMENT BORING
10' BORING
Cornwall Central Middle School
Cornwall Central Middle School
Main St
PB
P-1
P-2
B-13 (10')
PB
N
200 ft
Google Earth

C.T. MALE ASSOCIATES

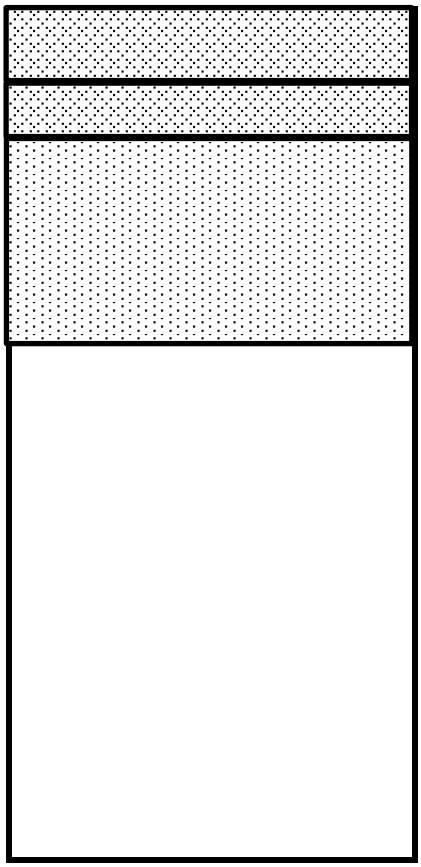
CONCRETE CORE LOG

CORE NO.: P-1
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/26/2022 **FINISH DATE:** 9/26/2022
SHEET 1 OF 1

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Central Middle School CTM OBSERVER: J. Scheetz

TYPICAL CORE SECTION	DESCRIPTION
0"	
	1.75" Top Course
	1" Top Course (Completely Weathered)
5"	Brown, dry, fine to coarse SAND, Some fine Gravel, trace silt
	Hand Auger Refusal w/ Spud Bar @ 8"
10"	
15"	
20"	



General Notes:

C.T. MALE ASSOCIATES

CONCRETE CORE LOG

CORE NO.: P-2
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/26/2022 **FINISH DATE:** 9/26/2022
SHEET 1 OF 1

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Central Middle School CTM OBSERVER: J. Scheetz

TYPICAL CORE SECTION	DESCRIPTION
0"	
	1.5" Top Course
	0.75" Top Course
	2.5" Binder Course
5"	
	Brown, dry, fine to coarse SAND, Some Silt, little fine gravel
10"	
	Hand Auger Refusal @ 12" on Cobble
15"	
20"	

General Notes:

C.T. MALE ASSOCIATES

TEST BORING LOG

BORING NO.: B-13
ELEVATION: **DATUM:**
LATITUDE: **LONGITUDE:**
START DATE: 9/26/2022 **FINISH DATE:** 9/26/2022
SHEET 1 OF 1

PROJECT: Cornwall Central School District Capital Project CTM PROJECT NO.: 22.2632

LOCATION: Cornwall Central Middle School CTM OBSERVER: D. Landreville

DEPTH (FT.)	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	RECOVERY	SAMPLE CLASSIFICATION	NOTES
		1	22	10	9	9	19	22"	3" Asphalt	
									Brown, dry, firm, fine to coarse SAND, Some fine Gravel (SW)	
		2	6	20	14	12	34	19"	Grades reddish-brown, compact	
5		3	7	13	15	10	28	5"	Grades dark brown, firm	
		4	5	4	31	10	35	10"	Grades brown, compact, Some Clay (SC)	Rock fragment in shoe of sampler, S-4
		5	>50				>50	0"	End of Test Boring @ 8'	
10										
15										
20										
25										
30										

N = NO. OF BLOWS TO DRIVE 2" SAMPLER 12" WITH A 140 LB. WT. FALLING 30" PER BLOW

DRILLING CONTRACTOR: Core Down Drilling
DRILL RIG TYPE: Geoprobe 7822DT
METHOD OF INVESTIGATION: 3.25" ID HSA
Automatic Hammer

GROUNDWATER LEVEL

DATE	LEVEL	CASING	STABILIZATION TIME

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR C.T. MALE EVALUATION. IT IS MADE AVAILABLE TO AUTHORIZED USERS ONLY THAT THEY MAY HAVE ACCESS TO THE SAME INFORMATION AVAILABLE TO C.T. MALE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF SUCH AUTHORIZED USERS.

SAMPLE CLASSIFICATION BY:
D. Landreville

SECTION 31 25 00 - EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Erosion, sediment and pollution controls as shown on the Drawings and as directed by the Architect to significantly reduce runoff on downstream properties. This includes temporary control measures to mitigate land disruption by other contractors during construction of this project.

2. Erosion, sediment and pollution control includes, but is not limited to, the following:

   a. Standard control measures such as storm structure protection, silt fence, silt fence dikes.
   b. Off site sediment tracking controls.
   c. Seeding, sodding and erosion control fabric.
   d. Clean up.

3. Comply with the Soil Erosion and Sediment Control (SESC) for this Project in consultation with appropriate local agencies and soil conservation service. *Any local or State Agency requirements are considered part of these specifications.*

1.3 SUBMITTALS, GENERAL:

A. General; Submit all action submittals and informational submittals required by this section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product listed.

1. Filter fabric and hardware cloth for storm structure protection.
2. Silt fence.
3. Erosion control blanket
4. Soil stabilization fabric for off-site sediment tracking control
5. Drop-In Inlet Protection

B. Material Certificates: Materials certificates showing content/mechanical analysis are required for the following products. Also, provide samples as noted.

1. Granular Backfill.
2. Granular Base Course Material.
3. Seeding & sodding.
4. Rip rap.
5. No. 4 stone for off site sediment tracking control.
6. 4,000 psi concrete.

1.5 INFORMATIONAL SUBMITTALS

A. Quality Control Submittals

B. Qualifications Certification: Submit written certification or similar documentation signed by applicable subcontractor, Contractor and manufacturer (where applicable) indicating compliance with applicable "Qualifications" requirements specified below in "Quality Assurance" article.

C. Installer Experience Listing: Submit list of completed projects using products proposed for this Project, including owner's contact and telephone number for each project, demonstrating compliance with applicable "Qualifications" requirements specified below in "Quality Assurance" article.

1.6 QUALITY ASSURANCE

A. Perform erosion, sediment and pollution control in compliance with applicable requirements of the New York Standards and Specifications Erosion and Sediment Control and other governing authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle and store products according to manufacturer's written instructions.

1.8 NOTICES

A. Pre-Construction Conference: Within seven days of start of construction, attend Civil/Structural Preconstruction Meeting. Representatives of all Contractors responsible for earthwork operations are required to attend.

B. When the site has been finally stabilized, Contractor will notify the Architect, in writing, that a final inspection be performed.

C. Pay any fines issued by any agency as a result of non-compliance with the SESC Plans.

1.9 INSPECTIONS AND MAINTENANCE

A. The Architect or qualified personnel of the Owner shall inspect disturbed areas of the construction site. Special attention will be focused on areas not finally stabilized, structural control measures, and locations where vehicles enter or exit the site. Disturbed areas will be inspected for pollutants entering the drainage system. Structural control measures will be reviewed for effectiveness in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site will be inspected for evidence of off-site sediment tracking.

B. Provide timely maintenance of vegetation erosion and sediment control measures, and other protective measures, during construction.

C. Perform corrective measures within three calendar days of the Architect's or Owner's report at no cost to the Owner. Failure by the Contractor to perform corrective work within this schedule automatically authorizes the Owner to hire others and deduct from the Contract Sum the costs incurred by the Owner for the performance of this Work.

PART 2 - PRODUCTS

2.1 SILT FENCE

A. Meet the following criteria unless specific type is shown on plans or Architect accepts the change in criteria.

1. Silt Fence: Polypropylene filter fabric supported by non-pressure treated hardwood posts meeting the following requirements.

Property	Unit	Test Method	Value
Grab Tensile Strength (Machine Direction)	lbs	ASTM D 4632	124 min
Grab Tensile Strength (Cross-Machine Direction)	lbs	ASTM D 4632	124 min
Grab Tensile Elongation	%	ASTM D 4632	15 / 15
Trapezoid Tear Strength	lbs	ASTM D 4533	65 min
Mullen Burst Strength	psi	ASTM D 3786	300 min
Puncture Strength	lbs	ASTM D 4833	60
Ultraviolet Stability (Strength Retained)	%	ASTM D 4355	70
Apparent Opening Size (AOS)	U.S. Sieve	ASTM D 4751	30
Permittivity	sec^{1}	ASTM D 4491	0.10
Coeff of Permeability	CM/Sec	ASTM D 4491	0.005 min
Water Flow Rate	$gal/min/ft^2$	ASTM D 4491	10 min

2. Basis of Design Product: Subject to compliance with requirements provide Tencate Geosynthetics Mirafi 100X fabric or comparable product.

3. Reinforced fence: Fabric backed with 14-1/2 gauge by 6 inch square mesh woven wire. See plans and details for specific locations or requirements.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. DGI Industries.
2. Hanes Geo Components.
3. TenCate Geosynthetics (Mirafi).

2.2 STAKES

A. One of the following:

1. 2-inch by 2-inch nominal by 4-feet long, non-pressure treated hardwood.
2. #4 rebar, 4-feet long min.

B. Maximum post spacing permitted shall be: 8'4" O.C.

2.3 PERMANENT SEEDING AND SODDING

A. Refer to applicable section.

2.4 TEMPORARY SEEDING (unless otherwise shown on Drawings):

A. Minimum Requirements:

1. Lime: 1/2 ton per acre.
2. Fertilizer: Commercial 5-10-10 or equivalent (600 lbs per acre).
3. Seed: Ryegrass (annual or perennial) (40 lbs. per acre).
4. Mulch: Straw at 2 ton per acre.

2.5 STABILIZED CONSTRUCTION ENTRANCE

A. No. 4 stone meeting the following requirements:

Standard ASTM Sieve Size	Percent Passing by Weight
4 inch	100
3 inch	90-100
2 inch	0-15
Passing No. 50	5-10
Passing No. 100	2-5

B. Soil Stabilization Fabric:

1. Stabilization Fabric: Commercially manufactured, UV stabilized low clogging, high flow, woven geotextile meeting the following requirements.

Property	Unit	Test Method	Value
Grab Strength	lbs	ASTMD-4632	315 min
Tensile Strength	lbs/in	ASTMD-4595	175 min
Grab Elongation	%	ASTMD-4632	15 max
Trapezoid Tear	lbs	ASTMD-4533	120 min
Mullen Burst	psi	ASTMD-3786	600 min
Permittivity	/Sec	ASTMD-4491	.05min
Water Flow Rate	gal/min/ft^2	ASTMD-4491	4 min

2. Basis of Design Product: Subject to compliance with requirements provide Tencate Geosynthetics Mirafi 600X fabric or comparable product.

3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. DGI Industries.
   b. Hanes Geo Components.
   c. TenCate Geosynthetics (Mirafi).

C. Granular Base Course Material: Shall be as specified in Earth Moving Section.

2.6 DROP-IN INLET PROTECTION:

A. Standard of quality for aftermarket inlet protection for use in existing and proposed catch basin, drop inlets, curb box inlets and storm manholes shall be Flexstorm Inlet Filters, by Inlet and Pipe Protection, Inc., Naperville, Illinois.

1. Description of System:

   a. An aftermarket drop-in inlet filter system designed to collect silt and sediment from surface storm water runoff at drainage locations shown on the plans, at existing inlets in pavement where adjacent disturbance will allow sediment runoff to occur, in areas where access to the site dictates their use due to phasing issues, or as directed by the Engineer.

   b. An aftermarket drop-in inlet filter system comprised of a corrosion resistant steel frame and a replaceable geotextile sediment bag attached to the frame with a stainless steel locking band. The sediment bag hangs suspended from the rigid frame at a distance below the grate that shall allow full water flow into the drainage structure if the bag is completely filled with sediment.

   c. The aftermarket drop-in inlet filter frame includes lifting handles in addition to the standard overflow feature. A proprietary Removal Tool engages the lifting bars or handles to allow manual removal of the assembly without machine assistance. The frame suspension system is adjustable in ½" increments up to 5" per side on rectangular designs should the casting or drainage structure have imperfections.

d. Standard woven polypropylene sediment bags with a typical flow rate of 200 gpm / sq ft.

2. Woven Sediment Bag Material Specifications:

		MARV[2]	
PROPERTY	TEST METHOD	ENGLISH	METRIC
Mechanical			
Tensile Strength (Grab)	ASTM D-4632	255 x 275 lbs	1130 x 1220 N
Elongation	ASTM D-4632	20 x 15 %	20 x 15 %
Puncture	ASTM D-4833	135 lbs	600 N
Mullen Burst	ASTM D-3786	420 psi	2890 kPa
Trapezoidal Tear	ASTM D-4533	40 x 50 lbs	175 x 220 N
Endurance			
UV Resistance	ASTM D-4355	90%	90%
Hydraulic			
Apparent Opening Size (AOS)[3]	ASTM D-4751	20 US Std. Sieve	0.850 mm
Percent Open Area (POA)	CW-02215 Mod.[4]	20%	20%
Permittivity	ASTM D-4491	1.50 sec^{-1}	1.50 sec^{-1}
Water Flow Rate	ASTM D-4491	200 gpm/ft^2	8,145 $l/min/m^2$

3. Tested Filtration Efficiency:

a. All testing performed in general accordance with the ASTM D 7351, *Standard Test Method For Determination of Sediment Retention Device Effectiveness in Sheet Flow Application*, with flow diverted into an area inlet. Test Soil used as sediment had the following characteristics with a nominal 7% sediment to water concentration mix:

Soil Characteristics	Test Method	Value
% Gravel	ASTM D 422	2
% Sand		60
% Silt		24
% Clay		14
Liquid Limit, %	ASTM D 4318	34
Plasticity Index, %		9
Soil Classification	USDA	Sandy Loam
Soil Classification	USCS	Silty Sand (SM)

Tested Efficiencies:

Property	Woven Sediment Bag
Filtration Efficiency	82%

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine conditions under which soil erosion and sediment control is to be installed notify Architect in writing of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

B. Beginning installation constitutes Contractor's acceptance of substrate and conditions.

3.2 GENERAL EROSION CONTROL

A. Install initial construction erosion control features, as indicated on SESC Drawings and Specifications or as directed by the Architect, prior to topsoil stripping, earthwork, and removal of existing vegetation. Keep the disturbance to a minimum. Install other features as described in the sequence of erosion, sediment and pollution control on the drawings.

B. Minimize amount of bare soil exposed at one time. Cumulative disturbance in excess of one acre requires coverage under NYSDEC SPDES Permit for Construction Activities.

C. Start permanent seeding within seven calendar days of rough grading. When this is not possible, provide temporary seeding of perennial rye grass at the rate of three pounds seed per one thousand square feet. Provide temporary seeding within seven days on non-roof, non-paved areas. When adverse weather conditions prevent good germination, repeat seeding as directed by the Architect until the area is stabilized. Till under temporary grass and fine grade when preparing for final seeding.

D. Until a disturbed area is stabilized, trap runoff sediment by the use of debris basins, sediment basins, silt traps, or other methods acceptable to the Architect and governing authorities. Construct sediment basins to dimensions shown on plans.

E. Provide erosion controls on slopes and swales traversing, bordering, or leaving the site. Limit the water flow to a non-erosive velocity.

F. Inspect erosion and sediment control measures immediately after each rainfall and at least daily during prolonged rainfall. Make required repairs immediately.

G. Remove sediment deposits when they reach approximately one-half of the height of the barrier. Dispose sediment in a manner that does not result in additional erosion or pollution.

H. Provide prompt removal and disposal of rubbish and debris in accordance with the governing authorities.

I. Coordinate temporary erosion and sediment control measures with permanent erosion control features specified elsewhere in the Contract Documents to the maximum extent possible to assure economical, effective, and continuous erosion control.

J. Remove all temporary measures at completion of construction.

3.3 MUNICIPAL SEWER AND WETLAND EROSION CONTROL

A. Control erosion, siltation and pollution to municipal sewers, water bodies and wetlands by taking appropriate measures such as, but not limited to, the following:

1. Prevent petroleum products and excessive amounts of silt, clay, and muck from entering municipal sewers, waters or wetlands of New York State during construction.

2. Prevent fresh concrete, concrete leachate and washings from equipment and trucks, from entering municipal sewers, waters or wetlands of New York State during construction.

3. Place silt fence to control erosion at the down slope edge of disturbed areas. Place this barrier to sediments before disturbance of the ground occurs and maintain in good condition until disturbed land is heavily vegetated or otherwise permanently stabilized.

4. Seed areas of soil disturbance resulting from this Project with appropriate perennial grass seed and mulch with straw within seven calendar days as described in general erosion control. Maintain mulch until a suitable vegetative ground cover is established.

3.4 STORM STRUCTURE PROTECTION

A. As shown on the Soil Erosion and Sediment Control Plans (SESC), provide storm structure protection at each inlet as shown on the detail plan. Clean storm structure protection material after each storm event to permit the fabric and/or drainage stone to work effectively. Remove the drainage material when the site is stabilized and approved by the Architect.

3.5 SILT FENCE/STRAW BALE DIKES

A. Locate in accordance with plans and details and as directed by the Architect. Excavate trench along the lower perimeter(s) of site, along the contract limit line, and as indicated on the Drawings. The placement of silt fence and/or bales shall consider drainage paths and intercept drainage prior to leaving site or entering storm system. Place excavated material on uphill side of trench for backfilling.

B. Drive stakes securely into the downhill side of the trench. When prefabricated silt fence with fabric attached to stakes is used, drive stakes so that fabric is buried in the ground as detailed.

C. Backfill trench with excavated material, so that fabric is securely buried in the ground to prevent undermining. Tamp soil.

D. Join sections by overlapping fabric between two stakes. Set stakes simultaneously. Overlap by minimum six inches, fold, and staple to prevent sediment bypass.

E. Attach silt fence securely to stakes spaced no more than eight feet on center. Secure fence fabric to stake with minimum three one inch staples.

F. Provide silt fence dikes perpendicular to swale center lines in swales one and one half percent and steeper. Locate dikes at a maximum interval of fifty feet on center unless otherwise shown on drawings.

G. Removal of silt and replacement of silt fence and/or bales shall be on going throughout the duration of the project to maintain an effective silt removing barrier.

3.6 TEMPORARY SEEDING

A. When necessary, provide temporary seeding as described in this Section.

B. Seedbed Preparation:

1. Scarify soil if compacted.
2. Remove debris and obstacles such as rocks and stumps.
3. Apply lime and fertilizer.
4. Apply seed uniformly by mechanical seeder or hydroseeder.
5. Apply straw mulch.

C. Provide permanent seeding as described elsewhere in the Contract Documents.

3.7 OFFSITE SEDIMENT TRACKING CONTROLS

A. Stabilization Blanket: Install as detailed and shown on Drawings to eliminate tracking sediment off site. Inspect after each rain storm and at least one time per week. When sediment begins tracking off site, immediately replace stone with clean No. 4 stone to retain sediment on site. Remove fabric and stone at project completion. Complete construction of proposed final surface(s).

3.8 DROP-IN INLET PROTECTION

A. Install channel drain inlet matting per manufacturer's installation requirements.
B. Clean silt from filter bag following each rain event and as required. Do NOT allow accumulated sediment to enter the inlet.

3.9 CLEANING

A. During the Contract and at intervals as directed by the Architect and as erosion, sediment and pollution control procedures are completed, clear the site of extraneous materials, rubbish, and debris. Leave the site in a clean, safe, well draining, and neat condition.

B. Clean storm ponding areas, catch basins, detention basins, and Oil and Grit Separator(s): Clean out contaminants, sediment, rubbish, construction debris, foreign objects and accumulated floatables from chambers and ponding areas thoroughly, immediately prior to final acceptance.

END OF SECTION 31 25 00

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.
B. The principle reference for materials and methods is the “New York State Department of Transportation Standard Specifications for Construction and Materials,” latest edition (NYSS).

1.2 SUMMARY

A. Section Includes:

1. Hot-mix asphalt paving.
2. Hot-mix asphalt patching.
3. Pavement-marking paint.

B. Related Sections:

1. Section 31 20 00 "Earth Moving" for subgrade and aggregate base preparation and other requirements.

1.3 SUBMITTALS

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

B. Action Submittals:

1. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

a. Job-Mix Designs: For each job mix proposed for the Work.

C. Qualification Data:

1. Manufacturer’s Certificates: Certify that hot mix asphalt products meet or exceed NYSDOT Standard Specifications:

a. Section 401: Plant Production
b. Section 402: Hot Mix Asphalt (HMA) Pavements
c. Section 407: Tack Coat
d. Section 685: Pavement Markings

1.4 QUALITY ASSURANCE

A. Manufacturer and Mixing Plant Qualifications: A paving-mix manufacturer and mixing plant with NYSDOT approved materials and batch plant equipment complying with the following NYSDOT Standard Specifications:

1. Section 401: Plant Production
2. Section 402: Hot Mix Asphalt (HMA) Pavements.

B. Asphalt Paving Installer: Company specializing in performing work described in this section with minimum experience of three years.

C. Permits: Submit certified copies of all permits obtained from local regulatory agencies and New York State Department of Transportation.

D. Installation Requirements: Work to be performed in accordance with the following NYSDOT Standard Specifications:

1. Section 402: Hot Mix Asphalt (HMA) Pavements
2. Section 407: Tack Coat

E. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
2. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
3. Review condition of subgrade and preparatory work.
4. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
5. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.5 REGULATORY REQUIREMENTS

A. Obtain written permission and required permits from applicable agency prior to start of construction, and submit copies of permits as specified in “Submittals - Quality Control Submittals” above.

1.6 PROJECT CONDITIONS

A. Temperature and Seasonal Limitations: Refer to NYSDOT 402-3.01 Temperature and Seasonal Limitations.

1. Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, if the temperature has not been above 35 deg for 12 hours immediately prior to application or if the following minimum surface temperatures are not met.

2. Minimum Surface Temperatures: Comply with NYSDOT Standard Specifications Section 402, table 402-1 – Temperature Requirements.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature in accordance with NYSDOT Standard Specifications Section 685-3.02 – Atmospheric Conditions.

PART 2 - PRODUCTS

2.1 AGGREGATE SUBBASE AND BASE FOR ASPHALT PAVING

A. Refer to Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.

2.2 ASPHALT PAVING MIX AGGREGATES

A. Aggregates for binder and top course: Conform to the requirements of NYSDOT Standard Specification 401-2.02, Aggregates.

2.3 ASPHALT MATERIALS

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes meeting NYSDOT Standard Specifications, Section 402 (70 Series) for each pavement course and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Mixes to be placed at thickness noted on the Drawings.
3. Binder Course (2-in < t < 3-in): NYSDOT No. 402.197904 (Type 3 Binder). Maximum 20% RAP permitted.
4. Binder Course (3-in < t < 5-in): NYSDOT No. 402.257904 (Type 3 Binder). Maximum 20% RAP permitted.
5. Shim Course: NYSDOT No. 402.058904 (Type 5 Shim). Maximum 20% RAP permitted.
6. Top Course: NYSDOT No. 402.127304 (Type 6.) Maximum 20% RAP permitted.
7. Top Course: NYSDOT No. 402.097304 (Type 7.) Maximum 20% RAP permitted.
8. Top Course: NYSDOT No. 402.097104 (Type 7F.) Maximum 20% RAP permitted.
9. Sheet Asphalt Top Course: NYSDOT No. 402.097304 (Type 7 Top) 100% Virgin material required. (Tennis Courts, Basketball Courts, and Tracks).

B. Coatings/Fillers: Comply with New York State Department of Transportation Standard Specification, Section 702 for material designations indicated.

1. Tack Coat: Emulsified asphalt

a. Slow setting type; NYSDOT Designation 702-3601 (SS-1h) or 702-4501 (CSS-1h).

b. Medium setting type; NYSDOT Designation 702-3401 (HFMS-2H) or 702-4301 (CMS-2h)

2. Asphalt Cement Filler: NYSDOT Designation 702-0700.

C. Water: Potable.

2.4 PAVEMENT MARKING PAINT

A. Complying with NYSDOT Standard Specifications:

1. Section 727-09: White and Yellow Solvent Borne Acrylic Permanent Traffic Paint

2. Colors:

a. White for asphalt striping and signage

1) Lane Markings for traffic in the same direction

b. Yellow for traffic markings

1) No parking parent / bus drop-off zones
2) No parking fire lanes
3) Lane Markings for opposing traffic
4) Parking Stalls – Confirm with owner

c. Blue for the following locations:

1) ADA Accessible symbol and associated ADA Accessible striping

3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. TM 5626 White Setfast Acrylic Traffic Marking Paint, Sherwin Williams Company, Baltimore, MD
b. TM 5627 Yellow Setfast Acrylic Traffic Marking Paint, Sherwin Williams Company, Baltimore, MD
c. TM 2133 Blue Setfast Latex Traffic Marking Paint, Sherwin Williams Company, Baltimore, MD

B. Pavement Striping Blackout Paint: Opaque, high quality, exterior grade primer compatible with existing asphalt surface and pavement marking paint.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. TM 5629 Black Setfast Acrylic Traffic Marking Paint, Sherwin Williams Company, Baltimore, MD

2.5 AUXILIARY MATERIALS

A. Soil Stabilization Fabric: Refer to Section 31 20 00 "Earth Moving".

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.

2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.

3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

    a. Subsurface preparation shall conform to the appropriate section of NYSS.

4. After rolling, test course with straight edge min. 15 ft. long. Satisfactorily eliminate any depression over 1/4" deep.

5. Proceed with paving only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 SAWCUTTING

A. Saw cut existing pavement perpendicular to the roadway surface in neat lines. If the pavement breaks irregularly along the cut line during removal, saw cut the entire length of pavement again to achieve one uniform, straight, and neat line.

3.3 TACK COAT

A. Apply in accordance with NYSDOT Standard Specifications Section 407-3.02.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

B. Manhole and Catch Basin Frames and Grates:

1. Coat surfaces of frames and grates with oil to prevent asphalt adherence to surfaces. Do not tack coat.

3.4 PATCHING

A. Hot-Mix Asphalt Pavement:

1. Preparation: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending the minimum distance shown on Drawings into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade. Apply tack coat.

2. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3. Use hot-applied joint sealant to seal new joints. Fill flush with surface of existing pavement and remove excess.

3.5 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.6 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

1. Herbicide Application: Obtain approval of Owner before herbicide notification or application. Notify Owner’s designated pesticide representative and all property neighbors not less than 48 hours in advance of any pesticide application including all herbicides, insecticides and fungicides in accordance with the School Pesticide Neighbor Notification Law, Section 409-h of New York State Education Law and Commissioner's Regulation 155.24.

C. Tack Coat: Apply tack coat.

3.7 PAVING GEOTEXTILE INSTALLATION

A. Apply tack coat. Place paving geotextile promptly according to manufacturer's written instructions. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches and transverse joints 6 inches.

1. Protect paving geotextile from traffic and other damage and place hot-mix asphalt paving overlay the same day.

3.8 HOT-MIX ASPHALT PLACING

A. Hot-Mix Asphalt Paving Application: Provide finished surface free from depressions that could collect water. Satisfactorily remove, at Contractor's expense, any depressions over 1/8" when tested with 6-foot straight edge without evidence of patching. Carry all paving to wood stripping, curbing or to location shown on Drawings.

B. Application Over Aggregate Base:

1. Heavy Duty, Auto Duty and Light Duty Asphalt Areas: Apply over aggregate base in 2 courses. Comply with New York State Department of Transportation Standard Specification, Section 401 and Section 402, for asphalt types specified.

C. Placement: Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. Spread mix at minimum temperature of 250 deg F.
3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

D. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.

E. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.9 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.

2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.

3. Offset transverse joints, in successive courses, a minimum of 24 inches.

4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

6. Compact asphalt at joints to a density within 2 percent of specified course density.

7. Use hot-applied joint sealant to seal new joints. Fill flush with surface of existing pavement and remove excess.

3.10 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927 or AASHTO T 245, but not less than 94 percent or greater than 100 percent.
2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.11 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus 1/2 inch, no minus.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch.
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.
4. Tennis Courts surface: No standing water, one hour after flooding, which can cover a nickel.

C. Pavement Surface Drainage: Pavement is to drain to catch basin, swale or other storm drainage control measure as indicated on Drawings or, if not indicated on drawings, to nearest storm drainage control measure.

D. Pavement Remediation: If pavement surface smoothness and drainage requirements above are not met, correct to meet tolerance and performance requirements. If remediation is not acceptable to Architect, removal and replacement of area will be required. Feather and smooth edges of correction measure so that joint is invisible.

3.12 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Perform work in accordance with NYSDOT Standard Specifications Section 727-09.

C. Sweep and clean surface to eliminate loose material and dust.

D. Surface must be clean, dry and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

E. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended application conditions (temperature, dew point, humidity) and rates to provide a minimum wet film thickness of 15 mils and minimum dry film thickness of 7.5 mils.

F. Do not apply pavement marking paint to concrete surfaces with concrete sealers or efflorescence. Remove by extended weathering, etching, or abrasive blasting.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
D. Replace and compact hot-mix asphalt where core tests were taken.
E. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.14 FLOOD TESTING

A. Flood Tests: Perform flood test in the presence of the Architect using water tank truck to confirm that pavement surface smoothness and surface storm drainage requirements are met.

3.15 CLEANING AND DISPOSAL

A. Paver and Equipment Cleaning:

1. Do not clean tools and equipment used for HMA placement on the pavement surface, or near streams, ponds, drainage structures or other areas that are tributaries to waterways.

2. Use an area approved by the Owner’s Representative for cleaning all paving equipment and tools.

    a. If possible, remove solid pieces of asphalt by scraping or other mechanical means prior to application of a cleaning agent.

3. If a petroleum product is used for cleaning, contain all liquid products during cleaning operations using tarpaulins, sand pads, pails, or other collection methods to prevent spillage or accidental release.

    a. Use hand sprayers or other similar devices to minimize the amount of petroleum product applied.

4. Properly dispose of sand and collected petroleum products as petroleum contaminated soil at no additional cost to the Owner.

B. Remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

END OF SECTION 32 12 16

SECTION 32 31 13 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Chain-link fences.
2. Privacy Slats

B. Related Sections:

1. Section 03 30 00 “Cast-in-Place Concrete”
2. Section 31 20 00 "Earth Moving"

1.3 REFERENCES

A. ASTM A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
B. ASTM F552 Standard Terminology Relating to Chain Link Fencing.
C. ASTM F567 Standard Practice for Installation of Chain Link Fence.
D. ASTM F626 Specification for Fence Fittings.
E. ASTM F900 Specification for Industrial and Commercial Swing Gates.
F. ASTM F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
G. ASTM F1184 Specification for Industrial and Commercial Horizontal Slide Gates.
H. CLFMI WLG2445 Chain Link Fence Wind Load Guide for the Selection of Line Post and Line Post Spacing.

1.4 PERFORMANCE REQUIREMENTS

A. Design Wind Load: Comply with applicable requirements of building code in effect for Project including applicable portions of ASCE 7 for Wind Load Pressure and CLFMI WLG 2445 Wind Load Guide for the Selection of Line Post Spacings.

1.5 SUBMITTALS

A. General: Submit all action submittals (except Samples for Verification) and informational submittals required by this Section concurrently.

B. Action Submittals:

1. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.

   a. Fence and gate posts, rails, and fittings.

   b. Chain-link fabric, reinforcements, and attachments.

   c. Polymer and polyester coatings.

      1) Note: Polymer and polyester coated samples and product data are to be submitted simultaneously.

   d. Accessories:

      1) Privacy slats
      2) Chain link fence wind screen

   e. Gates and hardware.

2. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show accessories, hardware, gate operation, and operational clearances.

3. Samples for Verification:

   a. Polymer and Polyester Coated Components: In 6-inch lengths for components and on full-sized units for accessories.

      1) Note: Polymer and polyester coated samples and product data are to be submitted simultaneously.

   b. Manufacturer's color charts.

4. Warranty:

   a. Sample of special warranty
   b. Sample of manufacturer warranty

C. Informational Submittals:

1. Qualification Data: Submit list of completed projects using products proposed for this Project, including owner's contact and telephone number for each project, demonstrating compliance with "Quality Assurance" article.

2. Product Test Reports: For framing strength according to ASTMF 1043.

D. Closeout Submittals:

1. Operation and Maintenance Data: For the following to include in operation and maintenance manuals:

a. Polymer and polyester finishes.
b. Gate hardware.

2. Warranty: Executed special warranty.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Minimum five (5) years' experience in installing chain link fences and gates similar in material, design, and extent to that indicated for this Project in accordance with ASTM F 567, whose work has resulted in construction with a record of successful performance.

B. Mockups: If required by Architect, build mockups to set quality standards for fabrication and installation.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.8 WARRANTY

A. Special Warranty: Contractor's warranty to repair or replace components of chain-link fences and gates that fail in materials or workmanship within the specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of any component of fence to perform as designed.
b. Faulty operation of gate(s) to perform as designed.

2. Warranty Period: Five (5) years from date of Substantial Completion.

B. Manufacturer warranty: Manufacturer's standard form in which Contractor agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of metals, metal finishes, coatings and other materials of the fence components, including fabric, framework and fittings.

2. Warranty Period: Fifteen (15) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle. Comply with CLFMI Product Manual and with requirements indicated below:

1. Fabric Height: As indicated on Drawings.

2. Steel Wire Fabric:

a. General Use: Wire with a diameter of 0.148 inch (9 gauge) minimum. For polymer coated fabric, wire with a diameter of 0.148 inch core (9 gauge core) minimum.

b. Tennis Court Fencing: 0.120 inch (11-gauge) core minimum.

3. Mesh Size:

a. General Use: 2 inches, unless noted otherwise.

b. Tennis Court Fencing: 1-3/4 inch mesh.

c. Baseball and Softball Backstop:

1) Bottom panels: 1-3/4 inch mesh
2) Remaining panels and hood: 2 inch mesh

4. Coatings:

a. Polymer-Coated (Vinyl) Fabric: ASTM F 668, Table 4, Class 2b, fused and adhered over zinc-coated steel wire.

1) Color: Black, complying with ASTM F 934.

2) Basis of Design Manufacturer: Subject to compliance with requirements, polymer coating that may be incorporated into the Work include, but are not limited to, the following:

a) Merchants Metals Brighton Colorcoat II fused and adhered polymer coating.

5. Selvage: Knuckled at both selvages.

2.2 FRAMEWORK MATERIALS

A. Posts and Rails: Comply with ASTM F 1043 for minimum dimensions and wall thickness of framing, including rails, braces, and line; terminal; and corner posts, meeting the following criteria:

1. Heavy Industrial Strength: ASTM F 1043 Group I-C, SS40, round steel electric-resistance-welded pipe galvanized with hot-dip process in accordance with ASTM A653/A653M and ASTM A924/A924M.

2. Manufactured to meet minimum yield strength of 50,000 psi and coated in accordance with the following standards:

   a. ASTM F1043, Group IC, Electrical Resistance Welded Round Steel Pipe, heavy industrial weight.
   b. M181, Type I, Grade 2, Electrical Resistance Welded Steel Pipe
   c. RR-R 191/3, Class 1, Grade B, Electrical Resistance Welded Steel Pipe.

B. Coatings:

1. PVC / Polyester Coating Over Zinc Coating:

   a. Thermoplastic vinyl finish to be 10 mils (minimum) thick.

   b. Cleaning and Surface Preparation: Consists of a four-stage pretreatment/wash, an iron phosphate coating and immersion in a water based epoxy primer.

   c. PVC Coating Application: Coating is thermally fused to heated pipe meeting the following standards:

      1) ASTM F1043 Group I-C, Heavy Industrial.
      2) Federal specification RR-F-191/3E, Class 1
      3) Shows satisfactory adhesion in cross-hatch test, Method B, ASTM D3359.
      4) Finish shall not crack, blister or split under normal use.

2. Color: Match chain-link fabric, complying with ASTM F 934, Standard Colors for Polymer-Coated Chain Link Fence Materials.

C. Basis of Design Manufacturer: Subject to compliance with requirements, framework and coatings that may be incorporated into the Work include, but are not limited to, the following:

1. Merchants Metals Colorbond Chain Link Fence Framework and Coating System.
2. Master Halco Permafused II Heavy Mil PVC Chain Link Fence Framework and Coating System.
3. Ameristar PermaCoat PC-40 (industrial weight), manufactured by Ameristar Fence Products (www.ameristarfence.com) Chain Link Fence Framework and Coating System.

2.3 FRAMEWORK SIZES

A. Line Post Size (determined by height):

1.	4 feet up to and including 6 feet high:	2 inches o.d.
2.	7 feet up to and including 9 feet high:	2-1/2 inches o.d.
3.	10 feet up to and including 12 feet high:	3 inches o.d.
4.	Over 12 feet to 16 feet high:	4 inches o.d.

B. End, Corner and Pull Post:

1.	4 feet up to and including 6 feet high:	2-1/2 inches o.d.
2.	7 feet up to and including 9 feet high:	3 inches o.d.
3.	10 feet up to and including 12 feet high:	4 inches o.d.
4.	Over 12 feet to 16 feet high:	4 inches o.d.

C. Horizontal Framework Members: Intermediate, top and bottom rails complying with ASTM F 1043. Size in accordance with the following guidelines unless otherwise indicated on drawings:

1. Top, Intermediate and Bottom Rail: 1.66 inches in diameter.

a. Bottom Rail: Provide bottom rail for:

1) Fence 9 feet high and over
2) Fencing at perimeter of track oval

b. Intermediate Rail: Provide intermediate rail for:

1) Fencing 10 feet high and over,
2) Tennis court fencing

2. Brace Rails: Comply with ASTM F 1043.

2.4 TENSION WIRE

A. Metallic-Coated Steel Wire: For use on fencing with zinc coated fence fabric. 0.177-inch-diameter (7 gauge), marcelled tension wire complying with ASTM A 817 and ASTM A 824, with the following metallic coating:

1. Type II, zinc coated (galvanized) with the following minimum coating weight:

a. Matching chain-link fabric coating weight.

B. Polymer-Coated Steel Wire: For use on fencing with polymer coated fence fabric. 0.177-inch-diameter (7 gauge core), tension wire complying with ASTM F 1664, Class 2b over zinc-coated steel wire.

1. Color: Match chain-link fabric, complying with ASTM F 934.

2.5 FITTINGS

A. General: Comply with ASTM F 626.

B. Post Caps: Provide for each post. Post caps to be weather-tight, securely fastened and vandal-resistant.

1. Provide line post caps with loop to receive tension wire or top rail.

C. Rail and Brace Ends: For each gate, corner, pull, and end post.

D. Rail Fittings: Provide the following:

1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails in the fence line-to-line posts.

E. Tension and Brace Bands: Pressed steel.

F. Tension Bars: Steel. Length not less than 2 inches shorter than full height of chain-link fabric with minimum cross-section of 3/16 inch x 3/4 inch. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.

G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading. Provide rod and turnbuckle or other means of adjustment.

H. Tie Wires, Clips, and Fasteners: According to ASTM F 626.

1. Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:

a. General Use Fencing including Tennis Court Fencing:

1) Aluminum: ASTM B 211; Alloy 1350-H19; 0.148-inch-diameter, mill-finished wire. Coating to match chain-link fence fabric. (Provide coating to match framework.)

2. Hog Rings: For attaching chain link fabric to bottom tension wire.

a. Material: Aluminum per ASTM B 211; Alloy 1350-H19; 0.192 inch (6 gauge), mill-finished wire.

I. Fitting Finish:

1. Steel or cast iron: Galvanized Coating for Pressed Steel or Cast Iron - Not less than 1.2 oz. /sq. ft. zinc.

a. Coating - Vinyl-coated per ASTM F 626.

2. Aluminum: Mill finish with coating to match framework.

3. Color: To match color of fence fabric.

J. Fasteners:

1. Material to be stainless steel.

a. Coating - Vinyl-coated per ASTM F 626.

2. Color: To match color of fence fabric.

3. Finish: Install fasteners that are no more than ¼ Inch long.

2.6 SWING GATES

A. General: Comply with ASTM F 900 for gate posts and single and double swing gate types.

1. Gate Leaf Width: 48 inches unless otherwise noted on drawings.
2. Gate Fabric Height: As indicated on drawings.

B. Pipe and Tubing:

1. Coating and finish to match fence framing.

2. Gate Post Size:

a. For gate heights over 6', and if gate height is equal to fence height, then standard fence framing end post requirements shall apply. Refer to Post and Rail requirements.

b. Gate Leaf up to 6 feet Wide: 2.875 inches o.d.; 4.64 lbs./l.f.

c. Gate Leaf over 6 feet and under 12 feet wide: 4 inches o.d.; 6.56 lbs./lin. ft. (weight applicable to Group IC SS40 framework only)

d. Gate Leaf over 12 feet Wide: 6.625 inches o.d.; 19 lbs./lin. ft.; or 4.5 inches o.d. (applicable to Group IC SS40 material complying with ASTM F 1043 only and upon approval of framework material by Architect.)

C. Frame Corner Construction: Welded.

D. Swing Gate Hardware:

1. Hinges: 180-degree inward swing unless otherwise noted on Drawings.

2. Latches: Commercial latch permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.

a. Provide gravity latch for tennis courts.

3. Padlock and Chain: Owner furnished.

4. Keeper: Provide keeper for all vehicular gates, which automatically engages gate leaf and holds it in open position until manually released. Provide sleeve to insert keeper. For concrete paving, set sleeve directly into concrete. For asphalt paving set sleeve into concrete collar.

5. Double Gates: Provide drop bar for all double gates, consisting of hot-dipped galvanized rod that drops into concrete collar. Provide locking device and padlock eyes as an integral part of the latch, requiring one padlock for locking both gate leaves.

6. Closer: Manufacturer's standard.

7. Color: To match fence fabric.

2.7 FENCE POST ROUND CONCRETE FORM

A. Basis-of-Design Product: Subject to compliance with requirements, provide Sonoco Sonotube Concrete Forms or comparable product.

2.8 PRIVACY SLATS – 90 Percent Coverage

A. Material: Heavy duty polyethylene reinforced tubular slats with “wings”:

1. Provide 90% coverage.
2. Slats must span full height of fence (i.e., no partial height slats).
3. Slat Width: 1 7/16” for 2” Mesh Size.
4. Manufactured for chain-link fences from virgin polyethylene containing UV inhibitor.
5. Sized to fit mesh specified with vandal-resistant fasteners and lock strips.
6. Installed vertically.
7. Verify wind-loading is appropriate for fencing specified and application.

B. Color: As selected by Architect from manufacturer's full range.

2.9 CONCRETE

A. Concrete Footings: Refer to Division 03 concrete section for cast-in-place concrete, ASTM F 567 Section 5 and Drawings and Details for footing size. Bottom of footing must not be smaller than the top to prevent frost heaving.

2.10 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107 and compatible with galvanized and clear coatings. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications. To be compatible with galvanized and clear coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements indicated.

1. Install fencing on established boundary lines inside property line.

3.4 CHAIN-LINK FENCE INSTALLATION

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil. Mechanically driven posts only allowed if shown on Drawings or specifically approved by Architect.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.

    a. Concrete Fill: Minimum 28-day compressive strength 3,000 psi (20 MPa). Refer to Division 03 Section "Cast-in-Place Concrete."
    b. Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

C. Types of Post Footings: As indicated on Drawing or as approved by Architect.

1. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.

2. Concealed Concrete: As indicated on Drawings to allow covering with surface material.

3. Posts Set into Concrete in Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.

4. Form or core-drill holes not less than 6 inches deep and 1/2 inch larger than OD of post for installing posts in concrete. Do not cut reinforcing steel. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, in two applications. Taper the grout at the top of the core to shed water away from post.

5. Fence heights for core depth.

    a. 6-inch minimum depth – 4’ nominal fence height, or less.
    b. 9-inch minimum depth – Greater than 4 feet nominal fence to 8 feet nominal fence height.
    c. 12-inch minimum depth – Greater than 8 feet nominal fence height.

D. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.

E. Line Posts:

1. Tennis: Space line posts uniformly at 8 feet o.c. unless otherwise indicated on Drawings.
2. General Use Fencing: Space line posts uniformly at 10 feet o.c. unless otherwise indicated on Drawings.

F. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at midheight of fabric 72 inches or higher, on fences with top rail and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

G. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with hog rings spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:

1. Extended along bottom of fence fabric. Install bottom within 6 inches of bottom of fabric and tie to each post with tie wires.

H. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps / loop caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps / loop caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer. Connection sleeves to be located / supported by post caps / loop caps.

I. Intermediate and Bottom Rails: Install and secure to posts with fittings.

J. Chain-Link Fabric: Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

1. Height of fabric between finished grade and bottom selvage.

   a. General Use: Leave 2 inches between finished grade or surface and bottom of selvage unless otherwise indicated.
   b. Tennis Court Fencing: Leave 1 inch between finish grade or surface and bottom selvage.

2. Fabric installation on fence posts relative to adjacent use:

   a. General Use: Apply fabric to inside of enclosing fence posts / framework as indicated on Drawings.
   b. Tennis Court Fencing: Apply fabric to inside (court side) of enclosing fence posts / framework.
   c. Track Oval: Apply fabric to inside (track side) of fence posts / framework.

K. Tension or Stretcher Bars: Thread bar through first row of diamonds of fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.

L. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Aluminum ties: Both ends of the tie are to make two complete wraps around wire pickets. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.
2. Privacy Slats: Install slats in direction indicated, securely locked in place, vertically**.**

3.5 FENCE INSTALLATION ADJACENT TO BUILDING WALL OR COLUMN

A. Install fencing and gates with maximum 2” gap between fence post and building wall or column unless otherwise noted.

3.6 SWING GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.7 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain chain-link fences and gates.

3.9 COMPLETION AND CLEAN UP

A. Leave the area of installation free of debris and excess soil, concrete, and gravel resulting from installation of the fence. Clean fencing of concrete slurry, hydroseeding overspray and any other excess material. Seed and mulch all areas around the fencing where bare earth is left exposed.

END OF SECTION 32 31 13

SECTION 33 41 00 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Non-pressure transition couplings.
3. Drains.
4. Frames and grates/lids
5. Catch basins.

B. Related Sections:

1. Section 01 78 39 “Project Record Documents”
2. Section 31 20 00 "Earth Moving"
3. Section 32 12 16 "Asphalt Paving"

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Catch basins. Include plans, elevations, sections, details, frames, covers, and grates.

C. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

D. Quality Control Submittals

1. Qualifications Certification: Submit written certification or similar documentation signed by applicable subcontractor, Prime Contractor and manufacturer (where applicable) indicating compliance with applicable “Qualifications” requirements specified below in “Quality Assurance” article.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Perform work, including shoring, in compliance with the applicable requirements of governing authorities having jurisdiction.

B. Comply with applicable Utility Company Regulations. Municipal Sewer Connection: Coordinate connection to existing municipal sewer with local sewer authority. Pay for all fees associated with connection to municipal sewer.

1. Local sewer authority contact:

Town of Cornwall
Department of Public Works
183 Main Street
Cornwall, NY, 12518
Telephone: 845 534-2171
Fax: 845 534-4342

2. Install connections to municipal sewer in accordance with local sewer authority standards and OSHA regulations. Provide materials complying with local sewer authority standards.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
B. Protect pipe, pipe fittings, and seals from dirt and damage.
C. Handle stormwater manholes according to manufacturer's written rigging instructions.
D. Handle catch basins according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Owner's written permission.

PART 2 - PRODUCTS

2.1 SOLID DOUBLE WALL HDPE SMOOTH INTERIOR PIPE:

A. Interior Diameter, 4" to 36": Corrugated polyethylene circular pipe with an integrally formed smooth interior complying with the following specifications:

1. Applicable Standards:

    a. 4 inch to 10 inch pipe: AASHTO M 252-Type S or SP
    b. 12 inch to 36 inch pipe: AASHTO M294-Type S or SP

2. Mannings “n” Value: 0.012.

3. ASTM D3034 for maximum allowable deflection.

4. Fittings: Meet performance requirements of ASTM D 3034 and ASTM F 1336. Gaskets to comply with ASTM F477.

5. Manufacturer: Similar to "N-12 Smooth Interior Pipe” by Advanced Drainage Systems, Inc.; London, Ohio.

B. Interior Diameter, 42" to 60": Corrugated polyethylene circular pipe with an integrally formed smooth interior complying with the following specifications:

1. Applicable Standards

    a. 42 inch to 48 inch pipe: AASHTO MP6
    b. 60 inch pipe: AASHTO MP7

2. Mannings “n” Value: 0.012.

3. ASTM D3034 for maximum allowable deflection.

4. Fittings to meet performance requirements of ASTM D 3034 and ASTM F 1336. Gaskets to comply with ASTM F477.

5. Manufacturer: Similar to "N-12 HC High Capacity Large Diameter Pipe” by Advanced Drainage Systems, Inc.; London, Ohio.

C. Interior Diameter, 4" to 30": Corrugated polyethylene circular pipe with silt-tight joints and an integrally formed smooth interior complying with the following specifications:

1. Applicable Standards

    a. 4 inch to 10 inch pipe: AASHTO M 252-Type S or SP
    b. 12 inch to 36 inch pipe: AASHTO M 294-Type S or SP

2. Mannings “n” Value: 0.010.

3. Fitttings: AASHTO M252 or M294.

4. Joints: Meeting AASHTO Standard Specification for Highway Bridges, Section 26 paragraph 26.4.2.4(e). Silt tight – meeting ASTM D1056 Grade 2A2.

5. Materials: ASTM 3350 minimum cell classification 324420C (4" to 10") or 335420C (12" to 30").

6. Similar to “Hi-Q Pipe” by Hancor, Inc.; Findlay, Ohio.

D. Interior Diameter, 36" to 60": Corrugated polyethylene circular pipe with an integrally formed smooth interior complying with the following specifications:

1. Applicable Standard: AASHTO M 294-Type S or SP
2. Mannings “n” Value: .010.
3. Fitttings: AASHTO M294.
4. Joints: “Sure-Lok” joints meeting AASHTO M294.
5. Materials: ASTM 3350 minimum cell classification 335420C.
6. Similar to “Sure-Lok F477 Pipe” by Hancor, Inc.; Findlay, Ohio.

2.2 PERFORATED SINGLE WALL HDPE CORRUGATED PIPE:

A. Interior Diameter, 3" to 24": Corrugated perforated single wall polyethylene circular pipe with uniform slots and drilled holes complying with the following specifications:

1. Applicable Standards:

a. 3 inch to 10 inch pipe: AASHTO M 252
b. 12 inch to 24 inch pipe: AASHTO M294

2. Fittings: Meet performance requirements of ASTM D 3034 and ASTM F 1336. Gaskets to comply with ASTM F477.

3. Manufacturer: Similar to “Perforated Single Wall Plastic Corrugated Pipe” by Advanced Drainage Systems, Inc.; London, Ohio.

2.3 PVC PIPE AND FITTINGS

A. PVC Gravity Sewer Piping:

1. Pipe: ASTM D 3034, SDR 26, PVC Type PSM sewer pipe, green in color, with bell-and-spigot ends for gasketed joints.
2. Fittings: ASTM D 3034, PVC with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Charlotte Pipe and Foundry
2. J-M Manufacturing
3. IPEX Inc.

2.4 NONPRESSURE TRANSITION COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:

1. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
2. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
3. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded, Flexible Couplings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Dallas Specialty & Mfg. Co.
   b. Fernco Inc.
   c. Mission Rubber Company; a division of MCP Industries, Inc.
   d. NDS Inc.
   e. Plastic Oddities; a division of Diverse Corporate Technologies, Inc.

2. Description: Elastomeric sleeve with corrosion-resistant-metal tension band and tightening mechanism on each end.

2.5 CLEANOUTS

A. Cast-Iron Cleanouts:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Josam Company.
   b. Smith, Jay R. Mfg. Co.
   c. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

2. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover with vandal proof screws. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.

3. Top-Loading Classification(s): Heavy Duty.

4. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

B. Plastic Cleanouts:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. NDS Inc.
b. Plastic Oddities; a division of Diverse Corporate Technologies, Inc.
c. Zurn Light Commercial Products Operation; Zurn Plumbing Products Group.

2. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.6 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4,000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Ballast and Pipe Supports: Portland cement design mix, 3,000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

2.7 STORMWATER INLETS

A. Curb Inlets: Made with vertical curb opening[, of materials and dimensions according to utility standards.
B. Gutter Inlets: Made with horizontal gutter opening[**,** of materials and dimensions according to utility standards. Include heavy-duty frames and grates.
C. Combination Inlets: Made with vertical curb and horizontal gutter openings**,** of materials and dimensions according to utility standards. Include heavy-duty frames and grates.

2.8 CATCH BASINS

A. Inside Dimension: 30-inch by 30 inch clear inside area, unless otherwise indicated.

B. Description: ASTM C 913, precast, reinforced concrete, of depth indicated, with provision for sealant joints.

C. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.

D. Riser Sections: 4-inch minimum thickness, Length, Width and Depth as indicated.

E. Top Section: Flat-slab-top type is indicated.

F. Joint Sealant: ASTM C 990, bitumen or butyl rubber.

G. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.

H. Grade Rings: Include two or three reinforced-concrete rings, of 6 to 9-inch total thickness, that match the frame and grate, and height as required to adjust manhole frame and cover to indicated elevation and slope.

I. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

2.9 CATCH BASIN FRAMES AND GRATES

A. Heavy Duty Ductile Iron Frame and Grate:

1. Description: Heavy-duty 24-in by 24-in (nominal clear opening) ductile iron frame and grate.

2. Material Requirements:

a. Material: ASTM A 536, Grade 70-50-05, ductile iron designed for A-16, structural loading. Meets AASHTO M306
b. Grate style: Bar, Flat
c. Frame style: Top Flange, Reversible, Bottom Flange
d. Coating: Asphaltic Coated
e. Color: Black
f. Origin of manufacture: USA
g. Clear opening depth: 24-in minimum, unless otherwise indicated
h. Clear opening length: 24-in minimum, unless otherwise indicated
i. Cover/Grate opening depth: 2-in
j. Cover/Grate opening width: 26-in
k. Cover/Grate opening length: 26in
l. Flange inner length: 26-in
m. Flange inner width: 26-in
n. Flange outer length: 32-in
o. Flange outer width: 32-in
p. Frame height: 6-in
q. Frame outside length: 27.5-in
r. Frame outside width: 27.5-in
s. Grate thickness: 2-in
t. Grate length: 25.75-in
u. Grate width: 27.75-in
v. Grate open area: 321 sq. in.
w. Grate wetted perimeter: 103-in
x. Slot width: 1.5-in
y. Tag Text: “Drains To Waterways Dump No Waste!”

3. Basis-of-Design Product: Subject to compliance with requirements, provide EJ Group Inc., Product No. 45726033C03 – "Classic Series V5626-2 REV 6" V5726 EXHD DI GR SET" by EJ Group Inc. (East Jordan Iron Works), 301 Spring Street, East Jordan, MI 49727 Telephone: 1-800-874-4100.

B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.

1. Size: 24-in by 24-in minimum unless otherwise indicated.
2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

C. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include 24-inch ID by 7 to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter flat grate with small square or short-slotted drainage openings.

1. Grate Free Area: Approximately 50 percent unless otherwise indicated.

2.10 IDENTIFICATION

A. Underground Warning Tape

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Presco, Inc.; Sherman, Texas
b. EMED Co., Buffalo, New York.
c. Seton Identification Products, A Tricor Direct Company.

2. Material: 6-inch wide, color-coded, heavy gauge 5-mil tape with aluminum backing.

3. All tapes printed with black ink on APWA (American Public Works Association) approved colors to meet or exceed industry standards.

4. Location: Provide warning tape 18 inches feet below finished grade in buried piping trenches and at foundation wall.

2.11 CONCRETE

A. Cast-in-Place Concrete: Refer to Div 03 concrete section for concrete strength, mixtures, fiber reinforcement and other requirements.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure drainage piping according to the following:

1. Install piping pitched down in direction of flow.

2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.

3. Install piping with 24-inch minimum cover.

4. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook."

5. Install corrugated steel piping according to ASTM A 798/A 798M.

6. Install PE corrugated sewer piping according to ASTM D 2321.

7. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join hub-and-spigot, cast-iron soil piping with gasketed joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
2. Join corrugated steel sewer piping according to ASTM A 798/A 798M.
3. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
4. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasketed joints.

5. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
6. Join dissimilar pipe materials with nonpressure-type flexible couplings.

B. Join force-main pressure piping according to the following:

1. Join PVC pressure piping according to AWWA M23 for gasketed joints.
2. Join dissimilar pipe materials with pressure-type couplings.

3.4 DRAIN INSTALLATION

A. Install type of drains in locations indicated.

1. Use Light-Duty, top-loading classification drains in earth or unpaved foot-traffic areas.
2. Use Medium-Duty, top-loading classification drains in paved foot-traffic areas.
3. Use Heavy-Duty, top-loading classification drains in vehicle-traffic service areas.
4. Use Extra-Heavy-Duty, top-loading classification drains in roads.

B. Embed drains in 4-inch minimum concrete around bottom and sides.

C. Fasten grates to drains if indicated.

D. Set drain frames and covers with tops flush with pavement surface.

E. Assemble trench sections with flanged joints.

3.5 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.
B. Set frames and grates to elevations indicated.

3.6 CONCRETE PLACEMENT

A. Place and test cast-in-place concrete according to ACI 318 and Division 03 concrete section**.**

3.7 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Division 22 Section "Facility Storm Drainage Piping."

B. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3,000 psi.

2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3,000 psi.

3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

    a. Use concrete that will attain a minimum 28-day compressive strength of 3,000 psi unless otherwise indicated.
    b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

C. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use non-pressure-type flexible couplings where required to join gravity-flow, non-pressure sewer piping unless otherwise indicated.

    a. Unshielded flexible couplings for same or minor difference OD pipes.
    b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
    c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

2. Use pressure-type pipe couplings for force-main joints.

3.8 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

1. Close open ends of piping with at least 8-inch thick, brick masonry bulkheads.
2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:

1. Remove manhole or structure and close open ends of remaining piping.

2. Remove top of manhole or structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

C. Backfill to grade according to Division 31 Section "Earth Moving."

3.9 IDENTIFICATION

A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.10 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.

2. Defects requiring correction include the following:

   a. Alignment: Less than full diameter of inside of pipe is visible between structures.
   b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
   c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
   d. Infiltration: Water leakage into piping.
   e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.

2. Test completed piping systems according to requirements of authorities having jurisdiction.

3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.

4. Submit separate report for each test.

5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

   a. Exception: Piping with soil tight joints unless required by authorities having jurisdiction.
   b. Option: Test plastic piping according to ASTM F 1417.
   c. Option: Test concrete piping according to ASTM C 924.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.11 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION 33 41 00