

**PROPOSED FACILITY PROJECTS
for the
TAPPAN FIRE DISTRICT**

**Bid 2108.01 A
New Firehouse Facility
135 Washington Street
Tappan, NY 10989**

**Bid 2108.01 B
Substation Alterations
300 Western Highway South
Tappan, NY 10989**

**Add Alternate Bid 2108.02
New Annex Facility
300 Western Highway South
Tappan, NY 1099**

PREPARED FOR:

**TAPPAN FIRE DISTRICT
PO Box 575
TAPPAN, NY 10989**

ARCHITECT:

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GENERAL CONSTRUCTION SPECIFICATIONS

ISSUED FOR BIDDING July 20, 2022

SPECIFICATIONS

DIVISION 2 – SITEWORK

SECTION 02150 - EXCAVATION & GRADING FOR BUILDING CONSTRUCTION	1-8
SECTION 02160 - DRAINAGE SYSTEM STRUCTURES & DRAIN LINES	1-2
SECTION 02170 - BITUMINOUS PAVING	1
SECTION 02180 - TOPSOIL & LAWNS	1

DIVISION 3 – CONCRETE

SECTION 03300 - CONCRETE & CEMENT WORK	1-15
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DIVISION 4 - MASONRY

SECTION 04200 - UNIT MASONRY	1-14
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DIVISION 5 - METALS

SECTION 05120 - STRUCTURAL STEEL	1-4
SECTION 05210 - STEEL JOISTS	1-3
SECTION 05311 - STEEL FLOOR & ROOF DECKING	1-4
SECTION 05400 - COLD FORMED METAL FRAMING & DETAILS	1-5
SECTION 05510 - METAL STAIRS	1-4
SECTION 05521 - PIPE & TUBE RAILINGS	1-2
SECTION 05540 – METAL WHEEL GUARDS	1

DIVISION 6 - WOODS AND PLASTICS

SECTION 06100 - ROUGH CARPENTRY	1-4
SECTION 06200 - FINISH CARPENTRY	1-3
SECTION 06400 - ARCHITECTURAL WOODWORK & PLASTIC LAMINATE WORK	1-3

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 02070 - DEMO SPECS	1-3
SECTION 01433 - ROOFING MANUFACTURE’S FIELD SERVICES	1-7
SECTION 06100 - ROUGH CARPENTRY	1-4
SECTION 07160 - BITUMINOUS DAMPPROOFING	1-3
SECTION 07190 - MASONRY SEALANTS	1-2
SECTION 07213 - BOARD INSULATION AND BATT INSULATION	1-2
SECTION 07220 - ROOF INSULATION	1-3
SECTION 07225 - EPS BOARD AND ROOF DECK INSULATION	1-3
SECTION 07240 - EXTERIOR INSULATION AND FINISH SYSTEM	1-5

SECTION 07270 - FIRE STOPPING	1-9
SECTION 07300 - ROOF SHINGLES	1-2
SECTION 07550 - MODIFIED BUTUMINOUS MEMBRANE ROOFING	1-12
SECTION 07620 - SHEET METAL FLASHING AND TRIM	1-4
SECTION 07715 - ALUMINUM GUTTER AND LEADER	1-3
SECTION 07900 - CAULKING AND SEALANTS	1-4
SECTION 017301 - ROOF UNDERLAYMENT	1-2
SECTION 074100 - STANDING SEAM METAL ROOF PANELS	1-17

DIVISION 8 - DOORS AND WINDOWS

SECTION 08100 - METAL DOORS AND FRAMES	1-3
SECTION 08200 - FLUSH WOOD DOORS	1-2
SECTION 08305 - ACCESS PANELS	1-2
SECTION 08330 - ROLLING FIRE DOORS	1
SECTION 08360 - UPWARD ACTING SECTIONAL DOORS	1-4
SECTION 08361 - BIFOLD GARAGE DOOR SPEC	1-5
SECTION 08362 - BIFOLD GARAGE DOOR DRAWING	1
SECTION 08700 - FINISHING HARDWARE	1-3
SECTION 08730 - WEATHERSTRIPPING AND THRESHOLDS	1

DIVISION 9 - FINISHES

SECTION 09260 - GYPSUM BOARD SYSTEMS	1-6
SECTION 09311 - CERAMIC TILE FLOOR FINISH	1-4
SECTION 09312 - CERAMIC TILE WALL FINISH	1-3
SECTION 09400 - EPOXY FLOOR SYSTEM	1-6
SECTION 09500 - SUSPENDED ACOUSTICAL CEILINGS	1-4
SECTION 09650 - RESILIENT FLOORING	1-4
SECTION 09688 - CARPETING GLUE DOWN	1-4
SECTION 09900 - PAINTING	1-9

DIVISION 10 - SPECIALTIES

SECTION 10200 - LOUVERS AND VENTS	1-5
SECTION 10350 - FLAGPOLES	1
SECTION 10500 - LOCKERS	1-2
SECTION 10520 - FIRE EXTINGUISHER	1
SECTION 10800 - TOILET ACCESSORIES	2

DIVISION 11 - EQUIPMENT

SECTION 11132 - PROJECT SCREENS	1-2
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DIVISION 12- FURNISHINGS

SECTION 12690 - ENTRANCE MATS

1

DIVISION 14 – CONVEYING SYSTEMS

SECTION 14200 - ELEVATORS

1-11

DIVISION 2 - SITEWORK

SECTION 02150 - EXCAVATION & GRADING FOR BUILDING CONSTRUCTION

02150.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", the "Contract Forms", and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

02150.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the execution of excavation and grading for building construction and improvements, complete, in strict accordance with the Contract Drawings and as herein specified and required by conditions at the site.
 - a. General site excavation and grading for building construction. Excavation, backfilling and grading generally to a point for a distance of not less than 5 feet around the entire perimeter of the building construction to a level of 6" below finished grades in accordance with the contours and elevations and grading contract limits shown on the Drawings.
 - b. Clearing and grubbing and removal of unwanted material.
 - c. Removal of all trees (except where noted to remain) including stumps and roots.
 - d. Porous fill.
 - e. Temporary shoring, bracing, sheet piling, etc. as required for construction of new facility; without exception including shoring and/or underpinning of existing building.
 - f. Disposal of rubbish and objectionable excavated materials. Excavation and demolition and removal of existing material of every name and nature which may be required for the installation of work under this contract unless otherwise noted on drawings and specifications.
 - g. Temporary protection barricades, enclosure, etc., required by Local Authorities including complete fence enclosure of site as directed by Architect.
 - h. Subgrade preparation.
 - i. Finish grading.

- j. Storm drainage systems including curb inlets and trench drains.
- k. Trench excavation for all General Construction site work, trenching for underground utilities will be by respective prime contractor.
- l. Bituminous (asphalt) paving for driveways and parking and roads including striping.
- m. Topsoil and lawns.
- n. Spare conduits to be installed 18" min. below grade under apron and driveways and between building where indicated.

02150.0300 RELATED WORK SPECIFIED ELSEWHERE

Division 3 Concrete

02150.0400 INSPECTION OF SITE

- 1. Before submitting bid, visit the site and check all existing conditions. If, in the opinion of the Bidder and conditions exist which might effect the completion of the work as planned, he shall report them in writing to the Architect before submitting his bid. No consideration will be given to claims made because of possible existing adverse conditions not mentioned in these specifications.

02150.0500 SUBSURFACE CONDITIONS

- 1. Subsurface conditions have been investigated and information is shown on site plan. Borings were performed by Soil Mechanics. Additional borings shall be issued via addendum.
- 2. Data and information thereby obtained and conveyed is not guaranteed to be accurate for entire site by the Owner, Architect or any of its agents or Contractors.
- 3. Such data and information is offered in good faith for purpose of placing Contractor in receipt of all information available to Architect. Although reasonable care was used in determination of this data and information, there is no warranty, express or implied as to accuracy of such data and information and Architect and the Owner assume no liability for any inaccuracies; Contractor alone shall assume responsibility for any conditions which may in fact exist and which are not reflected in data and information. Contractor must interpret such data and information according to his own judgment and acknowledge that he is not relying upon same as accurately describing conditions which may be found to exist.

4. Contractor further acknowledges that he assumes all risks contingent upon nature of subsurface conditions to be actually encountered by him in performing work covered by his contract, even though such actual conditions may result in his performing more or less work than originally anticipated. It shall be further understood that actual excavation shall be unclassified, that Contractor is responsible for all materials encountered during excavation and that the Contractor shall report any unsatisfactory conditions and perform any additional excavation required at no additional cost to Owner.

02150.0600 COOPERATION

1. Properly coordinate the work of this Section with work of contiguous trades and/or Contracts.

02150.0700 PROTECTION

1. Execute the work in such manner that no damage or injury shall occur to persons, existing curbs, roads and walks, and any and all other property. Any damage or injury resulting from work under this Division shall be the responsibility of the Contractor, who shall make good such damage and assume all responsibility for such injury, without additional cost to the Owner. Notify all individuals, municipal agencies and service utility companies having jurisdiction over any affected above surface or subsurface utilities and protect or remove and/or relocate these services as required in accordance with their requirements.
2. Trees:
 - a. All trees in building construction area (except for those noted to remain) are to be removed. Existing trees to remain shall be protected by using boxing, guys, burlap around trees, and the like all as directed.
 - b. The Architect shall be notified of any situation in which trees or shrubs will hinder the construction operation. The Architect will decide the necessary action to be taken in such a situation.
3. Temporarily support and maintain the sides of excavations until permanent support is provided. Shore and brace all work, wherever required to prevent injurious caving or sliding, and to protect existing work. Provide sheet piling, adequately braced, where other means are insufficient to maintain excavations in stable conditions. Install work so as not to interfere with the proper placing and compacting of backfill. Remove all temporary work as the work progresses and necessity for same ceases to exist.

02150.0800 CLEARING AND GRUBBING

1. General: Under this item, the Contractor shall clear and grub the entire area within the limits of the work of this contract and remove all structures to the extent shown or as determined by the Architect.
2. Clearing and grubbing shall consist of the removal or destruction of trees, roots, stumps, bushes, and decayed or growing organic matter above and below the surface of the ground.
3. The Contractor shall use every precaution to prevent injury to roads, curbs, walks, pipes, conduits, poles and other structures above and below ground that are adjoining or included in the area under contract, and shall repair or replace at his own expense any material or work damaged or destroyed by his forces, while clearing the site.
4. The Contractor shall see that stock piles of materials and storage of equipment are in cleared spaces. He shall prevent his employees from tramping through existing plantings except when it is necessary in carrying out the work. He shall prevent equipment from being taken through existing planting.
5. No burning at the site will be permitted. Contractor shall assume that it will be necessary to remove all cleared material to public disposal areas and that on site burning will not be permitted.
6. Material removed under this item, unless otherwise specified or noted on the drawings, shall become the property of the Contractor and shall be legally disposed of.
7. All areas outside the site which are found necessary for the disposal of materials removed under this item shall be acquired by the Contractor at his own expense.

02150.0900 LINES AND GRADES

1. Establish and maintain all lines and grades for the work with required batter boards and elevation points.
2. A competent Engineer shall be employed by the Contractor to establish all lines and grades. Should the services of a licensed land surveyor be required, he shall be retained and paid for by the Contractor.
3. Prior to any construction, notify the Architect should any discrepancy occur.

4. Removal of Existing Topsoil:

- a. All topsoil in areas of operations shall be carefully scraped off and piled independent of the other excavated material in areas designated by the Architect/Owner. This topsoil shall be reused for grading at the completion of the work. If it is not needed, it shall remain the property of the Owner.
- b. Stock piles shall be such shape and size as will keep loss of topsoil by wind and erosion to a minimum and shall be trimmed in a workmanlike manner to fairly uniform surfaces and slopes. They shall be placed on clear and well drained lands, in areas designated by the Architect. The equipment, methods and workmanship shall be such as to avoid lifting of subsoil, or other unsuitable material. Topsoil operations shall not be carried on during unsuitable weather or when the topsoil is wet or frozen. The decision of the Architect shall be final in the matter.

5. Drainage: Conduct operations so as to prevent the accumulation of surface water in the vicinity of excavated and graded areas and provide all necessary ditches as required. Any water which accumulates in excavations shall be promptly remedied by pumping or other effective means.

02150.1000 GENERAL EXCAVATION

1. Include the satisfactory removal of all materials of every nature and description which are encountered in obtaining the lines, grades and elevations shown on the drawings. Suitable materials from the excavation shall be utilized for filling. Excavated materials which, in the opinion of the Architect, are not suitable for fill or embankment and excess materials (excluding topsoil) not needed for filling shall be removed and legally disposed of outside the site.

02150.1100 TRENCH EXCAVATION

1. Trenches shall be open cuts of the necessary width, to the correct alignment, for the proper installation of underground lines, with banks as nearly vertical as possible. Provide sheeting and/or shoring as may be necessary to protect life and the excavation it. Width of excavation at the bottom shall not exceed 20" plus the external diameter of the pipe, equally divided on each side of the pipe.
2. Bottom of trench shall be accurately graded and shaped to provide uniform bearing and support for the bottom quadrant of the pipe barrel on undisturbed soil at every point along its entire length. Excavation shall not be completely plowed, scraped or dug by machinery to finished grade. The last several inches shall be trimmed by hand to exact line and grade and shaped to support the pipe just prior to placing the pipe. In the event excavation is carried too deep in error, refill trench with suitable material

compacted properly in accordance with other portions of this Section and excavate to proper elevation by hand. Ample provision shall be allowed for making up joints.

3. Trenches shall not be opened farther in advance of the pipe laying than is necessary. No pipe laying in wet trench will be permitted. Excavation must be kept free from water. In accordance with other portions of this Division, backfill and compact.

02150.1200 BUILDING EXCAVATION, FILLING AND BACKFILLING

1. Excavation:

- a. Excavation shall be carried to elevations, depths and dimensions indicated. The footing elevations noted are intended to carry all bearings to the same strata of earth. No extra compensation will be allowed for any additional excavation required to insure uniform quality of bearing. All bearings shall be on undisturbed earth. If excavations for walls or footings are carried too deep by error, they shall be backfilled, but shall be brought to proper elevation with concrete mixed and placed as specified under Division 3 - CONCRETE, at no additional cost to the Owner. Minimum bearing soil shall be one and one half (1 1/2) tons per sq. ft. Remove materials of every nature and description encountered in obtaining indicated lines and grades.
- b. Excavate outside of building walls and foundations, etc., not less than one foot and more if necessary to allow for inspection work.
- c. Bottom of all excavations shall be leveled or otherwise properly trimmed to lines and grades as required.
- d. Slabs on grade shall be placed upon approved (by the Architect) compact granular fill, except as otherwise specified or shown on the drawings.
 1. Where natural subsoil directly under slabs on grade is of clay or silt, excavate to 6" below bottom of slab and backfill with compacted gravel. This does not exclude the placing of compacted gravel to a greater depth where shown on the drawings and/or herein specified.
- e. As the basis of the Contract, it shall be assumed that the material to be excavated is earth.
- f. Provide and operate all pumps, hose and drainage lines required to keep excavations free from water at all times, until after concrete has been placed for all footings and foundation walls. In the event that overtime labor is necessary to preform this work, it shall be done without additional cost to the Owner.

2. Filling and Backfilling:

- a. Promptly backfill excavations as work permits, but not before concrete walls and footings have attained adequate strength (min. 60% design) and piping and other items below backfill have been tested and approved.
- b. For backfilling, use earth free from waste, objectionable matter, loan, wood rubbish, debris or stones other 1/2 cubic foot. Do not use frozen material. Objectionable backfilling material shall be legally disposed of away from the site.
 1. All excess excavation not required as backfill for work under this Contract shall be removed and legally disposed of outside the site.
- c. Backfill and fill to new surface grades as required. If sufficient sound and approved fill materials are not on hand to complete filling operations to required grades, provide same at no extra cost to the Owner.
- d. Backfill around building walls, and under any slabs on grade, shall be with compacted clean sand and gravel.
- e. All filling and backfilling shall be deposited in layers: Each layer to be compacted to not less than 95% of the maximum density obtained at optimum moisture contents as determined by AASHTO T-180, Method "D". Final compaction tests must indicate a minimum of 95% compaction for the total fill.
- f. All rough grading shall be brought up to grades, required as shown on Site Plan. Unless otherwise indicated, the following depths shall be allowed for finished grading:
 1. Concrete Walls 5 Inches
 2. Bituminous Paving As Required by Drawings
 3. Grass Areas 6 Inches
 4. Other Areas As Required by Drawings
- g. Compaction shall be by Contractor using mechanical tampers.

02150.1300 SUBGRADE PREPARATION

1. Subgrades shall be shaped to the required line, grade, and cross-section, and shall be rolled with approved equipment until thoroughly compacted. In paved areas, the full depth of subgrade in fill areas and the top 6" of the subgrade in cut areas shall be compacted to not less than 95% of the maximum density obtained at optimum moisture content as determined by AASHTO-T-180, Method "D". In other areas, compact to not less than 90%. All soft or otherwise unsuitable subgrade material shall

be removed and replaced with suitable materials as directed by the Architect. Low areas, holes, and depressions shall be brought to the required grade with approved material thoroughly compacted as herein provided. All roadway and parking area paving shall be installed on a subbase of a mixture of sand, gravel or other acceptable material compacted as described above for paved areas.

02150.1400 POROUS FILL

1. Stone or gravel: Pass through a 2" ring and be retained by a 1" mesh.
2. The subgrade below fill shall be brought to a true and even plane and compacted to a solid bearing. Porous fill shall be installed to a minimum compacted depth of 6" and leveled to a reasonably true and even surface. All piping, etc., installed below porous fill shall have been tested and approved before installation of fill. After placing porous fill, stones larger than 3" in any dimension shall be hand removed or broken up.

02150.1500 FINISHED GRADING

1. All areas shall be uniformly graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, except as otherwise specified. The finished surface shall be not more than 0.15 foot above or below the established grade or approved cross section. Ditches shall be finished so as to permit adequate drainage. The surface of areas to be turfed shall be finished to smoothness suitable for the application of turfing materials. The surface of the pavement subgrade shall not vary more than 0.50 foot from the established grade and approved cross-section.

02150.1600 PROTECTION

1. Newly graded areas shall be protected from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades re-established to the required elevations and slopes, at no additional cost to the Owner. The finished subgrade shall be protected and maintained in a satisfactory condition until the stone base course is placed.

SECTION 02160
SANITARY DRAINAGE SYSTEM - STRUCTURES & DRAIN LINES

1. General: furnish and install drain pipe, precast concrete, leaching pools, inlets, cast iron frames on domes, etc., and necessary appurtenances to provide for a complete sanitary drainage system as shown on the drawings and as herein specified. Excavation, trenching and backfilling shall be in accordance with other portions of this Section.
2. Materials:
 - a. Precast concrete septic tank, grease traps, catch basins, storm rings, leaching pools, etc. shall be as manufactured by Andrew Carlston & Sons, Inc.; Carbo, Inc.; W.D. Bocard & Sons, or approved equal.
 1. Grade Frames and Covers: Flockhart Cast Iron Type 325D, or approved equal.
 - b. Provide drain rings, solid domes, frames and covers or slabs as shown and detailed on the drawings and as herein specified; shall be 4000 psi precast reinforced concrete units manufactured by Andrew Carlson & Sons, Inc.; W.D. Bocard and Sons; or Casbro, Inc.; or approved equal. All dome and slab tops shall be heavy duty traffic bearing type.
 - c. all drainage pipe shall be 6" diameter, with rubber gasket joints, unless otherwise noted on drawings. Use A.D.S. pipe between site drain rings typical.
 - d. Concrete Block or Brick: Where required for drainage structures, cement block shall be 100% solid 4200 pound psi, brick shall conform to ASTM Specification C-62, Grade SW.
 - e. Provide drain mesh wrap full height at all drain structures to prevent soil erosion into pools.
3. Installation:
 - a. Examine pipe carefully prior to placing. Damaged or defective pipe shall not be used. Pipe shall be lowered and not dropped into trenches.
 - b. Proceed upgrade with pipe laying operation faithfully adhering to indicated grades and alignment, placing spigot ends of pipe in direction of flow.
 - c. Joints shall be made up as recommended by the manufacturer of the drainage pipe and shall be left smooth and clean on inside of the joint. Use approved rubber gasket joints.

- d. Where necessary to allow for vertical adjustment at tops of inlets, provide adequate support by use of 1:2 mortar.

4. Backfilling:

- a. All material used for backfill shall consist of earth, sand and gravel or other approved materials free from large clods of earth or stones.
 1. Backfill for all Underground Structures, etc. Trenches shall not be backfilled until all required tests have been performed and approved by the Architect. Trenches shall be carefully backfilled in 6" layers and thoroughly and carefully compacted until pipe has a cover of not less than one (1) foot. The remainder of the backfill material shall then be deposited in the trench in one (1) foot layers and tamped. Backfill in areas adjacent to and under pavements shall be backfilled as specified above except that the entire depth of the trench shall be compacted to a density of at least 95% of the maximum density at optimum moisture content. Backfill in all other areas shall be compacted to at least 90% of maximum density.
- b. Backfill for Drainage Structures: Backfill shall not be placed against structures until the approval of the Architect has been obtained. Backfill shall be deposited in a maximum of 12" horizontal layers, uniformly spread and compacted to a density of at least 95% of maximum density at optimum moisture content. Special precautions shall be taken to prevent wedging action against the walls of the structures.

SECTION 02170 - BITUMINOUS PAVING

1. General: Take special precautions when installing bituminous pavements to prevent the bituminous materials from staining the exposed parts of building, curbs, or structures above finished grade. Any stains or markings caused by paving work shall be removed by the Contractor, at his own expense, to the satisfaction of the Owner.
2. Heavy Duty Bituminous pavements shall consist of a 2” New York State type 1A Asphaltic Concrete Surface Course placed on a 4” Penetration Macadam Base Course, over a fully compacted 6” Loam/RCA mix base in accordance with the plans and sections on the drawings and as herein specified.
3. Penetration Macadam Base Course for Heavy Duty Pavements (minimum 4” compacted thickness):
 - A. The base course shall conform in all respects to the requirements of the State of New York, Dept. of Public Works, Division of Construction, "Public Works Specifications for "Item 45SN - Base Course - Bituminous - Macadam Penetration Method Asphalt", with the following modifications:

Use Size 3 Stone.
Bituminous material shall be asphalt cement.
Penetration grade 85 - 100%.
4. Asphaltic Concrete Surface Course: (minimum 2” thickness after compaction)
 - a. The asphaltic concrete surface shall conform to the requirements of State of New York, Dept. of Public Works, Division of Construction, and “Public Works Specifications as amended. References herein to "Standard Specifications" shall be to that document.
 - b. Thickness shall be compacted depth as indicated on the drawings.
 - c. The surface course shall conform to the requirements of the "Standard Specifications" for Item 51 - Asphalt Concrete - Type 1A (Mixing Method - Hot Mix - Two Course)"
5. All paving at roads shall comply with NYS DPW standard street and public improvement construction specifications and details.

SECTION 02180 - TOPSOIL & LAWNS

A. MATERIALS

1. Grass Seed:

Pearl's Premium sun/shade mix

B. Seeded Lawns:

1. Prepare and seed all lawn areas disturbed by construction and where lawns have not been established.
2. Provide topsoil as required to maintain depth of 6" for all lawn areas. Topsoil shall be free of roots, debris and rock. Prior to spreading topsoil disc or scarify ground to a minimum depth of 3". Ground limestone shall be evenly distributed over topsoil at a rate of 100 pounds per 1,000 square feet. Commercial starter fertilizer (10-30-15) applied at the rate of 25 pounds per 1,000 square feet and worked into top 3" of the topsoil.
3. Immediately before any seed is sown, ground shall be scarified as necessary and raked until surface is smooth, friable and of a uniform texture. Minimum seeding rate 5 pounds to 1,000 square feet. Seed shall be raked into ground and rolled or tamped and thoroughly watered.
4. Once grass lawn areas are established, general contractor shall maintain appropriate lawn maintenance for duration of project until final completion.
5. Provide sod lawn areas where indicated on site plan

C. ORNAMENTAL PLANTINGS AND IRRIGATION:

1. Contractor shall include plantings as indicated on the landscaping plan.
2. Provide and install stone with fabric underlayment where indicated on site drawings..

D. WARRANTY:

3. Contractor shall warrant all lawn and landscaping for one year after installation..

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DIVISION 3 - CONCRETE

SECTION 03300 - CONCRETE & CEMENT WORK

03300.0100 GENERAL

1. Include all labor, materials, equipment and appliances and perform all operations in connection with the installation of concrete and cement work as shown on the drawings and specified herein, and generally include the following:
 - a. Concrete work for all foundations, footings, piers, walls, floor slabs, and all other items of concrete as required to make the work of this section complete, and as detailed on the drawings hereinafter specified.
 - b. All required formwork.
 - c. Reinforcing steel and wire mesh, including chairs, spacers and tie wires.
 - d. Installing and/or building in of all items embedded in the concrete such as anchor bolts, inserts, sleeves, blocking, etc., as required by this and other trades under this and other contracts.
 - e. Cement mortar protection for pipes and conduits in slabs.
 - f. Vapor barrier under slabs on grade.
 - g. Premoulded joint fillers.
 - h. Finishes of all concrete and concrete slabs.
 - i. Concrete walks, platforms, terraces and curbs.
 - j. Testing and inspecting concrete work.
 - k. Concrete foundations for all motors, pumps, tanks and other items of equipment provided under Mechanical and Electrical Contracts.
 - l. Construction and expansion joints.
 - m. Perimeter insulation.
 - n. All other items of concrete and cement and related work to be inferred as needed to make the work of this contract complete.
 - o. Damp proofing all basement walls below grade.

- p. Water stops at basement footings.
- q. Set anchor bolts provided by structural steel contractor for all columns and other bearing plate locations as required.

03000.0300 RELATED WORK SPECIFIED ELSEWHERE

- 1. Waterproofing - Division 7.
- 2. Miscellaneous bolts, anchors, reglets, inserts, etc., required by other trades and installed under this Section.

03300.0400 CODE REQUIREMENTS AND APPLICABLE STANDARDS

- 1. Local building codes, laws and regulations govern all work. Adhere to where mandatory, specifications and drawings to the contrary notwithstanding.
- 2. ACI 318-95.
- 3. ACI 301-96 (paragraph reference).
 - a. Except as modified herein.
 - b. Contractor to maintain current copies of ACI-301 manual on site.

03300.0500 SHOP DRAWINGS

- 1. Submit shop drawings for approval in accordance with the requirements of the Supplementary General Conditions showing locations, size, length and bending of all bars, and also such additional details as may be required to completely cover the furnishing and installing of all reinforcement, chairs and spacers and execution of all concrete work. Allow sufficient time for checking and approval prior to fabrication. Show the location, sizes and forms of all required openings, miscellaneous steel items, inserts, anchor bolts, recesses, etc., as required for work under this and other Contracts.
- 2. All details shall be in accordance with the current rules and practices of the American Concrete Institute and jurisdictional codes, except where otherwise indicated.
- 3. Shop drawings shall indicate all slab depressions.

03300.0600 COORDINATION

- 1. Properly coordinate the work of this Section with work of contiguous trades.

03300.0700 MATERIALS

1. Cement: ASTM-C150 Type I, Type II, or Type III may be used only with written permission of the Architect. Air-entrained concrete where specified shall be obtained by use of approved air-entraining agents, the use of air-entraining, or other type cements is expressly prohibited without prior approval of the Architect. Cement used throughout the project shall not vary in color so as to prejudice appearance of exposed concrete. Only one brand of any type of cement shall be used for exposed concrete surfaces.
2. Aggregate: ASTM C33 except as modified herein.
 - a. Fine Aggregate shall conform to the following requirements:

Not more than 3% shall pass the No. 200 sieve.

Rational analysis shall conform to Table A as follows:

<u>Table A</u>	<u>By Weight</u>
Kaolin	Max. % 6
Quartz & Feldspar	Min. % 75
10 Cycle Sodium Sulphate	Max. % loss 6
5 Cycle Magnesium Sulphate	Max. % loss 15

It shall not show darker than light amber when tested by colorimetric method.

The graduation of the sand shall be constant and the fineness modulus shall not vary by more than 0.2.

- b. Coarse Aggregate: Shall consist of hard crystalline stone or gravel free from clay, silt, shale, or decomposed or thin laminated pieces. The pieces shall be clear and uncoated, and conforming to Table B below:

<u>TABLE B</u>	<u>GRAVEL OR STONE</u>
<u>Abrasion Test</u> with Los Angeles Machine (ASTM Designation C-131) Max. Permissible percent by weight	40
<u>Soundness Test</u> (ASTM Designation C-88) Max. permissible percent by weight for 10 cycles, magnesium sulphate for 5 cycles, sodium sulphate	7.5

Chemical Test (ASTM Designation C-289)
and/or Petrographic Analysis (ASTM
Designation C-295) max. permissible
percent of following reactive minerals. 12

Opal or Opaline chart	0.25%
Chalcedony	5%
Glassy or crytocrystal lime acidic to intermediate volcanic rocks or tuffs	3%

Test with all aggregate for potential reactivity in accordance with ASTM C295, C289, and C227. Supply certified test reports by an agency satisfactory to the Architect for compliance of the aggregate to the contract documents.

Coarse aggregate where specified for lightweight structural concrete shall conform with the requirements of ASTM C330 - graded to size 3/4" to #4 of Table 1 therein.

3. Admixtures.

- a. Air-entraining admixtures shall be Darex AEA, neutralized Vinsol-Resin, or equivalent as approved by the Architect.
- b. Plasticizer shall be "Pozzolith" as manufactured by Master Builders.
- c. No other admixtures will be permitted without the express approval of the Architect.

4. Reinforcing bars shall be new billet stock unless otherwise specified and shall conform to ASTM 615, Grade 60. The Contractor shall furnish, when requested by the Architect, a certificate from the manufacturer guaranteeing that the present product meets the specification requirements.
5. Wire Mesh for concrete reinforcement shall consist of welded wire fabric conforming to ASTM Designation A185.
6. Mixing water shall be clean and potable. If there is any question as to its suitability, it shall be tested in accordance with AASHTO Standard Method of Test T-26.
7. Premolded Joint Material: Celotex Corp. "Flexell" or approved equal. Expansion joint sealer shall be Sonneborne Building Products, Inc. Sonolastic, one component Paving Joint Sealer or approved equal.

8. Surface Hardener: "Lapidolith" by Sonneborne Building Products, Inc., "Hornlith" by A.C. Horn Co., Inc. or "Saniseal" by the Master Builders Co.
 - a. Shall be installed in accordance with the Manufacturer's recommendations.
 - b. Provide five (5) year written guarantee by Manufacturer.
9. Vapor Barrier: "Vis Queen" as manufactured by Visking Division of Union Carbide, Polyethylene sheets, .066" thick, or other approved equal.
10. Perimeter Insulation: Shall be "Styrofoam SB" as manufactured by Dow Chemical Company or approved equal. Insulation shall be 2" thick unless otherwise noted on the drawings.
11. Grout under base plates: Fosroc "Conbextra" or approved equal.
12. Other materials as herein specified.

03300.0800 STORAGE OF MATERIALS

1. General: Storage facilities are subject to the approval of the Architect. Afford easy access for inspection and identification of shipments.
2. Cement: Store cement well off the ground in a dry, weather-tight adequately ventilated structure with provision to prevent the absorption of moisture.
3. Aggregates: Store aggregates in a manner to assure good drainage to preclude the inclusion of foreign matter, and to preserve the gradation. Keep each size group separate by means of bulkheads between the piles.
4. Reinforcing Steel: Store reinforcing steel off the ground under cover and protected from rusting, oil, grease and distortion.

03300.0900 FORM WORK

1. Chapter 2 of ACI 301 is included in its entirety except as modified hereinafter.
2. Design form work to be strong, rigid, accurately formed to within 1/4 inch of the lines and dimensions shown on the drawings and strong enough to support the dead weight of the concrete without deflection or leakage.
3. Design form ties so that they may be cut off no less than 1 inch from any concrete surface. Patch all holes left by form ties in a manner satisfactory to the Architect.

4. Coat all wall forms with a form oil. Keep reinforcement clean of form oil.
5. Provide temporary openings in forms to permit inspection, cleaning, and placing concrete.
6. Remove forms so as not to damage concrete. Remove forms in accordance with paragraph 2.3.4.

03300.1000 REINFORCING

1. Accurately fabricate reinforcing steel to the details and dimensions shown on the drawings, maintain bars free from dust, mud, rust, scale, oil, distortion, and structural defects.
2. Bend all bars cold and in a manner which will not injure the bars. Do not use bars with bends or kinks not indicated on the drawings. Fabricate in accordance with ACI315-80 standards.
3. Support all reinforcement rigidly in its design location prior to placing concrete, support reinforcing off the ground on precast concrete blocks.
4. Place all reinforcement within the limits of a days' operation, firmly supported and firmly connected before start of concrete placement. Provide concrete cover as indicated in paragraph 5.5 except as otherwise noted. Correct bent or displaced bars before placing concrete.
5. Prepare bending and placing drawings at a scale deemed suitable by the Architect for the work shown. Submit copies of shop drawings in accordance with the general conditions for review; correct and resubmit as required until approval is obtained. Maintain on the job site, an approved up-to-date set of shop drawings bearing the approved stamp by the Architect. All work shall conform to these drawings.

1. Proportion all concrete to attain the properties and strength indicated in Table E.

Table E

<u>Description</u>	<u>28 Day Strength</u>
Piers and Footings	4000 psi
Slabs on grade	5000 psi
Foundation Walls	4000 psi
Floor Slabs (on Decking)	3500 psi

2. Submit a mix design, to the Architect, no less than 35 days prior to placement of concrete; for each class of concrete. The mix design consists of:
 - a. Mix proportions including admixtures.
 - b. Gradation and specific gravities of aggregates.
 - c. Test reports of the components quality as outlined in Paragraph 7.
 - d. Strength tests of designed mix indicating strength at least 20% higher than job requirements.
 - e. Slump, weight, and air content of designed mix.
3. The Architect, may at his discretion, require additional cement or other changes to the mix if the designed mix fails to meet the specification.
4. Produce concrete with a slump not exceeding 4 inches.
5. General Contractor shall arrange for making and testing samples of the concrete as placed. Tests will be in accordance with ASTM Standards. Failure of the concrete to comply with the contract documents as evidenced by these tests is sufficient cause for rejection of the concrete placed. Cost of all tests shall borne by the Owner.

03300.1200 MIXING

1. Equipment: Machine mix all concrete in a mechanical batch-type mixing plant conforming to acceptable standards. Provide mixers with adequate facilities for the accurate measurements and control of each of the materials entering the mixer.

Prepare all batches by weight in automatically controlled batch plants.

2. **Mixing:** Do not charge mixers in excess of the manufacturers rated capacity for mixing, or operate in excess of the rated speed. Excessive mixing requiring the addition of water to preserve the required consistency will not be permitted. Discharge the entire batch before recharging. Discharge all wash water before recharging. Once initial sets has taken place, do not attempt to temper the concrete by addition of water.
3. **Ready-Mixed Concrete:** May be used provided that the central plant producing the concrete and the mixing and transporting equipment is suitable for the production, transportation and placing of the specified concrete. Ready-mixed concrete shall conform to the requirements of ASTM Designation C94 except as modified herein. Mixing in transit shall be prohibited.

03300.1300 PREPARATION FOR PLACING CONCRETE

1. Remove water from all areas where concrete is to be placed. Do not permit water to flow over freshly placed concrete. Clean forms and concrete handling equipment thoroughly. All form work, reinforcement, etc., will be inspected and approved prior to placing concrete. Clean earth foundations of mud, water, loose material and debris.

03300.1400 PLACING CONCRETE

1. Place concrete only when the weather conditions are suitable for proper placing, finishing and curing.
2. Mix, transport, and place concrete to maintain proper consistency and avoid segregation. Maintain concrete in a plastic state at all times from mixing to placing in final position.
3. Convey concrete from mixer to final location in a manner which will prohibit segregation. Do not exceed 3 foot fall from mixer conveyance. Do not exceed 6 foot free fall when placing in final position.
4. Vibrate all concrete in place with approved internal vibrators. Do not vibrate after initial set has taken place.

03300.1500 CONSTRUCTION JOINTS & EMBEDDED ITEMS

1. ACI 301, Chapter 5 is included in its entirety except as modified hereinafter.
2. Where not shown, locate construction joints to provide the least impairment to the structure: Location and detail of all construction joints must be approved by the Architect.

3. Location construction joints to produce the following maximum length of concrete placement:

Beams and slabs cast on ground	30 feet each way
Walls	50 feet each way

4. Accurately locate all inserts, sleeves, anchor bolts, etc. Mislocation or embedded items is solely the responsibility of the Contractor.

03300.1600 BONDING AND GROUTING

1. Clean all laitance and loose material from surfaces of set concrete, slush face of joint with neat cement grout. Place new concrete before grout has set.
2. Grout all base plates with a mix of one part cement to two parts sand.

03300.1700 PATCHING

1. Patch all slight honeycomb and other surface defects by chipping out defective material and patching with a 1 part cement to 3 parts sand mortar.
2. Where in the Architect's opinion the defects will impair the structural adequacy of the member, make repairs as directed by the Architect. All costs relating to such repairs will be borne by the Contractor.
3. Where in the Architect's opinion, the defects will impair the finished appearance of the area, make repairs as directed by the Architect. All costs relating to such repairs will be borne by the Contractor.

03300.1800 PROTECTION AND CURING

1. Protect concrete from injury, from any cause for no less than five (5) days after placing. Begin curing immediately after the concrete has attained its initial set. Cure by water spray, saturated burlap or curing compound. Cure in accordance with ACI 301, Chapter 12.

03300.1900 INCLEMENT WEATHER

1. Place concrete only when the ambient temperature is between 40 degrees F and 85 degrees F.

In order to place concrete at temperatures outside of the above range, special instructions may be issued by the Architect. All costs involved in implementing these special instructions will be borne by the Contractor.

2. In general, the special instructions will be in accordance with the recommendations of ACI 305-82 and ACI 306-88, except that Chapter 6 of ACI 306 will not be utilized.

03300.2000 FINISHING CONCRETE

1. Formed surfaces ACI 301 Chapter 5.3.3 is included in its entirety.
2. Flatwork: ACI 301 Chapter 5.3.4 is included in its entirety except as modified herein.
 - a. Finish all flat floors except as noted below with a steel trowel finish suitable for receiving floor finishes. Class A tolerance verify requirements with Architect.
 - b. Finish exterior slabs with non-skid broom finish. Class B tolerance.
 - c. Do not float or trowel concrete surfaces while the material is wet or sloppy. Delay finishing operations until all surface water has disappeared. Do not dust cement over wet areas to accelerate drying.
3. Surface Hardener: Unless otherwise specified, all exposed interior concrete slab surfaces shall be treated with the specified surface hardener, applied in strict accordance with the manufacturer's printed instructions.
4. Wood Float Finish: Concrete platforms shall be finished by tamping with special tools to force the aggregate away from the surface, then screening with straight edge to bring surface to the required lines. While the concrete is still green, it shall be wood-floated to a true and uniform plane with no coarse aggregate visible.
5. Screeds for All Finished Work: Provide metal screeds as approved by the Architect. Screeds shall be set with instruments to proper elevations.

03300.2100 CONCRETE SIDEWALKS, TERRACES, RAMPS AND CURBS

1. Concrete and the equipment, workmanship, testing, etc., and materials therefore, shall conform to the applicable requirements of Division 3, CONCRETE, of these specifications except as otherwise specified herein. Concrete shall be air-entrained 4000 psi minimum compressive strength at 28 days. Concrete shall have a slump of not more than 4". Air entrained shall range between 5 and 8%.
2. Subgrade Course:
 - a. The subgrade shall be constructed true to grade and cross-section as shown on the drawings and shall be constructed in accordance with the applicable requirements of PARAGRAPH, SUBGRADE PREPARATION. The subgrade for curbs shall extend in all cases at least 1 foot in width beyond the back face of the curb.

3. Forms: Wood or metal, straight, free from warp, of sufficient strength to resist springing during construction, and of a height equal to the full depth of the finished work. Wood forms shall be 2" surfaced plank. Metal forms shall be of approved section with a flat top surface. Benders or thin plank forms may be used for curb returns. Forms shall be set with the upper edge true to line and grade and shall be held rigidly in place by stakes placed on the outside of forms and set flush with the top edge of the form. Clamps, spreaders and braces shall be used where required to insure rigidity in the curb forms.
4. Concrete Placement and Finishing:
 - a. Sidewalks & Ramps: Place in forms in a layer of such thickness than when compacted and finished the walk will be of the thickness shown on the drawings. After the concrete has been placed between side forms, a strike-off guided by the side forms shall be used to bring the surface to the proper section to be compacted. The concrete shall then be tamped with a heavy tamper and given a final tamping with a light tamper. The surface shall be finished to grade and cross section with a wooden float at least 10 feet in length, 6 to 8 inches in width, and at least 1 inch in thickness with handles at each end for longitudinally floating along the surface. After float, the surface shall be troweled smooth and then finished with a fine hair push broom drawn over the surface traverse to the line of traffic. If necessary water may be added to the surface immediately in advance of brooming. Before final finish, the surface shall be checked with a 10 foot straight edge, and any irregularities of more than 1/8" in 10 feet shall be eliminated. Divide into rectangles at intervals of approximately five feet by means of contraction joints. The contraction joints shall be formed in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least 1" by means of a jointer having a radius of 1/8" or a cutting blade not more than 1/8" thick. The completed surface shall be uniform in color and completely free of blemishes and tool marks.
 - b. Curbs: Place in the forms to the specified depth in 6" layers and thoroughly consolidate by tamping and spading so that there are no rock pockets at forms, and mortar entirely covers the top surfaces. Concrete may be compacted by means of mechanical vibrators approved by the Architect. The surface of the top of the curb shall be edged with the proper edging tool and floated and finished with a smooth wood float or a concrete rubbing block until it is true to grade and section and uniform in texture. These surfaces shall then be brushed with a fine hair brush with strokes parallel to the line of the curb. Ample water shall be used during the finishing operations. Immediately after removing the front curb forms, the face of the curb shall be rubbed with a wood or concrete rubbing block and water until all blemishes, form marks, and tool marks have been removed. The surface of the face shall, while still wet, be brushed in the same manner as the curb top. The face of the finished curb shall be true and straight and the top

surface of curbs shall be of uniform width, free from humps, sags, or other irregularities. When a straightedge, 10' long is laid on the top of the curb, or on the surface of gutters, the surface shall not vary more than 1/8" from the edge of the straight edge, except at grade changes or curves. All visible surfaces and edges of the finished curb, shall be free of all blemishes and form and tool marks, and shall be uniform in color, shape and appearance.

5. Expansion Joints:

- a. Provide expansion joints in sidewalks, terraces and platforms at all walk intersections and returns, at buildings, steps, structures, and other features against which the slabs abut. In addition, provide expansion joints for sidewalks at intervals of 20 feet. Form joints with expansion joint filler strips, 1/4" thick. The filler strips shall be Phillip Carey "Elastite", Serviceized Products Co. "KorkPak" or approve equivalent joint filler. Joint filler shall be held in place by means of steel pins or other devices to prevent warping of the filler during floating and finishing. After finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/4".
- b. Expansion joints for curbs: Form expansion joints for curbs with joint filler cut and shaped to the cross section of the curb. Provide expansion joints at the ends of all returns and directly opposite the expansion joints of abutting concrete walks and unless otherwise indicated shall be of the same type and thickness as the joints in the sidewalk. Where curbs do not abut concrete walks, expansion joints at least 1/2 inch in width shall be provided at intervals not exceeding 20 feet.
- c. After the concrete has cured and is thoroughly dry, the upper part of all expansion joints shall be cleaned and shall be sealed with joint sealer. Sealer shall be a cold-applied 2 component, polysulfide type sealant conforming as a minimum to ASA Standard 116.1-60. The compound shall be capable of being mixed on-the-job to a consistency appropriate for pressure extrusion. When mixed and applied in accordance with the manufacturer's instructions, the mixture shall completely fill the joints without the formation of air holes and voids.

6. Curing: Immediately after the completion of the finishing operations, the exposed surfaces of concrete shall be cured by one of the following methods, as the Contractor may elect.

- a. The entire exposed surface shall be covered with quilted covers conforming to AASHTO Specification M-73. Immediately after placing, they shall be thoroughly wet with water and kept in a saturated condition for not less than 7 days.
- b. The entire exposed surface shall be wetted with a fine spray of water and then covered with waterproof paper conforming to ASTM Standard C-171. Sheets shall be laid directly on the concrete surface and overlapped 12" when a

continuous sheet is not used. The curing medium shall be not less than 18" wider than the concrete surface to be cured, and shall be securely weighted down by placing a bank of moist earth on the edges just outside the forms and over the transverse laps to form closed joints. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

7. Protection: After the concrete has been cured, all debris shall be removed, and the areas adjacent to the work shall be backfilled, graded, and compacted in a satisfactory manner in accordance with the lines and grades shown on the drawings. The completed work shall be protected from damage until accepted. The Contractor shall repair and clean, at no additional cost to the Owner, all concrete damaged or discolored during construction. Repair of sidewalks, if required, shall be made by removing and replacing defective portion between the nearest cleavage or expansion joints.

3300.2200 TRENCH DRAIN

1. Provide complete trench drainage systems where indicated on the drawings at wash bay. System shall include but is not necessarily limited to precast trench drains, cast iron heavy duty lock down grate covers, anchors, fittings, hardware, end caps and outlet end with 4" nipple. Coordinate with plumber who will provide and install piping tied into site drainage pools.
2. System shall be ACO S-100 Channel Slope trench drain system with "D" load class ductile iron slotted grate or approved equal.
3. Manufacturer's product literature and detailed shop drawings indicating the entire installation including all components and details referenced by catalog number and piping to storm drain location.
4. All materials, systems, components, etc. shall be installed in strict compliance with the manufacturer's printed product system specifications and installation instructions including ACO drainage systems manual and ACO drain technical installation.
5. The ACO Drain System requires a bedding of concrete on both sides and under the channels. An area must be provided for channel placement wide enough and deep enough to accommodate the channel and bedding concrete. Follow ACO installation techniques exist for proper placement of ACO trench. As noted in both the ACO Drain Products Catalog 02725/ACP and ACO Drain Technical Installation. Prescribed methods and systems shall be reviewed with ACO technical services personnel prior to installation.

03300.2300 PERIMETER INSULATION

1. Manufacture: Perimeter insulation shall be "Styrofoam SB" rigid type, as manufactured by Dow Chemical Co., or approved equal. Thickness as shown on Drawings.
2. Preparation: The surfaces to which insulation is to be applied shall be smooth, flat and trim.
3. Foundation Walls: Install on the inside surface of the foundation wall to a minimum depth of 24" below bottom of slab with a thin layer of asphalt emulsion. Apply a layer of roofers felt, cut in strips the thickness of the floor slab, to the insulation to prevent the concrete from bonding to the insulation; cement with asphalt emulsion. Conform with details shown on the drawings.

03300.2400 INSPECTION AND TESTS

1. All concrete operations are subject to inspection and test as ordered by the Architect. All tests will be made in accordance with the appropriate ASTM Standards. The Contractor will provide all required assistance in performing these inspections and tests. The cost of inspection and tests will not be borne by the Contractor. The test performed constitute sufficient cause for rejection should these tests indicate failure to comply with the Contract documents.

03300.2500 TESTING

1. Testing and Inspection which may be performed by the Owner:
 - a. The General Contractor shall schedule for the following services:
 - b. Test cylinders shall be made and stored in accordance with ASTM C-31. The method of sampling fresh concrete shall be in accordance with ASTM C-172. The Contractor shall provide a safe storage box for storage of test cylinders in an undisturbed manner.
 - c. Two (2) of the specimens shall be tested after seven (7) days and two (2) after twenty-eight (28) days. Two (2) cylinders will be saved for testing at 45 days. 45 Day tests will not be required if the 28 Day tests are satisfactory. The 7 day strength will be assumed to have 70% of the 28 days strength. For Type III cement, the 7 day test shall indicate 90% of 28 day strength.
 - d. Compression tests shall be conducted in accordance with ASTM C-39.

PROPOSED FIREHOUSE PROJECTS
TAPPAN FIRE DISTRICT
TAPPAN, NY

CONCRETE & CEMENT WORK
DIVISION 3- CONCRETE
03300.0100

- e. Slump tests shall be made for each truck load of concrete placed, in accordance with ASTM C-143.

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DIVISION 4 - MASONRY

SECTION 04200 - UNIT MASONRY

04200.0100 GENERAL

1. The work under this Section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

0400.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of all masonry and related work, complete, in strict accordance with the Contract Drawings and Schedule of Finishes, as specified herein or reasonably implied, in general as follows:
 - a. Concrete Masonry Units: For interior and exterior reinforced bearing walls and cavity as shown and detailed on the drawings.
 - b. Brick masonry unit veneer including all ties, etc.
 - c. All truss type reinforcing and steel rebar reinforcing, bearing plates, anchor bolts, eye and pintle masonry ties, etc. as noted on the drawings.
 - d. Expansion joints as shown on the drawings.
 - e. Furnishing and building in of anchors, ties, clamps, clips, etc., as required for work of this Section.
 - f. Mortar beds and grouting for saddles, windows, doors, louver frames, and similar items as noted on the drawings.
 - g. Scaffolding, hoists, centers, shoring, bracing, etc., as required for work under this Section.
 - h. Cleaning and pointing.
 - i. Clean-up and removal of rubbish, etc.
 - j. Do all cutting and patching, etc.
 - k. The masonry contractor shall install all necessary items that are required in the work and supplied by others, including: bolts, nailing blocks, inserts, anchors, flashing, lintels, expansion joints, conduits, etc.

0400.0300 QUALITY ASSURANCE

1. Tests:

Manufacturer or supplier of masonry units shall submit to Architect prior to delivery, certification of compliance of units with specified standards, as determined by an acceptable testing agency conforming to the applicable requirements of ASTM E329. Brick shall be tested in accordance with ASTM C67, and concrete masonry units in accordance with ASTM C140. If tests made after delivery indicate that units do not conform to specified requirements, costs of such tests shall be borne by the supplier.

2. Masonry cements:

Proprietary masonry cement mixes used in engineered masonry construction shall be subject to laboratory testing to assure compliance with minimum requirements for strength and bond.

3. Sample panels:

Erect sample panels for each type of masonry required, approximately 4 ft. long by 4 ft. high, showing the proposed color range, texture, bond, mortar, and quality of work. The sample panel, when accepted, shall become the project standard for bond, mortar, quality of work, and appearance. Do not begin work until panel is accepted by Architect.

0400.0400 SUBMITTALS

1. Samples:

Submit samples of each type of masonry unit and each accessory item required. Provide certification of pull-out strength of all masonry ties and anchors. Submit certification of compliance with required standards for all masonry units.

2. Shop Drawings:

Provide shop drawings of custom sized and shaped precast Brick as detailed on the drawings.

0400.0500 PRODUCT DELIVERY, STORAGE AND HANDLING

1. Delivery:

Deliver masonry units to job site in undamaged condition. Deliver and handle units to prevent chipping, breaking, or other damage.

2. Storage:

Store masonry units off ground and protected from wetting by capillary action, rain, or snow, and protected from mud, dust, or other materials and contaminants likely to cause staining or defects.

0400.0600 JOB CONDITIONS

1. Cold weather construction:

Masonry construction performed when ambient temperature falls below 40 degrees F. shall conform to the Recommended Practices and Guide Specifications for Cold Weather Masonry Construction published by the International Masonry Industry All-Weather Council.

2. Coverings:

The Contractor shall construct and maintain temporary protection as required to permit continuous progress of the work. During construction, partially completed walls which are not enclosed or sheltered shall be kept dry by covering at the end of each day and when work is not in progress with strong, weather-resistant material extended a minimum of 2 ft. down each side, and held securely in place.

3. Protections:

Do not apply uniform floor or roof loads for at least 12 hours or concentrated loads for at least 3 days after building masonry walls or columns.

4. Staining:

Prevent grout or mortar from staining the face of masonry to be left exposed or to be painted. Remove immediately any grout or mortar in contact with face of such masonry. Protect all sills, ledges, and projections from droppings of mortar. Protect door jambs and corners from damage during construction.

1. Materials

a. Portland cement:

ASTM C150, Type II

b. Lime:

Hydrated lime, ASTM C207, Type S.

c. Sand:

ASTM C144.

d. Aggregates:

ASTM C404.

e. Water:

Mixing water must be clean and free of harmful amounts of acids, alkalis, organic materials, or other substances that would adversely affect the quality or appearance of the mortar or the masonry units.

f. Brick and Stone:

1. Veneer Brick shall be ASTM C216, Grade SW, Type 1 wire cut nominal; 4" x 4" x 12' as manufactured by Interstate Brick Co. or equal. Submit sample of Brick and Stone. Provide brick similar in color, texture, and physical properties to those available for inspection at the Architect's office. Do not exceed variations in color and texture of samples accepted by the Architect.
2. Stone accents and rockface shall be Rock Cast Stone. or equal color. Provide all samples, sizes and finishes for all interior and exterior stone as indicated and noted in the drawings.

g. Hollow loadbearing CMU:

ASTM C90, Grade N, Type 1, Normal weight.

h. Hollow non-loadbearing CMU:

ASTM C129, Type II, Light weight.

i. Provide bond beams with two (2) #5 3,000 psi concrete where indicated.

j. Reinforcement:

Steel reinforcing shall conform to the following ASTM Specifications:

1. Cold-drawn steel wire, ASTM A82.
2. Welded steel wire fabric, ASTM A185.
3. Billet steel deformed bars, ASTM A615, Grade 60.

k. Material for anchors and ties:

All anchors and ties shall be coated or corrosion-resistant metal meeting or exceeding the following ASTM Specifications:

1. Zinc coating of flat metal, ASTM A153.
2. Zinc coating of wire, ASTM A116, Class 3.
3. Copper-coated wire, ASTM B227, grade 30HS.
4. Stainless steel, ASTM A167, Type 304.

l. Types of anchors and ties:

Provide the following types of anchors and ties for masonry construction:

1. Wire mesh: Minimum 20 gauge, 1/2 in. mesh, galvanized wire, and 1 in. less in width than width of masonry.
2. Corrugated veneer anchors: Minimum 22 gauge, minimum 7/8 in. wide x 6 in. long.
3. Cavity wall ties: Shall be eye & pintle type minimum 3/16 in. wire diameter with drip, rectangular, at least 2 in. wide, or Z-shaped with 2 in. legs, length sufficient to allow 1 in. minimum mortar coverage of ends or legs. At all veneer space 16" vertical & horizontal staggered.
4. Joint reinforcement: Prefabricated welded joint reinforcement, longitudinal

cross tie wire minimum 9-gauge spaced 16 in. on center; ladder or truss-type design.

5. Dovetail flat bar anchors: Minimum 16 gauge, 7/8 in. minimum width, corrugated, turned up 1/4 in. at end, or with 1/2 in. hole within 1/2 in. of end of bar.
6. Wire anchors: Wire anchors shall be minimum 3/16 in. diameter.
7. Rigid anchors for intersecting bearing walls: 1 1/2 in. wide x 1/4 in. thick x 24 in. minimum length; turn up ends minimum 2 in. or provide cross pins.
8. Wire ties for grouted reinforced masonry: Minimum 9-gauge wire bent into rectangular stirrups 4 in. wide and 2 in. shorter than overall wall thickness; form so that tie ends meet in center of one embedded end of stirrup.

2. Mixes

a. Mortar mixes:

Mortar shall comply with the minimum requirements of ASTM C270, Type M for Arriscraft units use a Portland cement-lime based mortar mix, proportioned to a 1:1:6 ratio, where 1 part Portland cement is mixed with 1 part Type S hydrated mason's lime and 6 parts masonry sand. This mixture shall be properly mixed with the appropriate quantity of water to result in a Type N mortar as specified in CSA A179-94; Mortar and Grout for Unit Masonry, and ASTM C270-95a; Standard Specifications for Mortar for Unit Masonry.

b. Admixtures:

No air-entraining admixtures or materials containing air-entraining admixtures shall be used. No antifreeze compounds or other substances shall be added to mortar or grout. No calcium chloride shall be included in mortar or grout in which metal reinforcing or accessories will be embedded. Mortar colors shall consist of inorganic compounds not to exceed 15% of the weight of the cement except that carbon black shall not exceed 3% of the weight on the cement. If mortar colors are used in reinforced masonry, the ultimate compressive strength of the masonry shall be determined by prism tests.

0400.0800 EXECUTION

1. Preparation

a. Inspection:

Inspect surfaces that are to support masonry work to assure completion to proper lines and grades free of all dirt and other deleterious material. Do not begin work until surfaces not properly prepared have been satisfactorily corrected.

2. Field Quality Control

a. Mortar and grout:

Mix mortar and grout in accordance with the proportion requirements of ASTM C270, and ASTM C476 as applicable. Control batching procedure to ensure proper proportions by measuring materials by volume. Amount of mixing water and mortar consistency shall be controlled by mason. Retempering will be permitted only within the first 2 1/2 hours of initial mix. Any mortar or grout that has partially set shall be discarded.

b. Allowable tolerances:

1. Maximum variation from plumb in lines and surfaces of columns, walls, and arises shall not exceed 1/4 in. 10 ft.; 3/8 in. in any story or 20 ft. maximum; or 1/2 in. in 40 ft.
2. Maximum variation from plumb for external corners, expansion joints, and other conspicuous lines shall not exceed 1/4 in. in any story or 20 ft. maximum; or 1/2 in. in 40 ft.
3. Maximum variation from level or grades for exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines shall not exceed 1/4 in. in any bay or 20 ft. maximum; or 1/2 in. in 40 ft.
4. Maximum variation of linear building line from an established position in plan and related portions of columns, walls, and partitions shall not exceed 1/2 in. in any bay or 20 ft. maximum; or 3/4 in. in 40 ft.
5. Maximum variation of linear building line from an established position in plan and related portions of columns, walls, and partitions shall not exceed 1/2 in. in any bay or 20 ft. maximum; or 3/4 in. in 40 ft.

c. Anchors and ties:

Remove all dirt, ice, loose rust, and scale prior to installation.

d. Protection of work:

Protect sills, ledges, and offsets from mortar droppings or other damage during construction. Remove misplaced mortar or grout immediately. Protect face

materials against staining. Protect door jambs and corners from damage during construction.

2. Installing Masonry

a. Preparation:

Verify that initial absorption rate of clay brick is less than 0.025 oz. /sq. in. per minute. Brick with absorption rates in excess of this amount shall be wetted with clean water 24 hours prior to placement until unit is nearly saturated, and shall be surface dry when laid. During freezing weather, units that require wetting shall be sprinkled with warm or hot water just before laying. No wetting of concrete unit masonry is permitted.

b. Installation:

Do not install cracked, broken, or chipped masonry units exceeding ASTM allowances. Use masonry saws to cut and fit exposed units. Lay brick plumb, true to line, and with level courses accurately spaced within allowable tolerances. Unless otherwise shown on the drawings, install masonry work using 1/2 running bond. Stop horizontal runs at end of workday by racking back in each course; toothing will not be permitted. Adjust units to final position while mortar is soft and plastic. If units are displaced after mortar has stiffened, remove, clean joints and units of mortar, and re-lay with fresh mortar. Adjust shelf angles to keep work level and at proper elevation. When joining fresh masonry to set or partially set masonry, remove loose unit and mortar, and clean and lightly wet exposed surface of set masonry prior to laying fresh masonry. The mason shall place all accessories and reinforcement in the masonry as the job progresses. Place horizontal joint reinforcement in first bed joint and each successive third joint of concrete masonry walls to prevent cracking. Cooperate with other trades to assure proper location of anchors, inserts, penetrations, etc.

c. Built-in items:

Install bolts, anchors, nailing blocks, inserts, frames, vent flashing, conduit, and other built-in items as masonry work progresses. Avoid cutting and patching. Solidly grout spaces around built-in items. Provide joints around exterior framed openings 1/4 to 3/8 in. wide, raked and tooled smooth to a uniform depth of 3/4 in., ready for caulking by others. Build chases in, do not cut. Install chases minimum of one masonry unit length from jambs.

d. Joints:

Provide nominal joint thickness of 3/8 in. for concrete unit masonry, 3/8 in. for brick masonry. Do not furrow bed joints for solid masonry units. Provide face-

shell bedding for concrete unit masonry except at grouted cells and base course, where full mortar bedding is required. Construct uniform joints. Provide full head and bed joints, shoved tight to prevent penetration of moisture. Provide weather-proof, concave, tooled joints in exposed surfaces when mortar is thumbprint hard, using round jointing tool. Strike joints flush in surfaces to be plastered, stucco, or covered with other material or surface-applied finish other than paint. Concave tool exterior joints below grade. Remove mortar protruding into cells or cavities to be grouted. Do not permit mortar droppings to fall into cavities of multi-wythe walls or to block weep holes. Fill with mortar all horizontal joints between top of masonry partitions and underside of concrete beams. Keep movement joints clean of all mortar and debris. For tuckpointing, rake mortar joints to a depth of 1/2 to 3/4 in., saturate with clean water, fill solidly with pointing mortar, and tool to match existing joints. Cut first course of CMU at each level with wet saw as required for bed joints to align with veneer joints.

e. Flashing & Damp Proofing:

Provide through-wall flashing at base of all cavity walls; at shelf angles; at lintels, heads, and sills of openings in exterior walls; at all locations shown on the drawings; and at any other locations as required to complete the integrity of waterproofed or dampproofed surfaces. Form dams at horizontal termination of all flashing.

Clean surface of masonry smooth and free from projections that might puncture or otherwise damage flashing membrane. Carefully fit flashing around projections and where dampproof membrane abuts columns, walls, etc. Neatly fold and bed in mastic or mortar so as to direct moisture to the outside. Form membrane to required profiles and install in such a manner as to force any moisture entering the wall to the outside. Hold outer edge of membrane to surface with mastic or mortar. Lap joints 4 in. and seal with mastic or embed in mortar. Form membrane to correct profile without wrinkles or buckles, and protect from punctures and tears during installation. Field cut units at 8/12 ratio at straight wall flashing where roofs intersect with masonry veneer.

Prior to installation of veneer brick and thin brick systems, the entire exterior face of CMU shall be damp proofed with Tamms Dehydrate 75 Emulsified Asphalt Damp Proofing Compound or equal, one (1) coat application.

f. Weep holes:

Provide weep holes in head joints in first course immediately above all flashing. Leave head joint free and clean of mortar or install weep hole tube in head joint. Space weep holes 24 in. on center maximum for brick masonry, and 24 in. on center maximum for Arriscraft. Keep weep holes and area above flashing free of mortar droppings. For backfill material behind retaining walls, and for loose fill

insulation in walls, screen cavity side of weep hole against clogging before fill material is placed.

g. Masonry bonding:

Bond facing and backing of multi-wythe walls as shown on the drawings with masonry headers extended a minimum of 3 in. into backing. If single header does not extend through wall, overlap headers from opposite sides of wall at least 3 in. Provide minimum number of wall headers equal to 4% of wall surface, spaced maximum distance of 24 in. on center either vertically or horizontally.

For multi-wythe walls of hollow concrete masonry units, bond inner and outer wythes by transverse lapping of stretcher unit at least 3 in. over units below, spaced maximum 32 in. on center vertically; or lap with stretcher units at least 50% wider than unit below, spaced maximum 16 in. on center vertically. Bond abutting or intersecting walls and partitions with at least 50% of units at the intersection laid in masonry bond. Provide a minimum of 3 in. of bearing of alternate units on unit below. Masonry bonding is not permitted for grouted or reinforced construction.

h. Metal-tie bonding:

Provide metal ties for bonding of multi-wythe walls as shown on the drawings. Stagger ties in alternate courses, and provide minimum of one tie for each 4.5 sq. ft. of wall surface. Maximum distance between adjacent ties not to exceed 18 in. vertically or 24 in. horizontally. Embed ties in horizontal joints of facing and backing. Provide additional ties within 12 in. of openings, spaced maximum 36 in. around perimeter.

In lieu of metal ties, contractor may use continuous prefabricated metal joint reinforcement as specified, spaced not more than 16 in. on center vertically.

For corner intersections of walls carried up separately, provide rigid steel anchors at maximum vertical spacing of 32 in. When intersecting bearing or shear walls are carried up separately, provide rigid steel anchors at a maximum vertical spacing of 2 ft.

Anchor nonbearing partitions abutting or intersecting other walls or partitions with cavity wall ties at vertical spacing not to exceed 4 ft.

i. Anchoring brick veneer:

Attach brick veneer to backing with metal veneer ties spaced maximum 16 in. on center vertically and horizontally with a minimum of one tie for each 2 sq. ft. of wall area. Embed ties at least 2 in. in horizontal joint of facing. Provide additional ties within 12 in. of openings, spaced maximum 36 in. around perimeter.

j. Expansion and contraction:

Provide vertical movement joints where called for on the drawings at intervals of not more than 20 ft. on centers, and at all offsets, returns, openings, and intersections with dissimilar materials. Provide continuous bond break at steel columns and members. Provide pressure-relieving joints by placing a continuous 1/8 in. neoprene pad below shelf angles.

3. Reinforced Masonry

a. Masonry strength:

Provide minimum ultimate compressive strength of 1,500 psi.

b. Reinforcement:

Hold vertical reinforcement firmly in place by means of frames or other suitable devices. Place horizontal reinforcement as masonry work progresses. Provide minimum clear distance between longitudinal bars equal to nominal diameter of bar. Provide minimum clear distance between bars in columns equal to 1 1/2 times bar diameter. Minimum thickness of mortar or grout between masonry and reinforcement shall be 1/4 in., except than 1/4 in. bars may be laid in 1/2 in. horizontal mortar joints, and 6-gauge or smaller wires may be laid in 3/8 in. mortar joints. Collar joints containing both horizontal and vertical reinforcement shall have a minimum width 1/2 in. larger than the sum of the diameters of the horizontal and vertical reinforcement.

c. Low-lift grouting:

For grout spaces less than 2 in. width, place grout at maximum 24-in. intervals in lifts of 6 to 8 in. as the wall is built. Assure that grout core is clean of mortar, mortar droppings, and debris. Agitate grout during and after placement to assure complete filling and coverage of reinforcement. If work is to be stopped for 1 hour or more, hold grout 1 1/2 in. below top of masonry. Continue grouting to top of finished wall.

d. High-lift grouting:

For grout spaces 2 in. or more in width, grout may be placed in lifts not to exceed 4 ft. For running bond, provide one metal tie for each 3 sq. ft. of wall with maximum spacing of 16 in. vertically and 24 or 32 in. horizontally for brick and concrete block respectively. For stack bond, provide one metal tie for each 2 sq. ft. of wall with maximum spacing 12 in. vertically and 24 in. horizontally for brick, or 16 in.

vertically and horizontally for concrete block.

Keep grout core clean. Provide cleanout holes in bottom course as required for inspection and cleaning. Replace cleanout plugs only after area to be grouted has been accepted. Do not place grout until the entire wall has been in place a minimum of 3 days. Place horizontal grout barriers at convenient intervals. If work is to be stopped for 1 hour or more, hold grout 1 1/2 in. below top of masonry. Continue grouting to top of finished wall.

e. Forms and shoring:

Provide substantial and tight forms to prevent leakage of mortar or grout. Brace or shore forms to maintain position and shape. Do not remove forms or shoring until masonry has hardened sufficiently to carry its own weight and any other temporary loads that may be placed on it during construction (10 days for girders and beams, 7 days for masonry slabs).

4. Cold-Weather Masonry Construction

a. Surface conditions:

Ice or snow that has formed on the masonry bed shall be thawed by application of heat. Apply heat carefully until top surface is dry to the touch. Any section of completed masonry work that is deemed frozen and damaged shall be removed before continuing construction of that section.

b. Condition of masonry units:

Use only dry masonry units, except as permitted below. Wet or frozen masonry units shall not be laid. No wetting of concrete masonry units will be permitted.

For brick masonry units used in cold-weather construction, initial rates of absorption may range to a maximum of 1 1/2 oz. When sprinkling is required to achieve proper rates, heated water shall be used. Water shall be above 70 degrees F. when temperature of units is above freezing and above 130 degrees F. when temperature of units is below freezing.

c. Construction requirements:

1. Air temperature 32 to 40 degrees F: Sand or mixing water shall be heated to produce mortar temperatures ranging from 40 to 120 degrees F.
2. Air temperature 25 to 32 degrees F: Sand and mixing water shall be heated to produce mortar temperatures ranging from 40 to 120 degrees F. Maintain temperature of mortar on boards above freezing.

3. Air temperature 20 to 25 degrees F: Sand and mixing water shall be heated to produce mortar temperatures ranging from 40 to 120 degrees F. Maintain mortar temperatures on boards above freezing. Provide sources of heat on both sides of walls under construction. Windbreaks shall be employed when wind is in excess of 15 mph.
4. Air temperature 20 degrees F. and below: Sand and mixing water shall be heated to provide mortar temperatures ranging from 40 to 120 degrees F. Enclosures and auxiliary heat shall be provided to maintain air temperature above freezing. Temperature of units when laid shall be not less than 20 degrees F.

d. Protection of completed work:

1. Mean ambient temperature 32 to 40 degrees F: Masonry completed or not being worked on shall be protected from rain or snow for 24 hours by covering with weather-resistive membrane.
2. Mean ambient temperature 25 to 32 degrees F: Masonry shall be completely covered with weather-resistive membrane for 24 hours.
3. Mean ambient temperature 20 to 25 degrees F: Masonry shall be completely covered with insulating blankets, or equally protected for 24 hours.
4. Mean ambient temperature 20 degrees F and below: Masonry temperature shall be maintained above freezing for 24 hours by enclosure and supplementary heat such as electric heating blankets, infrared heat lamps, or other approved methods.

5. Pointing and Cleaning

a. Pointing:

At final completion of masonry work, cut out any defective joints or holes in exposed masonry and repaint with mortar, tooling to match adjacent joints.

b. Cleaning:

Dry brush masonry surface after mortar has set at end of each workday and after final pointing. Clean exposed, unglazed masonry with stiff brush and clean water. Cleaning agents may be used only with written approval of Architect. Cleaning agents must be tested on sample wall area of 20 sq. ft. Protect adjacent materials from damage due to cleaning operations. Remove efflorescence in accordance with brick manufacturer's recommendations.

Leave work area and surrounding surfaces clean and free of mortar spots, droppings, and broken masonry.

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DIVISION 5 - STRUCTURAL STEEL

SECTION 05120 - STRUCTURAL STEEL

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Structural steel framing members, structural steel support members, struts, and with required bracing, welds, and fasteners.
- B. Baseplates, shear stud connectors and expansion joint plates.

1.02 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

- A. Section 3300.1500: Anchorages cast in concrete.
- B. Section 0400.1200: Anchorages embedded in masonry.

1.03 RELATED WORK

- A. Section 05210 - Steel Joists.
- B. Section 05311 - Steel Roof Deck: Support framing for small openings in metal deck.
- C. Section 05313 - Steel Floor Deck: Support framing for small openings in metal deck.

1.04 REFERENCES

- A. ASTM A36 - Structural Steel.
- B. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- C. ASTM - A325 - High Strength Bolts for Structural Steel Joints.
- D. ASTM A490 - Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.

- E. ASTM - A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- F. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- G. ASTM A572 - High Strength Low Alloy Columbium-Vanadium Steel of Structural Quality.
- H. ASTM A502 - Steel Structural Rivets.
- I. AWS D1.1 - Structural Welding Code.
- J. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
- K. FS TT-P-31 - Paint, Oil: Iron Oxide, Ready Mix, Red and Brown.

1.05 SHOP DRAWINGS

- A. Submit shop drawings under provisions of the General Conditions.
- B. Indicate profiles, sizes, spacing, and locations of structural members, connections, attachments and fasteners.
- C. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
- D. Prepare shop drawings under seal of a Professional Structural Engineer registered in State of New York.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Structural Steel Members: ASTM A36.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Bolts, Nuts and Washers: ASTM A325.
- D. Welding Materials: AWS D1.1; type required for materials being welded.

- E. Primer: FS TT-P-31, brown.

2.02 FABRICATION

- A. Fabricate structural steel members in accordance with AISC Specification.

2.03 FINISH

- A. Clean, prepare, and shop prime structural steel members.

PART 3 EXECUTION

3.01 ERECTION

- A. Erect structural steel in accordance with AISC Specification.
- B. Make provision for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Do not field cut or alter structural members without approval of Architect/Engineer.
- D. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete. Use a primer consistent with shop coat.
- E. All structural steel installations shall be A-36 steel and shall conform to ASTM Specifications. Affidavit to be filed with Building Department upon request.
- F. All structural steel fabrication, erection, and connections shall conform to latest AISC standards and specifications Type 2 construction except as noted.
- G. All field connections to be 3/4" diameter machine bolts unless indicated otherwise. Shop connections to be either machine bolted or welded. All bolts to be A-325 friction type. Connections shall be per Type 1 construction per AISC for portal frames and shall be detailed to develop at least full allowable movement and shear capacity. All remaining steel to have Type 2 connections. A-307 bolts may be used for minor connections when acceptable to engineer.

- H. Steel encased in concrete shall not be painted. All steel surfaces not in contact with concrete shall receive one shop coat of approved paint, and after erection, one field coat. Omit primer paint at welds and high strength bolts.
- I. The structure shall be properly guyed and braced.
- J. Grout under column and beam bearing plates shall be non-shrink, propak or equal.
- K. Provide loose lintels as required for openings in masonry walls and partitions.
- L. Provide holes in shop for bolted blocking, pipe penetrations, etc. Details shall be shown on shop drawings for review by Engineer.

SECTION 05210 - STEEL JOISTS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Open web steel joists, with bridging, attached bearing plates, angles, and anchors.
- B. Loose bearing plates and anchor bolts for site placement.

1.02 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

- A. Section 0300.1500: Anchorages cast in concrete.
- B. Section 0400.0200: Anchorages embedded in masonry.

1.03 RELATED WORK

- A. Section 05120 - Structural Steel.
- B. Section 05311 - Steel Roof Deck: Support framing for small openings in metal deck.
- C. Section 05313 - Steel Floor Deck: Support framing for small openings in metal deck.

1.04 REFERENCES

- A. ASTM A307 - Carbon Steel Threaded Standard Fasteners.
- B. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- C. AWS D1.1 - Structural Welding Code.
- D. FS TT-P-636 - Primer Coating, Alkyd, Wood and Ferrous Metal.
- E. SJI - Standard Specifications for Open Web Steel Joists H-Series, and Standard Specifications for Longspan Steel Joists LH- Series and Deep Longspan Steel Joists DLH-Series.
- F. SSPC 15 - Red Oxide.

1.05 QUALITY ASSURANCE

- A. Conform to SJI Standard Specifications, Load Tables, and Weight Tables.

1.06 SHOP DRAWINGS

- A. Submit shop drawings under provisions of the General Conditions.
- B. Indicate standard designations, configuration, sizes, spacing, and locations of joists, bridging, connections, and attachments.
- C. Prepare shop drawings under seal of a Professional Structural Engineer registered in State of New York.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Open Web Joist Members: SJI Type.
- B. Anchor Bolts, Nuts and Washers: ASTM A325.
- C. Primer: SSPC 15, Type 1 red oxide.

2.02 FABRICATION

- A. Fabricate steel joists in accordance with SJI Standard Specifications including headers and other supplementary framing.
- B. Provide bottom and top joist chord extensions indicated.
- C. Drill holes in top chords necessary for attachment of wood nailers. Weld threaded lugs to top chords for attachment of wood nailers.
- D. Prepare and shop prime with two coats of primer.

PART 3 EXECUTION

3.01 ERECTION

- A. Erect steel joists in accordance with SJI Standard Specifications.
- B. Bear joists on supports in accordance with SJI.
- C. During erection, provide temporary bracing for induced loads and stresses.
- D. Coordinate placement of anchorages in concrete and masonry construction for securing bearing plates.
- E. Field weld joist seat to placed bearing plates after alignment, positioning after installation of bridging.
- F. Do not permit erection of decking until joists are braced and bridged.
- G. Do not field cut or alter joists without approval of Architect/Engineer.
- H. After erection, prime welds, abrasions, and surfaces not primed. Use primer consistent with shop coat.
- I. All joists and accessories shall be of the type, size, gage and spacing as shown on the plans.
- J. All joists shall receive one shop coat of approved paint, and after erection, touch up paint as necessary.
- K. All bridging shall be continuous top and bottom, and shall be welded to joists. Provide "X" bridging where shown.
- L. Any field cutout to be made in joists shall be approved by, and reinforced as specified by the engineer. No cutout shall be made prior to approval.
- M. End blocking shall be provided where joists are not otherwise restrained against rotation.
- N. All joists to be welded or bolted to supporting steel per SJI requirements.

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SECTION 05311 - STEEL FLOOR AND ROOF DECKING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Steel roof deck and accessories.
- B. Framed openings up to 18 inches (450 mm).
- C. Bearing plates and angles.

1.02 RELATED WORK

- A. Section 05120 - Structural Steel: 05210 - Steel Joists.

1.03 REFERENCES

- A. AISI - Specification for the Design of Cold-Formed Steel Structural Members.
- B. ASTM A36 - Structural Steel.
- C. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot- Dip Process, Structural (Physical) Quality.
- D. ASTM A525 - Steel Sheet, Zinc-Coated, Galvanized by the Hot- Dip Process.
- E. ASTM A611 - Steel, Cold-Rolled Sheet, Carbon, Structural.
- F. AWS D1.1 - Structural Welding Code.
- G. SDI - Design Manual for Composite Decks, Form Decks, Roof Decks.

1.04 SHOP DRAWINGS

- A. Submit shop drawings under provisions of General Requirements.
- B. Indicate decking plan, deck profile dimensions, supports, projections, openings, and reinforcement, finishes, pertinent details, and accessories.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store decking on wood sleepers with slope for positive drainage.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Sheet Steel: ASTM A446, Grade B structural quality; with G60 coating; unfinished.
- B. Bearing Plates: Angles: ASTM A36 steel.
- C. Welding Materials: AWS D1.1.
- D. Cell Closures: Closed cell foam rubber, profiled to decking.
- E. Metal Closure Strips, Wet Concrete Stops, Cover Plates, and Related Accessories: 22 gage sheet steel; of required profiles and size.
- F. Primer: Red oxide type.
- G. Touch-up Primer: Red oxide.

2.02 FABRICATION

- A. Metal Decking: Minimum gage as noted on plans, sheet steel, high fluted profile to SDI 24 inch sheets; multiple span; lapped joints.
- B. Fluted Floor Decking: Minimum gage as noted on plans, sheet steel, 1-1/2 inch fluted profile; 24 inch wide sheets, multiple span, lock seam joints, to SDI.
- C. Fabricate metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, Roof Decks to accommodate maximum working stress of 20,000 psi and maximum span deflection of 1/240.
- D. Fabricate roof sump pan of 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches (38 mm) below roof deck surface, bearing flange 3 inches (75 mm) wide, watertight.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Erect metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, and Roof Decks. Provide welding in accordance with AWS D1.1.
- B. On steel support members provide 3 inch minimum bearing. Align and level on supports.
- C. Weld male/female side lap at 18 inches oc maximum.
- D. Fasten deck to steel support members at ends and intermediate supports with 3/4 inch fusing welds at 12 inches oc maximum.
- E. Reinforce deck openings from 6 to 18 inches (150 to 450 mm) in size with 2 x 2 x 1/4 inch (50 x 50 x 6 mm) steel angles. Place angles perpendicular to flutes; extend minimum two flutes each side of opening and weld to deck.
- F. Install 6 inch (150 mm) wide sheet steel cover plates where deck changes direction. Spot weld in place 12 inches oc maximum.
- G. Install sheet steel strip closures at roof edge and floor edge upturned to thickness of slab, to contain wet concrete. Provide closures of sufficient strength to remain in place without distortion.
- H. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.
- I. Install foam cell closures in locations above walls and partitions.
- J. Position roof sump pans with flange bearing on top surface of deck. Weld at each deck flute.
- K. Immediately after welding deck in place, touch-up welds, burned areas, and surface coating damage with prime paint.
 - 1. Metal floor deck shall be 1-1/2 inches deep, galvanized, Composite Type, equal to United State Steel Deck 1-1/2 inch "B-Lok" or Bowman 1-1/2 inch "Vgrip".
 - 2. Metal roof deck shall be 1-1/2 inches deep, galvanized, wide rib, equal to United Steel Roof Deck "Type B" or Bowman Roof Deck "Type B".

3. Weld to supports and screw side laps, per manufacturer's recommendations and specifications.
4. Deck units shall be in lengths to span over three or more supports where possible.
5. Stone concrete topping shall have 28 day, 3000 psi. Closures shall be provided at edges, at perimeter and at openings to serve as concrete stop.
6. Conform to steel deck institute recommendations.

PROPOSED FIREHOUSE PROJECTS
TAPPAN FIRE DISTRICT
TAPPAN, NY

STEEL FLOOR AND ROOF DECKING
DIVISION 5 – METALS
SECTION 05311

SECTION 05400 - COLD FORMED METAL FRAMING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Non-load bearing formed steel stud interior wall framing including soffits, etc. as shown on the drawings.

1.02 RELATED WORK

- A. Section 07213 - Batt and Blanket Insulation: Insulation within framing members.
- B. Section 09260 - Gypsum Board Systems.

1.03 REFERENCES

- A. ASTM A90 - Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- B. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by Hot Dip Process, Physical (Structural) Quality.
- C. ASTM A570 - Hot-Rolled Carbon Steel Sheet and Strip. Structural Quality.
- D. ASTM A611 - Steel, Cold-Rolled Sheet, Carbon, Structural.
- E. AWCI (Association of Wall and Ceiling Industries) - Specifications Guide for Cold Formed Steel Structural Members.
- F. AWS D1.1 - Structural Welding Code.
- G. FS TT-P-645 - Primer, Paint, Zinc-Chromate, Alkyd Type.

1.04 SYSTEM DESCRIPTION

- A. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1.05 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in structural framing components with three years minimum experience.

1.06 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Provide product data on standard framing members. Describe materials and finish, product criteria and limitations.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.

PART 2 PRODUCTS

2.01 FRAMING MATERIALS

- A. Studs: ASTM A446 sheet steel.
- B. Track: Formed steel; channel shaped; same width as studs, tight fit.

2.02 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.
- B. Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.

2.03 FASTENERS

- A. Self-drilling, Self-tapping Screws, Bolts, Nuts and Washers: ASTM A90, hot dip galvanized.
- B. Anchorage Devices: Power driven.
- C. Welding: In conformance with AWS D1.1.

2.04 FABRICATION

- A. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.

- B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

2.05 FINISHES

- A. Galvanizing: G90 coating class.
- B. Primer: FS TT-P-645, touch-up for galvanized surfaces.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that substrate surfaces and building framing components are ready to receive work.
- B. Beginning of installation means acceptance of existing conditions.

3.02 ERECTION OF STUDDING

- A. Install components in accordance with manufacturer's instructions.
- B. Align floor and ceiling tracks; locate to partition layout. Secure in place with fasteners or welding at maximum 24 inches o.c.
- C. Place studs at 16 inches o.c.; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.
- D. Construct corners using minimum three studs. Double stud at wall opening, door, and window jambs.
- E. Erect load bearing studs one piece full length. Splicing of studs is not permitted.
- F. Erect load bearing studs, brace, and reinforce to develop full strength to meet design requirements.
- G. Extend stud framing through ceiling to underside of floor or roof structure above.
- H. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

- I. Install intermediate studs above and below openings to match wall stud spacing.
- J. Provide deflection allowance in stud track, directly below horizontal building framing for non-load bearing framing.
- K. Attach cross studs to studs for attachment of fixtures anchored to walls.
- L. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- M. Touch-up field welds and damaged galvanized surfaces with primer.
- N. Complete framing ready to receive gypsum wall board.

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PROPOSED FIREHOUSE PROJECTS
TAPPAN DISTRICT
TAPPAN, NY

COLD FORMED METAL FRAMING
DIVISION 5- METALS
SECTION 05400

SECTION 05510 - METAL STAIRS

PART 1 GENERAL

1.01 WORK INCLUDED

Provide and install of:

- A. Steel stair frame of structural sections, with open and closed risers as called out on plans.
- B. Pan to receive concrete fill stair treads and landings.
- D. Balusters and handrailing.
- E. Steel ladder to roof access hatch.

1.02 REFERENCES

- A. ANSI A202.1 - Metal Bar Grating Manual for Steel and Aluminum Gratings and Stair Treads.
- B. ASTM A36 - Structural Steel.
- C. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- D. ASTM A307 - Low-Carbon Steel Externally and Internally Threaded Fasteners.
- E. ASTM A352 - High Strength Bolts for Structural Steel Joints.
- F. ASTM A386 - Zinc-Coating (Hot-Dip) on Assembled Steel Products.
- G. ASTM A446 - Steel Sheet, Zinc Coated (Galvanized) by the Hot- Dip Process, Physical (Structural) Quality.
- H. ASTM A500 - Cold-formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- I. ASTM A501 - Hot-formed Welded and Seamless Carbon Steel Structural Tubing.
- J. AWS D1.1 - Structural Welding Code.
- K. FS TT-P-31 - Paint, Oil: Iron Oxide, Ready Mix, Red and Brown.

- L. FS TT-P-641 - Primer Coating, Zinc Dust - Zinc Oxide (for Galvanized Surfaces).
- M. FS TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.

1.03 STRUCTURAL REQUIREMENTS

- A. Fabricate stair assembly to support live load of 100 lb/sq. ft. with deflection of stringer not to exceed 1/240 of span.
- B. Railing assembly, wall rails, and attachments to resist lateral force of 50 lbs. at any point without damage or permanent set.

1.04 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, openings, size and type of fasteners, and accessories.
- C. Include erection drawings, elevations, and details where applicable.
- D. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
- E. Prepare shop drawings under seal of a Professional Structural Engineer registered in the State of New York.
- F. Submit samples under provisions of Section 01300.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel Section: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Sheet Steel: ASTM A446, Grade B, structural quality with galvanized coating.
- D. Bolts, Nuts, and Washers: ASTM A307.
- E. Welding Materials: AWS D1.1; type required for materials being welded.

- F. Primer: FS TT-P-31, brown; for shop application and field touch-up.
- G. Touch-up Primer for Galvanized Surfaces: FS TT-P-641.
- H. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure.

2.02 FABRICATION - GENERAL

- A. Verify dimensions on site prior to shop fabrication.
- B. Fabricate items with joints tightly fitted and secured.
- C. Fit and shop assemble sections in largest practical sizes, for handling through building openings.
- D. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius. At exposed to view locations, place plastic filler between welds; sand flush.
- E. Make exposed joints butt tight, flush, and hairline.
- F. Accurately form components required for anchorage of stairs, landings and railings to each other and to building structure.

2.03 FABRICATION - PAN STAIRS AND LANDINGS

- A. Fabricate stairs with risers and treads of pan construction to receive concrete.
- B. Form treads and risers from minimum 16 gage sheet stock.
- C. Secure tread pans to stringers' clip angles, welded in place.
- D. Form stringers of rolled steel channels, 12 inches deep. Weld fascia plates to channels using 14 gage steel sheet stock across channel toes.
- E. Form landings from minimum 20 gage metal decking. Reinforce underside with angles to attain design load requirements.
- F. Prime paint components.

2.04 FINISH

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact bond with concrete or where field welding is required.
- C. Prime paint items specified with one coat.

PART 3 EXECUTION

3.01 ERECTION

- A. Erect stairs level and plumb, free from distortion or defects detrimental to appearance or performance.
- B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
- C. Verify alignment with adjacent construction. Coordinate related work.
- D. Do not field cut or alter members.
- E. Field bolt and weld to match standard of shop bolting and welding. Hide bolts and screws whenever possible. Where not hidden, use flush countersunk fastenings.
- F. Mechanically fasten joints butted tight, flush, and hairline. Grind welds smooth and flush.

PROPOSED FIREHOUSE PROJECTS
TAPPAN FIRE DISTRICT
TAPPAN, NY

METAL STAIRS
DIVISION 5- METALS
SECTION 05510

SECTION 05521 - PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Steel pipe and tube handrails, balusters, and fittings.

1.02 RELATED WORK

- A. Section 05510 - Metal Stairs: Handrailing at stairs.

1.03 REFERENCES

- A. ASTM A386 - Zinc-Coating (Hot-Dip) on Assembled Steel Products.
- B. FS TT-P-31 - Paint, Oil: Iron Oxide, Ready Mix, Red and Brown.

1.04 STRUCTURAL REQUIREMENTS

- A. Railing assembly, wall rails, and attachments to resist lateral force of 50 lbs. at any point without damage or permanent set.

1.05 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Indicate component details, materials, finishes, connection and joining methods, and the relationship to adjoining work.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.
- D. Submit samples under provisions of Section 01300.

PART 2 PRODUCTS

2.01 STEEL RAILING SYSTEM

- A. Rails and Posts 1-1/2 inches diameter steel pipe welded jointing.
- B. Posts: 12 inches diameter steel pipe welded jointing.

- C. Fittings: Elbows, Tee-shapes, wall brackets, escutcheons; cast steel.
- D. Mounting: Adjustable brackets and flanges, with steel inserts for casting in concrete where required.
- E. Splice Connectors: Steel concealed spigots.
- F. Primer: FS TT-P-31, brown; one coat.

2.02 FABRICATION

- A. Verify dimensions on site prior to shop fabrication.
- B. Fit and shop assemble sections in largest practical sizes, for delivery to site and installation.
- C. Supply components required for secure anchorage of handrails and railings.
- D. Grind exposed welds smooth and flush with adjacent surfaces.
- E. Make exposed joint butt tight, flush, and hairline.
- F. Accurately form components required for anchorage of railings to each other and to building structure.

PART 3 EXECUTION

3.01 PREPARATION

- A. Supply items to be cast into concrete embedded in masonry or placed in partitions with setting templates and erection drawings to appropriate Sections.

3.02 INSTALLATION

- A. Install in accordance with shop drawings and manufacturer's instructions.
- B. Erect work square and level, free from distortion or defects detrimental to appearance or performance.
- C. Anchor handrailings to structure.
- D. Weld field connections and grind smooth to complete assembly. Touch-up welds with primer.

SECTION 05540 METAL WHEEL GUARDS

PART 1 GENERAL

1. The work under this Section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

PART 2 PRODUCTS

1. Provide & install McKinley Wheel Guards at each overhead door jamb (2 per door), Model # Type/WG7 Cast Iron.
2. Casting shall be uniform in quality, free from blow holes, porosity, hard spots, shrinkage defects, swells, cracks or other injurious defects.
3. Each unit to be a minimum of 24" x 8" wide wall bracket, 20" high dome to round off corner not to extend more than 6" into opening.
4. Each unit shall be finish painted. Refer to quality assurance.

PART 3 QUALITY ASSURANCE

1. Material used in manufacturer of iron castings shall conform to ASTM specifications A48-64 Class 40 Iron.
2. All cast iron casting shall have one coat of bituminous paint. Casting to be finished painted as per paint section under metals, otherwise verify with Architect. Color selected by Owner.

DIVISION 6 - WOOD AND PLASTICS

SECTION 06100 - ROUGH CARPENTRY

06100.0100 GENERAL

1. The work under this Section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

06100.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of all carpentry related work, complete, in strict accordance with the Contract Drawings and as specified herein or reasonably implied.
 - a. Blocking, grounds, nailing strips, wedges, centerings, wood curbs for roof openings, wood closures and members to receive flashing, etc., for the work of this Contract.
 - b. All other items of carpentry work indicated on the drawings.
 - c. All required miscellaneous rough hardware and fasteners as necessary for a complete installation.

06100.0300 RELATED WORK SPECIFIED ELSEWHERE

1. Concrete Work - Division 3.
2. Masonry - Division 4.
3. Doors and Windows - Division 8.
4. Specialties - Division 10.
5. Thermal & Moisture Protection - Division 7.

06100.0400 MATERIALS

1. General: Lumber shall conform to the requirements of the latest edition of the American Lumber Standards Simplified Practice Recommendation R-16. Grades shall conform to the grading rules of the Association having jurisdiction, and shall bear the official grade and trademark of the Inspection Bureau of the Association and a mark of mill identification. Moisture content of lumber shall not exceed 19 percent (19%).

2. Preservative Treatment: Pressure treat all lumber for exterior work, and for all wood furring, screeds and grounds, and all lumber embedded in or in contact with masonry or concrete, against decay with zinc chloride or other approved preservatives, in accordance with the standard specifications of the American Wood Preservers Association; shall be kiln dried after treatment.
3. Lumber:
 - a. Defects or blemishes shall not appear in the material used. Lumber shall be D4S, sound, thoroughly seasoned and well manufactured, and free from warp that cannot be corrected in the process of nailing or bolting.
 - b. Furring Screeds and Grounds: Western or Northern White Pine, Fir or Spruce which has been prepared and bundled by the manufacturer for those purposes.

06100.0500 VERIFICATION OF DIMENSIONS AND CONDITIONS

1. All dimensions and conditions at the building which affect the size, construction and installation of items or features provided under this Section shall be carefully checked, verified and compared with the drawings. All discrepancies and conflicts including those between different materials or installations shall be reported to the Architect in writing for correction and adjustment.
2. Consult and agree with other trades on details of construction of adjoining installations which have not yet been completed.

06100.0600 STORAGE OF LUMBER AND WOODWORK

1. Lumber for rough usage when delivered at the site shall be immediately piled in stacks to insure drainage and free circulation. Stacks shall be supported on skids, placed to give slope of not less than 1/2" per foot, the stacks with a minimum clearance of 6" above grade. Stacks shall be covered with tarpaulins or other watertight covering. Grounds and similar small sized lumber shall be stored inside the building as soon as possible after delivery.

06100.0700 TEMPORARY PROTECTION, ENCLOSURES AND PARTITIONS

1. Provide and maintain protection during the life of the Contract for all materials and work installed under this Section and for other work requiring protection.
2. Provide and maintain all temporary partitions and enclosures for doors, windows, temporary openings, and for openings to exclude rain and snow and to permit maintenance of suitable conditions and temperatures within the building for the work to be actively executed at all times.

3. Provide batten doors, complete with hinges and padlocks at all exterior door openings, and as directed and approved by the Architect.
4. Remove and dispose of, off the site, all temporary protection enclosures.

06100.0800 ROUGH HARDWARE

1. Provide all items of rough hardware of every description including nails, spikes, screws, bolts, anchors, ties, expansion shields and bolts, strap irons and other items which are required to assemble or secure the work shown or specified herein.
2. All nails, driven into the face of exposed exterior woodwork, shall be non-corrosive and such nails shall be set and putty stopped.

06100.0900 FRAMING AND BLOCKING

1. Provide blocking, etc., as shown or as obviously necessary for the various systems and items herein specified, with all bolts or nails and all gusset plates, metal attachments, and miscellaneous steel items or devices shown or necessary for rigid substantial construction and support of work indicated.
2. Conform to details shown on the drawings. Framing shall be accurately done and abutting members shall fit closely and be securely fastened together as approved.
 - a. Attaching to Masonry: Except where built-in anchors are shown or specified, members required to be attached to masonry shall be secured to same with expansion bolts extending into masonry not less than 4" or by special bolts or anchors where so shown or specified.
3. Set all members in designated positions, build plumb and true, and brace in position. Frame as shown or directed for the proper assembly of work, both concealed and within enclosed areas.

06100.1000 NAILING STRIPS FOR ROOFING AND SHEETMETAL WORK

1. Materials in general shall be dimension fir lumber or other approved species dressed to required sizes. All material where indicated as bolted, shall be secured with bolts of sizes and spacing as included therein. Furring for soffit finish shall be arranged for solid nailing at all edges and joints.
2. Include required recessing of nuts and washers, as required.
3. Provide all other required bolts and fastenings.

06100.1100 GROUND, FURRING AND SCREEDS

1. Provide all wood grounds and/or furring required for the securing in place of all finished carpentry work, interior wood finish and other items furnished by this or other contractors including trim, mouldings, finished carpentry, shelving, frames, covers, stools, aprons, etc.
2. Grounds shall be minimum 3/4" thick and as wide as may be necessary for the required purpose; securely attached with hardened nails, screws, toggle bolts or other fasteners. Grounds shall be carefully plumb, leveled and straightened by means of wood or steel wedges or blocks and where necessary shall be aligned with continuous partitions and wall surfaces.
3. Grounds and screeds shall be of dressed lumber free from wave or knots which would impair its usefulness.
4. The attention of the contractor is called to the fact that the plans do not show all the blocking nor some of the subordinate framing which will be required. This blocking and subordinate framing will be required. This blocking and subordinate framing is nevertheless to be furnished and installed under this Section.

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SECTION 06200 - FINISH CARPENTRY

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Finish carpentry items, other than shop fabricated work, with hardware and attachment accessories.
- B. Any and all Oak chair rails, window trim, wainscot, bars, cabinets, etc.

1.02 WORK INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

- A. Section 08700 - Hardware: Supply of cabinet hardware to this Section.

1.03 RELATED WORK

- A. Section 06100 - Rough Carpentry.
- B. Section 06410 - Custom Casework: Shop fabricated cabinetwork.
- C. Section 08210 - Wood Doors.
- D. Section 08610 - Wood Windows.
- E. Section 08700 - Hardware: Supply of finish carpentry hardware.
- F. Section 09900 - Painting: Painting and finishing of finish carpentry items.

1.04 REFERENCES

- A. AWI - Quality Standards.
- B. FS L-P-508 - Plastic Sheet, Laminated, Decorative and Non- Decorative.
- C. FS MM-L-736 - Lumber - Hardwood.
- D. FS TT-W-550 - Wood Preservative, Chromated Copper Arsenate Mixture.
- E. FS TT-W-568 - Wood Preservative, Creosote-Petroleum Solution.
- F. FS TT-W-570 - Wood Preservative, Pentachlorophenol.
- G. FS TT-W-571 - Wood Preservation: Treating Practices.
- H. FS TT-W-572 - Wood Preservative, Water Repellent.

- I. FS MMM-A-130 - Adhesive, Contact.
- J. PS 1 - Construction and Industrial Plywood.
- K. PS 20 - American Softwood Lumber Standard.
- L. PS 51 - Hardwood and Decorative Plywood.
- M. PS 58 - Basic Hardwood.

1.05 QUALITY ASSURANCE

- A. Perform finish carpentry work in accordance with AWI Quality Standards, Premium grade.
- B. Fire retardant treatment to conform to requirements of Underwriters' Laboratories (UL).

1.06 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Indicate materials, component profiles, fastening methods, jointing details, finishes, and accessories.
- C. Submit samples under provisions of Section 01300.

1.08 DELIVERY AND STORAGE

- A. Deliver wood materials under provisions of Section 01600.
- B. Store indoors, in ventilated areas with constant minimum temperature of 60 degrees F and maximum relative humidity of 55 percent.

PART 2 PRODUCTS

2.01 LUMBER MATERIALS

- A. Softwood Lumber: PS 20; premium grade in accordance with AWI; maximum moisture content of 6 percent for interior work and 10 percent for exterior work.
- B. Hardwood Lumber: PS 58; premium grade in accordance with AWI; maximum moisture content of 6 percent.
- C. Facias to be primelock factory primed with Alkyo - oil primer finger jointed Eastern White Pine 5/4" boards with maximum lengths for minimum jointing.

2.05 ACCESSORIES

- A. Bolts, Nuts, Washers, Lags, and Screws: Size and type to suit application; non-corrosive for exterior, high humidity, and treated wood locations; plain finish at other interior locations.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Set and secure materials and components in place, plumb, and level.
- B. Verify mechanical, electrical, and building items affecting this Section are placed and ready to receive this work.
- C. Prime paint surfaces of items or assemblies in contact with cementitious materials.

3.02 SITE TREATMENT OF WOOD MATERIALS

- A. Brush apply two coats of preservative treatment on exterior located finish carpentry items.
- B. Apply preservative treatment in accordance with manufacturer's instructions.
- C. Treat site-sawn ends. Allow preservative to cure prior to erecting materials.
- D. Prime paint surfaces in contact with cementitious materials.

3.03 PREPARATION FOR FINISHING

- A. Sand work smooth and set exposed nails and screws. Apply manufacturer's recommended filler in exposed screw indentations and at joints.

END OF SECTION

SECTION 06400
ARCHITECTURAL WOODWORK & PLASTIC LAMINATE WORK

06400.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

06400.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of all related work, complete, in strict accordance with the contract drawings, and as specified herein or reasonably implied.
2. Wood counters and cabinets. The products of "Boise Cascade" Model "Clear Brook" of Berryville, VA or approved equal shall be used as a standard of acceptable workmanship and fabrication.
3. Laminated plastic counter tops and cabinet bases.
4. Wood trim, mouldings, etc. All wood trim profiles are to match existing trim profiles unless otherwise determined by the Architect.
5. All other wood and/or plastic laminated items classified as cabinet work and as called for on the drawings.
6. Shop priming all finished woodwork and millwork which is not required to be stained or varnished or plastic laminate surfaced.
7. All rough hardware, and furnishing and installing finishing hardware where hereinafter specified to be provided under this Section, and as required to be provided under this Section and as required to complete the work of this Section.
8. All cutting and patching of work to permit the installation of new work.

06400.0300 SHOP DRAWINGS

1. Submit shop drawings in accordance with the requirements of the General Conditions based on the Contract Drawing and Specifications showing complete details of construction, size of members, kinds of material, assembly of work, and connections for the proper execution of the work of other divisions. Show the profiles of all profiles of all mouldings and show methods of reinforcement, anchorage and support.

1. Submit samples for approval in accordance with the general requirements including wood, laminates, hardware, etc. All woods and plastic laminates showing the graining, texture, color, etc. All finished work shall lie within the range of approved samples of each kind of wood.

06400.0500 MATERIALS

1. All counter tops shall be surfaced with 1/16" thick high pressure laminated plastic sheet; as the Formica Corporation's General Purpose Grade 10, or approved equal. All laminates shall conform to performance standards of NEMA Publication No. LD1-1971. The laminated plastic should be bonded to the core material under recommended bonding pressures and conditions using Koppers Penacolite G-1124 Resorcinol adhesive or approved equal. Colors and patterns of plastic laminates shall be as approved by the Architect.
2. All exposed interior woodwork, millwork, trim and cabinet wood, etc. that is not designated to be surfaced with plastic laminate shall be of selected single botanical variety and all exposed faces shall be clear of all knots and surface blemishes and all lumber used shall be of a quality classified as "first" (FAS). All interior trim, millwork, cabinet work, doors, etc., shall match existing as to graining, profile and color, within a particular area.
3. Unless otherwise specified scribe or closure moulding for painting shall be clear White Pine.
4. Trim: Solid stock, select grade of same species as adjoining work.
5. Drawers: Solid stock, birch or maple.

06400.0600 VERIFICATION OF DIMENSIONS AND CONDITIONS

1. Add dimensions and conditions at the building which affect the size, construction and installation of items or features provided under this Section shall be carefully checked, verified and compared with those given on the drawings. All discrepancies and conflicts shall be reported to the Architect.

06400.0700 GROUNDS, FURRING AND SCREEDS

1. Provide all wood grounds and/or furring required for the securing in place of all finished carpentry work, interior wood finish and other items furnished by this or other contractors including trim, mouldings, shelving, frames, covers, stools, aprons, etc.

06400.0800 ANCHORS, BOLTS AND ATTACHMENTS

1. Furnish all anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing blocks, wood, bricks, etc., which are required for the proper fastening and installation.

06400.0900 HARDWARE

1. Provide all hardware required for cabinets and millwork. All cabinet doors shall be provided with fixed pin butts 2-1/2" x 2-1/2" for doors 18" wide or less and 3" x 3" for wider doors, spring catches, and door pulls all of design approved by the Architect and of brushed stainless steel finish. Provide all necessary channel bases, pilaster strips, etc. Finish of hardware shall match existing finish of hardware, or as directed by the Architect.
2. Assemble all work in conformity with the best cabinet work practice. All plastic laminate work shall conform to the specified plastic laminate manufacturer's standard practices, conditions, procedures and recommendations.

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SECTION 02070
DEMOLITION

PART 1 - GENERAL

1.1. DESCRIPTION

- A. This section specifies the General Conditions for Demolition.

1.2. SUMMARY

- A. This Section requires the selective removal and subsequent off site disposal of the following:
1. On all roof areas, existing roofing is to be removed down to the deck. Completely remove metal edge, copings, gravel stops, flashings, etc. on all roof areas. Install protection on the side of the building where the roof is being removed to preserve the building surfaces. All material is to be removed from the site and disposed of in a legal manner. Any debris on the ground shall be picked up and placed in containers each day. Remove only enough roofing that can be reinstalled the same day.
 2. The roofing contractor is required to keep the building manager informed about the area where work is to be performed. When working over the office area, 72 hour notice is to be given so that the furniture, personnel and equipment can be protected.
 3. All electrical disconnects will be done by the Owner. Again, 72 hour notice is required so that facilities can get a mechanic on site.
- B. Hazardous Materials: Removal of hazardous materials such as asbestos, may be included in the scope of this contract. If included, please see Asbestos Abatement Specification for further details.

1.3. SUBMITTALS

- A. General: Submit the following in accordance with General Conditions and Technical Specification Sections.
1. Photograph or video tape of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner prior to start of work. If photographs are used provide a written narrative describing conditions in photographs. If video taped provide a verbal narrative of the conditions being video taped.

1.4. JOB CONDITIONS

- A. Occupancy: Owner will occupy portions of the building under and next to areas of demolition. Conduct demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 48 hours advance notice to Owner of demolition activities that will affect Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of structures to be demolished.

SECTION 02070

DEMOLITION

- C. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
1. Storage or sale of removed items on site will not be permitted.
 2. The Owner reserves the right to claim any and /or all demolished materials, equipment, etc. The Contractor shall coordinate with the Owner and arrange to turn over any materials, and equipment by the Owner.
- D. Protection: Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to selective demolition work.
1. Provide protective measures as required to provide free and safe passage of Owner's Personnel and general public to occupied portions of building.
 2. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
 3. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
 4. Remove protection at completion of work.
 5. Damages : Promptly repair damages caused to adjacent facilities by demolition work.
 6. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1. DEMOLITION

- A. General : Perform demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
1. Promptly remove debris to avoid imposing excessive loads on supporting walls, roof decks, or framing.
 2. Remove no more existing roofing than can be covered in one day by new roofing.
- B. If unanticipated mechanical, electrical or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner in written accurate detail. Pending receipt of directive from Owner rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

SECTION 02070
DEMOLITION

3.2. DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site. Use chutes to remove debris, rubbish, and other materials from roof. Furnish dumpsters or other suitable containers for the materials being demolished. Do not allow demolished materials to accumulate on-site.

3.3. CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment, protection and demolished materials from site.
 - 1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start of operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION

SECTION 01433 – ROOFING MANUFACTURER’S FIELD SERVICES

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 07 Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes Manufacturer’s field services for roofing assemblies.
- B. Related Sections:
 - 1. Section 07 05 00 - Common Work Results for Thermal and Moisture Protection.

1.3 REFERENCES

- A. International Building Code (current edition) or local authority building code.
- B. American Society of Civil Engineers (ASCE): ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- C. Factory Mutual Global (FMG): Roof Assembly Classifications.
- D. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- E. American National Standards Institute and Single Ply Roofing Institute (ANSI/SPRI): ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal

1.4 SUBMITTALS FOR REVIEW

- A. Product Data: Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.
- B. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.
- C. Roofing System Manufacturer’s Evaluation: Provide a comprehensive written assessment comparing available roofing solutions with validation of why the roofing system selection for the specific project is suitable and appropriate

- D. Roofing System Manufacturer's Report Form: Provide a copy of the report form utilized by the roofing system manufacturer for progress inspections to monitor installation and quality.
- E. Online Reporting Capabilities. Provide a sample of the roofing system manufacturer's online roof inspection report as well as information about how long inspection reports are available to owner.

1.5 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Submit installation instructions and recommendations indicating special precautions required for installing the membrane.
- B. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual Global, Underwriters Laboratories, Warnock Hersey or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.
- C. Manufacturer's Certificate: Certify that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- D. Manufacturer's Certificate: Submit a certified copy of the roofing manufacturer's ISO 9001 compliance certificate.
- E. Written certification from the roofing system manufacturer certifying the applicator is currently authorized for the installation of the specified roof system.
- F. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7, Method 2 for Components and Cladding. In no case shall the design loads be taken to be less than those detailed in Design and Performance Criteria article of this specification.
- G. Qualification data for firms and individuals identified in Quality Assurance Article below.
- H. Test Reports: Submit ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal Products.
- I. Substitutions: Products proposed as equal to the products specified for this project shall meet all of the requirements in the appropriate Division 7 specifications and shall be submitted for consideration at least 7 days prior to the date that bids must be submitted.
 - 1. Proposals shall be accompanied by a copy of the manufacturer's standard specification Section. That specification Section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take

place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.

2. Manufacturer's checklist will be accompanied with any substitution to verify equal performance characteristics to those specified in Division 7 specification.
3. The Owner's decision regarding substitutions will be considered final.

1.6 CONTRACT CLOSEOUT SUBMITTALS

- A. Project Warranty: Provide specified warranty for the Project, executed by the authorized agent of the Manufacturer.
- B. Roofing Maintenance Instructions: Provide a roof care and maintenance manual of manufacturer's recommendations for maintenance of installed roofing systems.
- C. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.
- D. Inspection Logs: Copy of inspection reports as performed by the manufacturer shall be submitted at project closeout and include photographic documentation of installation progress, weather conditions, and personnel on the project at the time of every inspection.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with not less than 12 years documented experience and have ISO 9001 certification.
- B. Installer Qualifications: Company specializing in specified roofing installation with not less than 5 years experience and authorized by roofing system manufacturer as qualified to install manufacturer's roofing materials.
- C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress. Maintain proper supervision of workmen.
- D. Maintain a copy of the roof plans, details, and specifications in the possession of the Supervisor/Foreman and on the roof at all times.
- E. Source Limitations: Obtain all primary components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer.
 1. The manufacturer providing the roofing system warranty must verify that they manufacture a minimum of 75% of the products utilized in the roofing system of this project. Products that are private labeled shall not be considered as manufactured by the roofing system supplier.

2. Upon request of the Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.
- F. Source Quality Control: Manufacturer shall have in place a documented, standardized quality control program such as ISO-9001.

1.8 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Roofing Conference: Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of roofing system installation and associated work.
- B. Require attendance of installer of each component of associated work: installers of deck or substrate construction to receive roofing work: installers of rooftop units and other work in and around roofing that must precede or follow roofing work and including mechanical work: owner: roofing system manufacturer's full time employee: and other representatives directly concerned with performance of the Work, including where applicable owner's insurers, testing agencies and governing authorities. Objectives of conference include:
1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.
 2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.
 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
 4. Review roofing system requirements (drawings, specifications and other contract documents).
 5. Review required submittals both completed and yet to be completed.
 6. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
 7. Review required inspection, testing, certifying and material usage accounting procedures.
 8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
 9. Record discussion of conference including decisions and agreements (or disagreements) reached and furnish a copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
- C. The Owner's Representative will designate one of the conference participants to record the proceedings and promptly distribute them to the participants for record.
- D. The intent of the conference is to resolve issues affecting the installation and performance of roofing work. Do not proceed with roofing work until such issues are resolved to the

satisfaction of the architect of record. This shall not be construed as interference with the progress of Work on the part of the owner.

1.9 MANUFACTURER'S INSPECTIONS

- A. When the Project is in progress, a full-time employee of the roofing system manufacturer must provide the following:
 - 1. Report progress and quality of the work as observed. Progress reports must be published to an online system as referenced in Section 1.4.
 - 2. Provide periodic (minimum of 3 days per week) roofing installation inspections: Inspections must include; photographic documentation of work in-progress and written statements of compliance with details/shop drawings.
 - 3. Report to the owner in writing any failure or refusal of the contractor to correct unacceptable practices called to the contractor's attention.
 - 4. Confirm after project completion that the manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.10 WARRANTY

- A. Upon completion of installation, and acceptance by the owner, the manufacturer will supply to the owner the specified warranty.
- B. Installer will submit a five (5)-year workmanship warranty to the membrane manufacturer with a copy directly to the owner.
- C. The roofing system manufacturer must have been in continuous business operation for a period of time at least as long as the length of the roof system warranty provided for this project.

1.11 DESIGN AND PERFORMANCE CRITERIA

- A. Uniform Wind Uplift Load Capacity (required for each roof section). See attached Wind Uplift Calculation.
- C. Dead Load: Loading of the roof structure, due to tear off of existing, and/or installation of new roofing materials shall not exceed the present loading. There will be no additional weight added to the structure
- D. Drainage Calculations: Drainage shall be calculated for all roof areas to determine suitability of all plumbing and gutter accommodations are sized appropriately to manage storm water runoff.

PART 2 — PRODUCTS (NOT USED)

PART 3 — EXECUTION

3.1 EXECUTION, GENERAL

- A. Comply with requirements of related Division 07 Section.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
- B. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.

3.3 FIELD QUALITY CONTROL

- A. Roofing Manufacturer Representative shall perform field inspection as specified in Article titled: MANUFACTURER'S INSPECTIONS above. Inspections must include photographic documentation of installation progress, weather conditions, and personnel on the project at the time of inspection
- B. Correct defects or irregularities discovered during field inspection. Issues deemed defective must be re-inspected and determined suitable by the roofing manufacturer
- C. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system. A copy of the specification shall also be on site at all times.
- D. Frequent progress meetings shall be conducted during the performance of roof system installation and must be attended by the owner, roofing system manufacturer's full-time employee, and other representatives directly concerned with performance of the work.

3.4 FINAL INSPECTION

- A. At the completion of the roofing installation and associated work, meet with contractor, installer, installer of associated work, owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.
- B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. Notify the owner upon completion of corrections.

- D. The roofing system manufacturer reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the roofing contractor.
- E. If core cuts verify the presence of damp or wet materials, the roofing contractor shall be required to replace the damaged areas at his own expense.
- F. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.
- G. Immediately correct roof leakage during construction. If the contractor does not respond within twenty four (24) hours, the owner may exercise rights to correct the Work under the terms of the Conditions of the Contract.

END OF SECTION 01433

SECTION 06100
ROUGH CARPENTRY

PART I GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Special Conditions and other Division-0 and Division-1 Project Manual Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following: Wood grounds, nailers, and blocking.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
- C. Division 6 Section "Finish Carpentry" for non-structural carpentry items exposed to view and not specified in another Section.

1.3. DEFINITIONS

- A. Rough carpentry includes carpentry work not specified as part of other Sections and generally not exposed, unless otherwise specified.

1.4. SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Material certificates for dimensional lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected.
- C. Wood treatment data as follows including chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material:
 - 1. For each type of preservative treated wood product include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
 - 2. For water-borne treated products include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.

1.5. DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

PART 2 PRODUCTS

2.01 LUMBER, GENERAL

- A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Grade Stamps: Provide lumber with each piece of factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
 - 1. For exposed lumber furnish with grade stamps applied to ends or back of each piece; or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.
- C. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
 - 1. Provide dressed lumber, S4S, unless otherwise indicated.
 - 2. Provide lumber with 15 percent maximum moisture content at time of dressing and shipment sizes 2 inches or less in nominal thickness, unless otherwise indicated.

2.2. DIMENSION LUMBER

- A. For light framing (2 to 4 inches thick, 2 to 12 inches wide) provide the following grade and species:
"Construction" grade.

2.3. MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.
- C. Grade: "Standard" grade light-framing-size lumber of any species or board-size lumber as required. "No. 3 Common" or "Standard" grade boards per WCLIB or WWPA rules or "No. 2 Boards" per SPIB rules.

2.4. FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, roofing work, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or AISI Type 304 stainless steel.

2. Nails, Wire, Brads, and Staples: FS FF-N-105.
Screws: FS FF-S-111.
Bolts and Screws: FS FF-B-575.
Nuts: FS FF-B-836.
Washers: FS FF-W-92.

2.5. PRESERVATIVE WOOD TREATMENT BY PRESSURE PROCESS

- A. General: All lumber or plywood is to be Preservative-treated wood or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood) Mark each treated item with the AWPB or SPIB Quality Mark Requirements. All wood blocking used for roofing work is to be preservative-treated.
- B. Pressure-treat above-ground items with water-borne preservatives to a minimum retention of 0.25 pcf. For interior uses, after treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Treat indicated items and the following:
 1. Wood cants, nailers, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood framing members less than 19 inches above grade.
- C. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces to comply with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces

PART 3 EXECUTION

3.1. INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow attachment of other construction
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.
- E. Countersink nail heads on exposed carpentry work and fill holes.
- F. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections

between members. Install fasteners without splitting of wood; pre-drill as required.

- G. Under base bid, add wood blocking to all curbs as required to raise the top of the curb a minimum of 8" above the finished roof surface.

3.2. WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement

END OF SECTION 06100

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07160 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Cold applied asphalt bitumen damp/water proofing on all exterior face of foundation walls, as well as all exterior face of CMU prior to installation of cavity insulation and masonry veneer.

1.02 RELATED WORK

- A. Section 04200 Masonry

1.03 REFERENCES

- A. ANSI/ASTM D41 - Asphalt Primer Used in Roofing, Damp proofing and Waterproofing.
- B. ANSI/ASTM D449 - Asphalt Used in Damp proofing and Waterproofing.
- C. ANSI/ASTM D450 - Coal-tar Bitumen Used in Roofing, Damp proofing and Waterproofing.
- D. ANSI/ASTM D491 - Asphalt Mastic Used in Waterproofing.
- E. ASTM D43 - Creosote Primer Used in Roofing, Damp proofing and Waterproofing.

1.04 QUALITY ASSURANCE

- A. Applicator: Company specializing in bituminous waterproofing systems with 5 years minimum experience.

1.05 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Indicate properties of primer, bitumen and mastic.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient and surface temperatures above 40 degrees F for 24 hours before application, and continuously until damp proofing has cured.

PART 2 - PRODUCTS

2.01 BITUMEN MATERIALS

- A. Asphalt: ANSI/ASTM D449, Type I.
- B. Asphalt Primer: ANSI/ASTM D41, compatible with substrate.
- C. Asphaltic Sealing Mastic: ANSI/ASTM D491.
- D. Coal-tar: ANSI/ASTM D450, Type I.
- E. Coal-tar: ASTM D43, creosote type.
- F. Coal-tar Sealing Mastic: Coal-tar bitumen filled with mineral dust and mineral fibers, to mastic consistency.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify surfaces are solid, free of frozen matter, loose particles, cracks, pits, rough projections, and foreign matter detrimental to adhesion and application of damp proofing.
- B. Do not apply damp proofing to damp, frozen, dirty, dusty or deck surfaces.
- C. Verify items which penetrate surfaces to receive dampproofing are securely installed.
- D. Beginning of installation means acceptance of substrate.

3.02 PREPARATION

- A. Clean and prepare surfaces to receive damp proofing in accordance with manufacturer's instructions.
- B. Apply mastic to seal penetrations, small cracks, and honeycomb in

substrate.

3.03 APPLICATION

- A. Prime surfaces in accordance with manufacturer's instructions.
- B. Apply cold bitumen with mop.
- C. Apply one coat, continuous and uniform at a rate.
- D. Seal watertight items projecting through damp proofing surface with mastic.

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SECTION 07190 – MASONRY SEALANTS

07190.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

07190.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of caulking and all related work, complete, in strict accordance with the Contract Drawings and as specified herein or reasonably implied.
 - a. Seal all exterior masonry and precast with TAMMS CHEMSTOP WB HEAVY DUTY WATER REPELLENT

07190.0300 DELIVERY AND STORAGE

1. Deliver, store and handle materials in a manner to prevent the inclusion of foreign materials and damage. Deliver and store packaged materials in original sealed containers until ready for use. Deliver materials in ample time to facilitate inspection and test.

07190.0400 SAMPLES

1. Submit the following samples of material for approval, in accordance with the requirements of the Supplementary General Conditions:
 - a. Field apply 24" x 24" sample for review

07190.0500 MATERIALS

1. CHEMSTOP WB HD is water based, oligomeric siloxane/silane, ready to use deep penetrating water repellent. CHEMSTOP WB HD is colorless when dry, non-staining, non-yellowing, and non-film sealer used for protecting concrete and masonry surfaces without altering the appearance or the texture of the treated surface. CHEMSTOP WB is breathable, non-flammable and complies with current federal AIM VOC regulations.
2. USES: CHEMSTOP WB HD repellent is used above grade on vertical surfaces to minimize water penetration, reduce efflorescence, and aid in minimizing spalling due to freeze-thaw cycles. It also protects against ultraviolet degradation, airborne dirt, smog, industrial fumes, acid rain, and most other atmospheric chemicals.

07190.0600 APPLICATION

1. General: Apply in accordance with the manufacturer's instructions as approved by the Architect and as herein specified.
2. Preparatory work:
 1. SURFACE PREPARATION: Cure new concrete 28 days before application. Surface must be structurally sound, clean, dry, free of dust, dirt, paint, efflorescence, laitance, and other contaminants that will prevent the proper penetration of CHEMSTOP WB. Prior to application joints or cracks must be properly sealed or filled. If acid is used for cleaning, neutralize completely before CHEMSTOP WB application. A dry substrate allows better penetration of the sealer.
 2. APPLICATION TECHNIQUES: Low pressure airless spray equipment is the method of application. Application should be from the bottom up to ensure uniform product distribution. Apply a saturation coat with a 6-8” controlled rundown. Two saturation coats of CHEMSTOP WB HD shall be required, applied using a “wet on wet” technique. Apply a test patch to evaluate surface appearance and effectiveness of the coverage rate.
 3. CLEAN-UP INSTRUCTIONS: Clean drips, runs, and overspray residue while still wet, using detergent and water. CHEMSTOP WB will not etch common glass and spills and overspray onto glass can be easily removed with a damp cloth. Dried material may require mechanical abrasion for removal. Clean application and spray equipment with detergent and water immediately following use.

SECTION 00 72 00 - GENERAL CONDITIONS

PART 1 — GENERAL

1.1 DEFINITIONS

- A. The contract document consists of the AGREEMENT, the GENERAL CONDITIONS of the contract, the DRAWINGS and the SPECIFICATIONS, including all revisions hereto.
- B. The Owner, the Contractor and the Owner's Representative shall be indicated as such throughout these documents. The term Contractor as used herein shall designate the successful bidder to whom the roof contract is awarded.
- C. The term Owner shall be understood to be Center Moriches Fire District.

1.2 OWNER'S REPRESENTATIVE STATUS

- A. The Owner's Representative shall have general Rights of Inspection of the work and is the agent of the Owner in all matters pertaining to the work as provided in the Contract Documents. The Owner's Representative has the authority to stop work whenever such stoppage may be necessary to ensure the proper execution of the contract and shall have authority to reject any and all materials, whether worked or unworked, if such materials are not in accordance with the plans and specifications.

1.3 CONDITION OF SITE

- A. The bidders shall visit the site before submitting their bids and determine the field conditions affecting their work. In considering the bids, the Owner will assume that the bidders are aware of all items, pertinent to their work and have made allowance for same in their bids.

1.4 VERIFICATION OF DIMENSIONS AND ELEVATIONS

- A. Dimensions and elevations indicated on the drawings in reference to existing structures or utilities are the best available data obtainable but are not guaranteed by the Owner's Representative and the Owner's Representative will not be responsible for their accuracy. Before bidding on any work dependent upon the data involved, the Contractor shall field check and verify all dimensions, grades, lines, levels or other conditions of limitations at the site to avoid construction errors. If any work is performed by the Contractor or any of his/her sub-contractors prior to adequate verification or applicable data, any resultant extra cost for adjustment of work as required to conform to existing limitations, shall be assumed by the Contractor without reimbursement or compensation by the Owner.

1.5 PROTECTION OF OWNER'S OPERATIONS

- A. The Contractor shall erect such barriers, tarpaulins, doors, etc., as may be necessary to protect the Owner's operations while work is in progress. Any such openings that are essential to carrying on the work shall be securely closed by the Contractor when not in use to protect the Owner's operations.

1.6 PROTECTION OF WORK AND PROPERTY

- A. The Contractor shall maintain adequate protection of all his/her work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He/she shall provide and maintain at all times any danger signs, guards and/or obstructions necessary to protect the public and his/her workmen from any dangers inherent with or created by the work in progress. He/she shall hold the Owner harmless from any loss arising due to injury or accident to the public or his/her workmen, or from theft of materials stored at the job site. All materials will

be stored in locations other than on roof surfaces except as necessary and shall then be placed on plywood or other type of material to protect the roof surface at all times.

- B. Before starting any work, the Contractor shall protect all grounds, copings, paving and exterior of all buildings where work will be performed.
- C. In those areas where materials will be raised to or lowered from the roof area, a protective covering shall be placed from the base of the wall extending up and over the top edge of the roof. This coverage shall be wide enough to assure that the exterior walls do not become stained or soiled during roofing operations.
- D. Any areas of the building or grounds which have become stained or damaged in any way shall be repaired or replaced by the Contractor prior to the final inspections. The method of repair used must be acceptable to both the Owner and the Owner's Representative.

1.7 MATERIAL STORAGE AND CLEAN-UP

- A. The Contractor shall keep the premises free from rubbish at all times and shall arrange his/her material storage so as not to interfere with the Owner's operations. At the completion of the job, all the unused material and rubbish shall be removed from the site. The ground shall be raked clean and the building shall be broom cleaned. If the Contractor refuses at any time to remove his/her debris from the premises, or to keep the working area clean, such cleaning will be completed by the Owner and deducted from the balance due the Contractor.
- B. The Contractor shall also remove drippage of bitumen or adhesive from all walls, windows, floors, ladders and finished surfaces. Failure to do so will result in the work being done by others and the cost shall be deducted from the balance due the Contractor.
- C. Materials must be delivered with manufacturer's label in tact and legible. Labels must be affixed to the outside of the package stating the type of product, name and address of the manufacturer. All materials shall be stored and protected against weather, vandalism, and theft. Any materials found to be damaged or missing shall be replaced by the Contractor at no cost to the Owner.

1.8 INSPECTION OF WORK

- A. Where the drawings or specifications require the inspection and approval of any work in progress by the Owner's Representative, the Contractor shall give that Representative ample notice to allow for scheduling the inspection, which shall be made promptly to avoid delay of work. If work has progressed without the required inspections or approval by the Representative, it shall be uncovered for inspection at the Contractor's expense.
- B. Uncovering of work not originally inspected, or uncovering questioned work may be ordered by the Owner's Representative and it shall be done by the Contractor. If examination proves such work to be incorrectly done or not done in accordance with the plans and specifications, the Contractor shall bear all cost of the reexamination. If the work is proven correctly installed, all such expense shall be born by the Owner.

1.9 INSPECTION OF WORK IN PROGRESS AND UPON COMPLETION

- A. If directed by the Owner's Representative, the Contractor shall cut not more than four (4) cores, of approximately 200 square inches each, from every newly constructed roof area, in order to establish the amount of materials used per square foot, and shall restore all such areas to sound and watertight conditions as prior to the core testing.
- B. In the event that such core cuts disclose any deficiency in materials, or soundness of construction, the Contractor shall, at his/her own expense, apply additional materials or otherwise correct the deficiencies to the satisfaction of the Owner's Representative.

- C. Noncompliance with the terms of this specification and ensuing contract can result in either the cancellation of the contract, or complete replacement of the defective areas at the Contractor's expense. In the event of cancellation, the Owner will not be obligated to compensate the Contractor for any work undertaken in a defective manner.
- D. Damages caused by water infiltration resulting from the failure of the Contractor to secure each day's work in a weather tight manner, will be corrected at the Contractor's expense. Included as damages will be all labor costs incurred by the Owner as a result of such water infiltration.
- E. The Owner will require the Owner's Representative to examine the work in progress, as well as upon completion, in order to ascertain the extent to which the materials and procedures conform to the requirements of these specifications and to the published instructions of the Manufacturer.
- F. The authorized Owner's Representative shall be responsible for:
 - 1. Keeping the Owner informed on a periodic basis as to the progress and quality of the work;
 - 2. Calling to the attention of the Contractor those matters he/she considers to be in violation of the contract requirements;
 - 3. Reporting to the Owner any failure or refusal of the Contractor to correct unacceptable practices;
 - 4. Conducting preliminary and subsequent job-site meetings with the Contractor's official job representative;
 - 5. Supervising the taking of test cuts, and the restoration of such areas;
 - 6. Rendering any other inspection services which the Owner may designate; and
 - 7. Certifying, after completion of the work, the extent to which the Contractor has complied with these specifications as well as to the published instructions of the Manufacturing Company.
- G. The presence and activities of the Owner's Representative shall in no way relieve the Contractor of his/her contractual responsibilities.

1.10 MISCELLANEOUS UTILITIES

- A. Electrical power will be furnished by the Owner for small tools only. All connections to the electrical system will be furnished by the Contractor.
- B. Water for concrete, mortar, washing and drinking purposes will be furnished by the Owner. Any connections to the water system shall be completed by the Contractor.
- C. At the completion of the work, or when the above connections are no longer required, the Contractor shall remove all connections and leave the facilities in a condition at least as satisfactory as prior to the commencement of his/her work.
- D. Toilet facilities will be provided by the Contractor. The Contractor will be responsible for supplying a portable toilet on the job-site. The Contractor's personnel are not permitted to enter the building without proper authorization from the Owner or Owner's Representative.

1.11 CHANGES OR EXTRA WORK

- A. The Owner may, without invalidating the original contract, order such changes or additions as may from time to time be deemed desirable. In so doing, the contract price shall be adjusted, as stated below, with all work being done under the conditions of the original contract except for such adjustments in extension of time as may be acceptable to the Owner. The value of such extra work shall be determined in one of the following ways:
 - 1. By firm price adjustment;
 - 2. By cost plus with a guaranteed maximum;
 - 3. By cost with a fixed fee; or

4. By unit cost.

- B. If agreement is reached that the extra cost shall be handled as per methods 2, 3, or 4, the Contractor shall keep and compile a correct amount of the cost together with such vouchers, etc., as may be necessary to substantiate same for presentation to the Owner. The Owner's Representative shall have authority to make minor job changes or additions as may be necessary to expedite the job providing such changes do not involve additional material cost. No major change or addition shall be made except upon receipt by the Contractor of a signed order from the Owner authorizing such a change. No claims for an extra to the contract price shall be valid unless so authorized.
- C. All work covered by unit prices submitted by the Contractor in his/her proposal must be covered by a written work order. The Owner's Representative will prepare the work order in triplicate covering the quantity of work and the total cost of the work. The work order which will be written at the end of each day, will be signed by the Owner's Representative and the Contractor's foreman and/or superintendent.

1.12 CORRECTION OF WORK PRIOR TO FINAL PAYMENT

- A. The Contractor shall promptly remove any work that does not meet the requirements of the plans and specifications or is incorrectly installed or otherwise disapproved by the Owner or the Owner's Representative as failing to meet the intent of the plans and specifications. The Contractor shall promptly replace any such work without expense to the Owner and shall bear the cost of making good all work of other contractors, or the Owner, destroyed or damaged by such removal or replacement.

1.13 CORRECTION OF WORK AFTER FINAL PAYMENT

- A. The Contractor shall guarantee all materials and workmanship for five (5) years from date of final payment of the contract by the Owner. Any defects which may arise during this period shall be promptly repaired by the Contractor including any damage done to the Owner's property due to such defects.

1.14 DEDUCTION FOR UNCORRECTED WORK

- A. If the Owner deems it unacceptable to have the Contractor correct work which has been incorrectly done, a deduction from the contract price shall be agreed upon therefore. Such a deduction from the contract price shall in no way affect the Contractor's responsibility for defects which may occur nor his/her ability for correcting them, and damage caused by them.

1.15 LIENS

- A. The Contractor shall, if required by the Owner, furnish him/her with a release in full of all liens arising out of this contract or in lieu thereof, and receipts in full for all materials and labor on the job. In either case, the Contractor shall furnish an affidavit that the liens or receipts include all the labor and material for which a lien could be filed. In lieu of the above, the Contractor may at his/her option furnish a bond to indemnify the Owner against all hazard of liens. Neither part nor final payment shall in any way release the Contractor from the above obligation and in the event that part or full payment has been made and any lien remains undischarged, the Contractor shall refund to the Owner the necessary funds to discharge such a lien including all cost and attorney's fees.

1.16 JOB CONDITIONS

- A. All surfaces to be covered shall be clean, dry, and free from dirt, debris, and foreign material before any of this work is installed. The Contractor shall be responsible for guarding against fires, and shall provide suitable fire extinguishers conveniently located at the site. Competent operators shall be in attendance at all times equipment is in use. Materials shall be stored neatly in areas designated by the Owner and dispersed so as to present a minimum fire hazard. Loads placed on the roof at any point shall not exceed the safe load for which the roof is designed.

- B. There is NO SMOKING allowed inside any buildings and the Contractor shall be responsible for enforcement of this job rule at all times with his/her personnel.
- C. The Contractor should be aware of Owner's property when tearing off the existing roof. This is required for removal of dirt, silt, debris, roof membrane and insulation from the roof surface in order to preserve the ecology, eliminate unsightly conditions and protect building surfaces. Specific locations will be discussed at the pre bid conference.
- D. Rolled Roofing Materials: All rolled roofing materials must be stored standing on end on a pallet or otherwise raised off of the roof. The materials are to be covered in a proper manner to assure that they will not become wet prior to application. Any materials that becomes wet or damaged must be removed from the job-site and replaced at the Contractor's expense.
- E. Ladders: Any ladders used on this project must be in good condition. The ladder must also be secured at the roof line at all times while in use. All ladders must be O.S.H.A. approved.
- F. No drugs or alcoholic beverages are permitted on the grounds.
- G. The Contractor shall place necessary barriers and/or protection around or under all work areas where his/her operations involve risk of injury to plant personnel.
- H. The Contractor will also protect the building structure from damage in the process of the job. In the event that damage does occur to any property or equipment, or the Owner's work in process, notification must be made within two (2) working days of the incidents to the Owner and Owner's Representative.
- I. During the progress of the job, if waste material and rubbish are found or damage resulting from the Contractor's operations is found, or the Contractor does not comply with the requirement by keeping the premises free of accumulations and correct the damage, it shall be the Owner's prerogative to hire personnel to do so; and the cost of this work will be deducted from the balance due the Contractor.
- J. Existing roof top equipment walls, windows, etc. shall be completely protected by masking or other effective methods. Any mastics or asphalt must be cleaned off metal surfaces.
- K. The Contractor is responsible for protecting all materials from the elements. If any material, such as insulation, becomes wet, it cannot be installed and must be replaced at the Contractor's expense. NOTE: Insulation and rolled roofing materials must be covered with waterproof tarps at the end of each work day. Plastic wrappers supplied by the insulation manufacturer are not acceptable substitutes for tarps. The Owner's Representative will reject any covering method or material which does not adequately protect roofing materials.
- L. Anyone guilty of willful destruction or unlawful removal of company property will be dismissed from the job and is subject to prosecution by law.
- M. Any lawns damaged by Contractor vehicles will be restored with a stand of grass at the Contractor's expense. Any damaged pavements will likewise be restored and at the Contractor's expense.
- N. The Contractor must verify that all materials can be installed to accommodate the building design, pertinent codes and regulations, and the manufacturer's current recommendations.
- O. The Contractor will ensure that all substrates are clean, dry, sound, smooth, and free of dirt, debris, and other contamination before any materials are supplied.

1.17 WORKMANSHIP

- A. All materials will be securely fastened and placed in a watertight, neat and workmanlike manner. All workmen shall be thoroughly experienced in the particular class or work upon which they are employed. All work shall be done in accordance with these specifications and shall meet the approval of the Owner or Owner's Representative. The Contractor's representative or job supervisor shall have a complete copy of specifications and drawings on the job-site at all times.
- B. Contractor shall plan and conduct the operations of the work so that each section started on one day is complete and thoroughly protected before the close of work for that day.

1.18 NOT USED

1.19 ROOF DECK

- A. Contractor shall notify the Owner or Owner's Representative of any unforeseen areas of damage. Where the damage is serious and extensive, it will be the Owner's prerogative to authorize removal and replacement of deteriorated roofing, insulation and repair of the vapor barrier, if present. Where damage to the roof deck is found, the Contractor shall furnish the Owner with a unit price for removal and replacement of the damaged deck.

1.20 SAFETY

- A. Contractor shall conform to requirements as designated by the United States Federal Government (O.S.H.A.). Contractor shall abide by all regulations as outlined in the O.S.H.A. handbook and shall have a handbook on location at all times.
- B. Contractors hereby acknowledged that they and their workers have undergone Safety Training and shall at all times act in compliance with all NRCA recommended safety compliance rules and regulations.

1.21 INSURANCE

- A. The following standard indemnity agreement and minimum insurance requirements are incorporated in the Specifications for all work performed by Contractors for the Owner, its affiliated and associated organizations or subsidiaries, hereinafter referred to as Owner.
 - 1. THE CONTRACTOR AGREES TO INDEMNITY AND SAVE THE OWNER AND OWNER'S REPRESENTATIVE HARMLESS FROM AND AGAINST ANY AND ALL COSTS, LOSS AND EXPENSE, LIABILITY DAMAGES, OR CLAIMS FOR DAMAGES, INCLUDING COST FOR DEFENDING ANY ACTION, ON ACCOUNT OF ANY INJURY TO PERSONS (INCLUDING DEATH) OR DAMAGE TO OR DESTRUCTION OF PROPERTY OF THE OWNER, ARISING OR RESULTING FROM THE WORK PROVIDED FOR OR PERFORMED, OR FROM ANY ACT, OMISSION, OR NEGLIGENCE OF THE CONTRACTOR, SUBCONTRACTOR AND THEIR AGENTS OR EMPLOYEES. THE FOREGOING PROVISIONS SHALL IN NO WAY BE DEEMED RELEASED, WAIVED OR MODIFIED IN ANY RESPECT BY REASON OF ANY INSURANCE OR SURETY PROVIDED BY THE CONTRACTOR.
 - 2. All sub-contractors are required to file Certificates of Insurance properly completed and signed by an authorized insurance company representative before their work commences on the job or job site. No monies will be paid until the acceptable certificates are on file with the Contractor. Such certificates shall provide that there will be no cancellation, reduction or modification of coverage without thirty (30) days prior written notice to the Contractor. In the event such certificates are not provided to the Contractor prior to commencement of work, Contractor's failure to demand such certificates shall not be deemed a waiver of Subcontractor's requirement to obtain the subject insurance.

3. The Contractor shall provide and maintain standard fire, extended coverage perils, vandalism and malicious mischief insurance to protect the interest of both the Contractor and the Owner for materials brought into the job or stored on the premises. Such insurance shall be for 100% of the insurable value of the work to be performed including all items of labor and materials incorporated therein, materials stored at the job-site to be used in completing the work, and such other supplies and equipment incidental to the work as are not owned or rented by the Contractor, the cost of which are included in the direct cost of the work. This insurance shall not cover any tools, derricks, machinery, tar buckets, ladders, engines, workmen's quarters, boilers, pumps, wagons, scaffolds, forms, compressors, shanties, or other items owned or rented by the Contractor, the cost of which is not included in the direct cost of the work.
4. In accordance with Section 1.21, the Contractor and subcontractor(s) shall maintain the following insurance:
 - a. Workmen's Compensation and Employer's Liability Insurance affording:
 - 1) Protection under the Workmen's Compensation Law of the States in which the work is performed; and
 - 2) Employer's Liability protection subject to a minimum limit of \$100,000.
 - b. Comprehensive General Liability Insurance in amounts not less than:
 - 1) Personal Injury: \$1,000,000 per person
(including bodily injury) \$1,000,000 per occurrence
 - 2) Property Damage: \$1,000,000 per occurrence
 - c. Comprehensive Automobile Liability Insurance in the following minimum amounts:
 - 1) Bodily Injury \$1,000,000 per person
\$1,000,000 per occurrence
 - 2) Property Damage \$1,000,000 per occurrence
 - d. This insurance shall:
 - 1) Include coverage for the liability assumed by the Contractor under this section.
 - 2) Includes coverage for:
 - a) Premises, operations and mobile equipment liability.
 - b) Completed operations and products liability.
 - c) Contractual liability insuring the obligation assumed by the subcontractor in this agreement.
 - d) Liability which subcontractor may incur as a result of the operations, acts or omissions of subcontractors, suppliers or material men and their agents or employees; and
 - e) Automobile liability including owned, non-owned and hired automobile.
 - e. All coverage will be on an occurrence basis and on a form acceptable to the Contractor.
 - 1) Include completed operation coverage which is to be kept in force by the Contractor for a period of not less than one year after completion of the work provided for or performed under these specifications;
 - 2) Not be subject to any of the special property damage liability exclusions commonly referred to as the exclusions pertaining to blasting or explosion, collapse or structural damage and underground property;
 - 3) Not be subject to any exclusion of property used by the insured or property in the case, custody or control of the insured or property as to which the insured for any purpose is exercising physical control; and
 - 4) The Certificates of Insurance furnished by the Contractor shall show by specific reference that each of the foregoing items have been provided for.
5. The Certificates of Insurance furnished by the Contractor as evidence of the Insurance maintained by him shall include a clause obligating the Insurer to give the Owner thirty (30) days prior written notice or cancellation of any material change in the insurance.

1.22 WORK HOURS AND DAYS

- A. When the Contract is awarded, the Contractor will contact the Owner's Representative to arrange the work schedule and the hours of the day that the workmen may be on the building. The job is to be bid under the assumption that all work will be performed on a straight time basis.

1.23 COMPLIANCE WITH LAWS

- A. The Contractor shall give notices, pay all fees, permits and comply with all laws, ordinances, rules and regulations bearing on the conduct of work.

1.24 OWNER'S RULES

- A. The Contractor and all his/her personnel/agent(s) shall abide by all rules created by the Owner. The Contractor must contact the Owner's Representative for specific information regarding the rules governing all operations of the project.
- B. The Contractor shall properly notify all employees of conditions relating to roof areas with very poor condition and which will be worked on. After such notification, the Contractor must take all necessary precautions to ensure the safety of his/her employees as well as the building personnel.
- C. THE CONTRACTOR SHALL "HOLD HARMLESS" THE MATERIAL MANUFACTURER, AGAINST ANY LITIGATION ARISING FROM ANY ACCIDENTS DURING THE COURSE OF THE CONTRACT.

1.25 SAFETY AND ECOLOGY

- A. The Contractor(s) shall conform to the requirements as designated by the United States Federal Governments (e.g., O.S.H.A.).

1.26 ANTI-DISCRIMINATION IN EMPLOYMENT

- A. Contractors and subcontractors shall not discriminate against any employees or applicant for employment, to be employed in performance of his/her contract, with respect to his/her hire, tenure, terms, conditions or privileges of employment because of his/her race, color, gender, sexual preference, religion, national origin, or ancestry.

PART 2 — INSTRUCTIONS TO BIDDERS

2.1 WITHDRAWAL OR MODIFICATION OF BID

- A. Any Bidder may withdraw his/her bid at any time before the scheduled closing date of the bid by appearing in person or by sending an authorized representative of the Bidder. An appointment should first be scheduled by calling the Owner's Representative. The Bidder or his/her representative shall be asked to sign, in writing that the bid was returned to him/her. After the withdrawal from the contract, the Bidding Contractor may not resubmit them.

2.2 BID OPENINGS

- A. Bids will be opened at the owner's convenience. Notice of award will be made by written correspondence.

2.3 QUESTIONS

- A. Technical questions regarding this bid can be directed to: Tim Roth troth@garlandind.com

- B. If the Contractor feels a conflict exists between what is considered good roofing practice and these specifications, he/she shall state in writing all objections prior to submitting quotations.
- C. It is the Contractor's responsibility, during the course of the work, to bring to the attention of the Owner's Representative any defective membrane, insulation or deck discovered which has not been previously identified.

2.4 RESPONSIBILITY FOR MEASUREMENTS AND QUANTITIES

- A. The Bidding Contractors shall be solely responsible for all accuracy of all measurements and for estimating the material quantities required to satisfy these specifications.

2.5 DISCREPANCIES AND ADDENDA

- A. Should a Bidder find any discrepancies in the Drawings and Specifications, or should he be in doubt as to their meaning, he/she shall notify the Owner's Representative at once, who will send a written Addendum to all Bidders concerned. Oral instructions or decisions, unless confirmed by Addenda, will not be considered valid, legal or binding.
- B. No extras will be authorized because of the Contractor's failure to include work called for in the Addenda in his/her bid.
- C. It shall be the responsibility of all Bidders to call to the Owner's Representative's attention at the pre bid meeting, any discrepancies which may exist between or with any of the contract documents, or any questions which may arise as to their true meaning.
- D. Modifications to the specifications (if necessary) will be followed by an addendum; no verbal discussions or agreements shall be recognized.

2.6 COMPETENCY OF THE BIDDER

- A. To enable the Owner to evaluate the competency and financial responsibility of a Contractor, the low Bidder shall, when requested by the Owner, furnish the information indicated in Section 5.0 below, entitled Contractor's Qualification Statement, which shall be sworn to under oath by him/her or by a properly authorized representative of the Bidder.

2.7 DISQUALIFICATION OF BIDDERS

- A. Any one or more of the following causes may be considered sufficient for the disqualification of a Bidder and the rejection of his/her bid(s):
 - 1. Failure to attend the pre bid meeting;
 - 2. Evidence of collusion among Bidders;
 - 3. Lack of responsibility as revealed by either financial, experience or equipment statements, as submitted;
 - 4. Lack of expertise as shown by past work, and judged from the standpoint of workmanship and performance history;
 - 5. Uncompleted work under other contracts which, in the judgment of the Owner, might hinder or prevent the prompt completion of additional work if awarded; or
 - 6. Being in arrears on existing contracts, in litigation with an Owner, or having defaulted on a previous contract.

2.8 NOTICE OF AWARD

- A. The award of this contract for the work is contingent upon receipt of an acceptable bid. Any part of or all bids may be rejected. All bids shall be good for a period of sixty (60) days following the date the bids are due. The contract shall be deemed as having been awarded when the formal notice of acceptance of his/her proposal has been duly served upon the intended awardee by an authorized officer or agent of the Owner.

2.9 WARRANTY

- A. A written warranty which will commence from date of acceptance by Manufacturer must be supplied with the roof installation.
- B. A five (5) year workmanship warranty is required from the Contractor for all remedial maintenance done under the terms of this contract.

2.10 START AND COMPLETION DATE

- A. Work shall begin within thirty (30) days from the award of this contract, or as agreed upon by the parties.
- B. All work as required in these specifications and drawings shall be completed within ninety (90) days of the start date, or as agreed upon by the parties.
- C. Unless work is hampered by long periods of inclement weather, by due proof of material unavailability, the Owner will assess a penalty in the amount of \$500.00 a day for each day beyond the agreed completion date.
- D. The Contractor is responsible for supplying trained workmen in proper numbers and for scheduling and laying out his/her work, so that it will be started and completed in a professional manner within the time period indicated on his/her Proposal form.
- E. If the Contractor sets equipment onto the job-site without commencing work immediately, the action will be considered "Spiking the job" which is unacceptable and will be considered a breach of contract by the Contractor; thereby, the contract will be terminated and the Contractor at no cost to the Owner, must remove his/her equipment and possessions from the job-site upon notification by the Owner.

2.11 PAYMENT

- A. Each invoice shall be accompanied by a detailed estimate of the amounts and values of labor expended and materials purchased up to the last day of the preceding month. The amount of the invoice shall not exceed ninety percent (90%) of the labor and material values estimated for the preceding month.
- B. Such payments shall be viewed by both parties as progress payments and shall not in any way relieve the Contractor of performance obligations under this contract, nor shall such payments be viewed as approval or acceptance of work performed under this contract.
- C. Final payment shall be withheld until all provisions of the specifications are met, including all necessary clean-up, and the Owner receives written verification of completion.
- D. Upon completion of the job, the Owner, the Owner's Representative, and the Contractor will make final inspection of the work done, and the Owner's Representative will sign a completion slip authorizing final payments.
- E. Contractor shall have a pre-approved line of credit from the material supplier.

- F. Final payment shall be made to the Contractor no later than thirty (30) days after job approval, providing the Contractor submits waivers of lien with his/her final invoice indicating that all suppliers have been paid.

2.12 NOT USED

2.13 TERMINATION BY THE OWNER FOR CAUSE

- A. The Owner may terminate the contract and finish the work by whatever reasonable method he/she deems expedient if the Contractor:
 - 1. Persistently or repeatedly refuses to supply specified materials or to provide enough skilled workers to ensure the project will be completed within the time period indicated on his/her Proposal form;
 - 2. Fails to make payment to sub-contractors and/or suppliers for labor and materials as stipulated in the contract documents; and
 - 3. Is guilty of substantial breach of a provision of the contract documents.
- B. When the Owner terminates the contract for any of the above reasons, the Contractor shall not be entitled to receive further payment until the work is finished. If the unpaid balance of the contract sum exceeds the cost of finishing the work, it will be paid to the Contractor. If the cost to finish the work exceeds the unpaid balance, the Contractor shall pay the difference to the Owner.

2.14 COMPLIANCE WITH LAWS

- A. The Contractor shall give notices, pay all fees, permits and comply with all laws, ordinances, rules and regulations bearing on the conduct of work.

PART 3 — CONTRACTOR'S INSTRUCTIONS

3.1 TAXES

- A. Contractor must comply with all state, federal and local taxes. The Contractor shall accept sole and exclusive responsibility for any and all state and federal taxes with respect to Social Security, old age benefits, unemployment benefits, withholding taxes and sales taxes.

3.2 CONTRACTOR'S LICENSE

- A. All pertinent state and local licenses will be required.

3.3 QUALIFICATION OF BIDDERS

- A. As per plans and specifications.

3.4 BUILDING PERMITS

- A. The acquisition of the applicable permits and associated costs to obtain said permits will be the responsibility of the successful Contractor.

3.5 JOB COORDINATION

- A. Contractor is responsible for daily communication with the Owner or Owner's Representative relating to areas of roof work in order that the Owner may adequately protect tenant's personal belongings, and the people themselves

against possible damage or injury. Contractor is also responsible for policing and protecting areas involving removal and replacement of roof projections, defective decking or other work involving deck penetration.

- B. Twenty-four hours prior to starting of the project and/or delivery of materials, the Contractor shall notify: the Owner's representative and the membrane manufacturer.

3.6 CLEAN-UP

- A. Accumulated debris shall be removed periodically to assure maximum safety and sanitation at all times. At completion of work, the Contractor shall remove all excess material and debris from the site and leave all roof surfaces free from accumulations of dirt, debris and other extraneous materials. The Contractor shall also remove any and all drippage of bituminous materials from the face of the buildings, floor, window, ladders and other finished surfaces.

3.7 SUPERINTENDENT

- A. The Contractor shall keep a competent superintendent, satisfactory to the Owner and Owner's Representative, on the job at all times when work is in progress. The superintendent shall not be changed without notifying the Owner and the Owner's Representative unless the superintendent ceases to be in the employ of the Contractor.
- B. The superintendent shall represent the Contractor in his/her absence and all directions and instructions given to the superintendent shall be as binding as if given directly to the Contractor.
- C. The superintendent shall be responsible for the conduct of all the Contractor's employees on the premises and shall promptly take necessary measures to correct any abuses called to his/her attention by the Owner.

3.8 INSPECTIONS

- A. Before any material applications are made, the Owner or his/her representative and the material supplier representative shall be available to ensure a complete understanding of the specification.
- B. A final inspection shall be conducted by Owner, Contractor, and the Owner's Representative upon being notified of completion of specified work and clean-up.

PART 4 — STATEMENT OF POLICY

4.1 ENGINEERING

- A. In addition to high-quality products, the Material Manufacturer provides recommendations and/or specifications for the proper installation of its material. However, the Material Manufacturer does not, nor does its representative, practice engineering or architecture. The Material Manufacturer makes no judgments on, and hereby disclaim any responsibility for the soundness of any roof deck or other structural component of buildings upon which the Material Manufacturer products are applied, and further recommend a structural engineer to examine the deck conditions.

4.2 GUARANTEES

- A. A roofing guarantee is available for review from the Material Manufacturer for the roofing systems published in these specifications. The guarantee will be issued only upon completion of all the guarantee requirements by an approved Contractor. Such guarantees cannot be altered or amended, nor may any other warranties, guarantees or representations be made by an agent or employee of the Material Manufacturer unless such alteration, amendment or additional representation is issued in writing and is signed by a duly authorized officer of the Material Manufacturer, and sealed with the Material Manufacturer seal. This guarantee does not cover cosmetic deficiencies. THE

MATERIAL MANUFACTURER WILL NOT BE RESPONSIBLE FOR ANY DAMAGES TO THE BUILDING OR ITS CONTENTS OR ANY OTHER CONSEQUENTIAL DAMAGES, AND ITS RESPONSIBILITY IS LIMITED TO REPAIRING LEAKS. The Contractor will warranty the roof to the Material Manufacturer for a period of five (5) years.

4.3 APPROVED CONTRACTORS

- A. The roof systems must be applied only by those contractors who have received approval from the Material Manufacturer for such installations. No guarantees will be issued when installation has been performed by a non-approved contractor. The contractor must show a minimum of five years of experience in installing this type of roof system.

4.4 ROOFING SEQUENCE

- A. Sequence according to plans and specifications.

4.5 ACCEPTABILITY OF COMPLETED WORK

- A. The acceptability of completed roofing work will be based on its conformance to the contract requirement. The Material Manufacturer is not obligated to accept non-conforming work, and such non-conforming work may be rejected. The rejected work shall be promptly replaced or corrected in a manner and by methods approved by the Material Manufacturer at the Contractor's expense. The Material Manufacturer will instruct the Contractor's foreman and work crew on the proper methods of installation of the roofing system, and will follow-up on a regular basis to inspect the work being done. Any deficiencies from the specified work noted by the Material Manufacturer will be immediately reported to the Owner, along with recommended corrective actions necessary. The Material Manufacturer will not act in a supervisory capacity, and will not be responsible for the Contractor's errors or omissions.

4.6 ENGINEERING AND ROOF DECK

- A. The Material Manufacturer nor its representatives, practice engineering nor architecture. It makes no judgments on, and hereby disclaim any responsibility for the soundness of any roof deck or other structural component of buildings upon which its products are applied. Re-roofing and general building structuring require certification from a structural engineer that the structure will support the proposed additional weight. In addition, the Contractor must notify the Owner or his/her representative on the job-site of any unforeseen areas of wet insulation. Where the damage is serious and extensive, it will be the Owner's prerogative to authorize removal and replacement of deteriorated roofing, insulation and repair of the vapor barrier if present. Where damage to the roof deck is found, the Contractor shall furnish the Owner with a unit price for removal and replacement of the damaged deck.

4.7 ASBESTOS IDENTIFICATION

- A. The Material Manufacturer routinely conducts roof surveys and inspections in order to provide recommendations and/or specifications for the use of its products. However, the MATERIALS MANUFACTURER IS NOT, NOR ARE ITS REPRESENTATIVES, CERTIFIED TO IDENTIFY, HANDLE OR MONITOR ASBESTOS IN ROOFING, DECKING OR INSULATION. THEREFORE, IT MAKES NO JUDGMENTS ON AND HEREBY DISCLAIMS ANY RESPONSIBILITY FOR IDENTIFYING, HANDLING OR MONITORING ASBESTOS. If a building owner suspects that an asbestos condition exists on or under the roof area in question, Material Manufacturer can recommend licensed laboratories and technicians that can identify, remove, dispose of, and monitor the project.

4.8 ASBESTOS LIMITATIONS

- A. The Owner has been informed, acknowledges and agrees that Material Manufacturer is not engaged in the business of identifying, abating, encapsulating or removing asbestos or asbestos containing materials from the work site and has not agreed to do so herein.

- B. IN CONSIDERATION OF THE PROVISION HEREOF, THE OWNER HEREBY AGREES TO INDEMNIFY, DEFEND AND HOLD HARMLESS THE MATERIAL MANUFACTURER, ITS OWNERS, OFFICERS, DIRECTORS, EMPLOYEES AND AGENTS, INCLUDING THE ENGINEER FROM AND AGAINST ANY AND ALL LIABILITIES, DAMAGES, LOSSES AND EXPENSES (INCLUDING BUT NOT LIMITED TO ATTORNEY'S FEES) ARISING OUT OF, OR RELATING TO, ANY CLAIMS, DEMANDS, OR CAUSES OF ACTION OF ANY KIND, ATTRIBUTABLE TO, ARISING OUT OF, OR RELATING TO THE PRESENCE OF ASBESTOS OR ASBESTOS-CONTAINING MATERIALS ON OR AT THE WORK SITE AND/OR THE ABATEMENT, ENCAPSULATION AND/OR THE REMOVAL THEREOF.

4.9 MOLD LIMITATIONS

- A. The Garland Company makes no representation or warranty, express, implied, or otherwise, regarding mold, fungi, rust, corrosion or other bacteria or organism. Neither shall Garland have any duty to identify, nor accept any responsibility or liability for any claims associated with mold, fungi, rust, corrosion or other bacteria or organism related claims.

END OF SECTION 00 72 00 - GENERAL CONDITIONS

SECTION 07213 - BOARD INSULATION AND BATT INSULATION

07213.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements" which form a part hereof whether attached hereto or not.

07213.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of all rigid insulation and batt insulation and related work, complete, in strict accordance with the Contract Drawings and as herein specified, or reasonably implied.
 - a. Blanket and batt, type insulation (R-11 in 4" walls and R-19 in 6" walls at all interior walls within the facility, R-30 at attic roof framing).
 - b. 2" rigid insulation at inside face of interior walls between metal furring where indicated on plans.
 - c. 2" Rigid insulation at masonry cavity walls.
 - d. 2" Rigid insulation at inside face of all foundation walls and extending 24" minimum into interior building area under slabs, typical all areas.

07213.0300 SHOP DRAWINGS

1. Submit product literature for approval of the following items herein specified in accordance with the requirements of the Supplementary General Conditions.

07213.0400 SAMPLES

1. Submit for approval in accordance with the requirements of the Supplementary General Conditions, samples of all materials herein specified as requested by the Architect and as follows:
 - a. Insulations.

07213.0500 GUARANTEE

1. The Contractor shall and hereby does guarantee all workmanship and materials entering into this Section of the specifications to be free of all leaks and other defects for a period of five years. Should any defects in the work develop within the five year period, the Contractor shall and hereby does agree to repair such defective work and to make all repairs to work of others damaged in correcting the defective work, and further, he agrees to and shall repair or replace work of others damaged by leaks in his

defective work without additional cost to the Owner. All repairs shall be made within five (5) days after notice to the Contractor. Such guarantee shall be made in writing to the Owner and transmitted to the Architect.

07213.0600 MATERIALS

1. General: Materials shall be delivered in unbroken containers, stored and handled so as to prevent inclusion of foreign substances and damage by water or breakage. All manufactured materials shall bear the manufacturer's labels. All materials shall be the product of one manufacturer.
2. All bat insulation shall be either mineral wool or fiberglass batts with vapor barrier of a width to fit between framing. Vapor barrier to warm side.
3. Rigid insulation shall be 2" thick Dow Styrofoam SM Brand rigid insulation with aged R-value of 10 in accordance with ASTM C518. Insulation board shall meet Physical Property Requirements of Federal Spec. HH-1-524C, Type IV, and ASTM C578, Type IV.

07213.0700 PRELIMINARY INSPECTION

1. Before starting work, carefully examine surfaces on which work of this Section is dependent. Check and verify lines, elevations, contours, and general condition of preliminary work. Any defects in surfaces to which materials of this Section are to be applied must first be corrected. Report any unsatisfactory conditions to the Architect before starting work, and do not commence work until so directed by the Architect. Start of installation will be considered acceptance of preceding work and acceptance of responsibility for correcting defects.

07213.0800 COOPERATION

1. Coordinate work of this section with work of contiguous trades under this and other Contracts. Flashings built into masonry shall be formed in advance so as not to delay work.

* * * * *

SECTION 07220
ROOF INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Inspect the deck to be sure it is dry, sound and clean of all dirt dust and debris. Replace drains with new cast iron drains and drain strainers.
- B. Mechanically fasten polyisocyanurate insulation to the deck. Rigid insulation is to be attached to the deck using fastening patterns specified in wind uplift calculations. Tapered insulation is needed to establish a **minimum ¼:12 slope** over the roof area.
- C. Install crickets as needed to navigate the equipment curbs and rails. The subsequent layers of tapered insulation including the crickets will be mechanically fastened.
- D. One layer of 3/8" Secure Rock or ½" primed DensDeck shall be mechanically fastened with the insulation to the deck. Stagger all joints in both directions.
- E. Provide all labor, equipment, and materials to install roof insulation over the properly prepared substrate.

1.2 RELATED SECTIONS

- A. Drawing and general provisions of the Contract, including General Supplementary Conditions Apply to this Section.
- B. RELATED SECTIONS
 - 1. Section 07550 - Modified Bitumen Roofing
 - 2. Section 07720 - Roof Accessories

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's specification data sheets for each product in accordance with General Conditions.
- B. Certification
 - 1. Submit roof manufacturer's certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
 - 2. Submit certification that insulation and fastening system furnished is Tested and Approved by Factory Mutual for I-90 Wind Up-Lift Requirements.

1.4 QUALITY ASSURANCE

- A. Fire Classification

It is the intent of this specification to provide a roof system with a Class A fire rating. The descriptions given below are general descriptions. The insulation, recovery board, and other components shall be as required by the membrane manufacturer to provide a Class A fire resistance rating.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Store all insulation materials in manner to protect them from the wind, sun, and moisture damage prior to and during installation. Any insulation that has been exposed to any moisture shall be removed from the project site.
- C. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins)
- D. Store materials off the ground. Any warped or broken insulation boards shall be removed from the site.

PART 2 - PRODUCTS

2.1 APPROVED EQUIVALENT

- A. Contractor must submit any product not specified a minimum five days before the bid date to Owner in order for product to be considered for approval. The Owner will notify Contractor, in writing, of decision to accept or reject request.

2.2 INSULATION MATERIALS

- A. Provide thicknesses of insulation as indicated, provide combination of types and thicknesses to provide a complete system.

1. POLYISOCYANURATE ROOF INSULATION

- a. Qualities: Factory Tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
- b. Insulation board shall meet the following requirements
 - 1. UL, WH or FM listed under Roofing Systems
 - 2. Federal Specification HH-I-1972, Class 1
- c. Physical Properties

Dimensional Stability	ASTM D2126	2% max.
Compressive Strength	ASTM D1621	25 psi min.
Vapor Permeability	ASTM E-96	1 perm max.
Foam Core Density	ASTM D-1622	2.0 pcf min.
Water Absorption	ASTM C209	<1%
R-Factor HR per inch		
Thickness	ASTM C518	5.6 (Design Value)

2. RECOVERY BOARD

- a. Qualities: Impact resistant, nonstructural fiber-reinforced gypsum panels.

1. Board Size: 4'x4'.
2. Thickness: Minimum ½".

- b. Source
 1. SecureRock, USG Corp.
 2. DensDeck
- c. Insulation board shall meet the following requirements
 1. UL, WH, FM listed under Roofing Systems.
 2. Federal Specification LLL-I-535-B

2.3 RELATED MATERIALS

- A. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes/shapes indicated, matching insulation board or of perlite or organic fiberboard, as per the approved manufacturer.
 1. Acceptable Manufacturers
 - a. Celotex
 - b. International Permalite, Inc.
 - c. Approved Equivalent

PART 3 - EXECUTION

3.1. INSPECTION OF SURFACES

- A. Roofing contractor shall be responsible for preparing and adequate substrate to receive insulation.
 1. Verify that work which penetrates roof deck has been completed.
 2. Verify that wood nailers are properly and securely installed.
 3. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness.
 4. Do not proceed until defects are corrected.
 5. Do not apply insulation until substrate is sufficiently dry.
 6. Broom clean substrate immediately prior to application.
 7. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.
 8. Verify that temporary roof has been completed.

3.3 CLEANING

- A. Remove debris and cartons from roof deck. Leave insulation clean and dry, ready to receive roofing membrane.

END OF SECTION

SECTION 07225 - EPS BOARD ROOF DECK INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Tapered EPS board roof deck insulation system for use as an acceptable and recommended substrate for project roofing system.

1.02 REFERENCES

- A. American Society for Testing & Materials (ASTM): C578-87a preformed, Cellular Polystyrene Thermal Insulation Spec for.
- B. The Society of the Plastics Industry, Inc. (SPI): ACCU-R EPS Program for product quality control and labeling program.
- C. Factory Mutual Research Corporation (FMRC)
 - 1. Loss Prevention Data Sheet I-28, current edition.

1.03 SYSTEM DESCRIPTION

- A. Description: EPS tapered roof deck insulation product specifically manufactured and recommended by manufacturer for compatibility with project roofing system for R-value and other physical properties indicated herein when tested in accordance with ASTM C578.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for specific EPS board roof deck insulation proprietary products affirming products do not contain chlorofluorocarbon (CFC) or hydrochlorofluorocarbon (HCFC).
- B. Samples: Submit three samples, 12" x 12" x 1" minimum, each specified EPS insulation product, identified with SPI ACCU-R quality assurance program label.
- C. Tapered Insulation Shop Drawings: Submit tapered EPS insulation shop drawings indicating layout, minimum and maximum thickness, slope direction, and placement sequence.

1.05 QUALITY ASSURANCE

- A. SPI ACCU-R Program: Comply with the quality assurance program of The Society of the Plastics Industry, Inc. (SPI) ACCU-R EPS program for appropriate testing, inspection, and review of product production practices for compliance with ASTM C578 requirements.
- B. Insurance Underwriter Requirements: Comply with owner's insurance underwriter's requirements for EPS roof deck insulation product for application with project roofing system.
- C. Factory Mutual Research Corporation (FMRC) Requirements: Comply with requirements for EPS roof deck insulation application with project roofing system.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Storage: Store and protect EPS roof deck insulation prior to installation from direct sunlight exposure and from weather to ensure insulation is dry when installed.

1.07 WARRANTY

- A. Manufacturer's Product Warranty: Submit manufacturer's standard warranty form for EPS board insulation R-value when tested for conformance with ASTM C578. This warranty is in addition to, and not a limitation of other rights Owner may have under Contract Documents.
 - 1. Warranty Period: 20 years from Date of Substantial Completion.
 - 2. Beneficiary: Issue warranty in the legal name of project Owner.
 - 3. Warranty Acceptance: Owner is sole authority who will determine acceptance of warranty document.

PART 2 - PRODUCTS

- A. Tapered EPS Board:
 - 1. Thickness 3" Minimum.
 - 2. Slope: 1/8"/LF

2.01 INSULATION MATERIAL

A. Material Standard: Comply with ASTM C578 for EPS board roof insulation.

1. Type II.

2.02 ROOF INSULATION BOARD

A. Molded EPS Board Insulation: Rigid, closed cell, lightweight, thermal insulation formed by the composition of hydrogen and carbon atoms in a closed mold to comply with ASTM C578-87a for type indicated as follows:

1. Type II: 1.35 pcf minimum density, R-value of 4.55 and 4.17 at 40 degrees F and 75 degrees F (4.4 degrees C and 23.9 degrees C), respectively.

PART 3 - EXECUTION

3.01 INSULATION

- A. General: Install EPS board insulation in single or multiple layers to achieve required R-value, extending EPS insulation over entire roof deck surface to be installed, cutting and fitting around projections and obstructions. Form cant strips, crickets, and tapered areas for positive drainage of roofing system.
- B. Insulation Board Joints: Stagger EPS board insulation joints in one direction for each course. For multiple layers, stagger joints in both directions between courses with no gaps to form a complete thermal envelope.
- C. Exposure: Do not install more EPS insulation in a day than can be covered with roofing membrane before end of work day or before start of weather conditions which can damage EPS insulation.
- D. Adhered Single-Ply Membrane Re-Roof: Install EPS board insulation over roof deck fully adhered and mechanically secured to deck substrate.
- E. Install boards with FM 60 fasteners at a rate of 1 fastener per 2 sq. ft. Provide fastener in each corner typical.

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SECTION 07240

EXTERIOR INSULATION AND FINISH SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Field constructed exterior insulation and finish systems adhered to substrates indicated below.
2. PB system consists of adhesive-base coat, insulation board, reinforcing fabric, and soft base and acrylic finish coats recommended by wall system manufacturer adhered to rigid substrate.

1.02 QUALITY ASSURANCE

A. Qualifications, additional:

1. Manufacturer, for other than named manufacturers: Minimum ten years experience in manufacturing products in United States of America for use in the United States of America.
2. Installer:
 - a. Certified by EIFS manufacturer; include original certification date, recertification dates, as applicable, and names of individuals trained from installer's staff.
 - b. Completed five Projects, minimum, of comparable magnitude using specified system in last three years except for water managed system.
 - c. Submit project reference list for review and verification; non-verifiable projects will be cause for installer rejection.
 - d. Indicate, in writing, trained individuals on staff who will be on-site daily during Project progress.

B. Regulatory requirements; indicate compliance with UBC Standard 26-4 demonstrated by either paragraph below:

1. ASTM E108-83, modified.
2. ASTM E84-80 fire testing apparatus in combination with full scale multi-story fire evaluation.

C. Mock-ups:

1. Prepare full story height by 10'-0" minimum width on-site mock-up of installed items; location designated by Architect, for Architect's approval of panel construction, finish, color, and sealant installation. Include one detail for each penetration type, build-ups, control joints, flashing details, and terminations.
2. Obtain Architect's mock-up approval before beginning final installation.
3. In-place panels final acceptance will be based on sample panels appearance.
4. Mock-up may be accepted as part of finished installation at Architect's option.
5. Notify Architect in writing when mock-ups will be ready for review.

- D. Preinstallation conference:
1. Prior to wall system installation, preinstallation conference will be held to review work to be accomplished.
 2. Attenders:
 - a. Contractor.
 - b. EIFS manufacturer's representative.
 - c. Subcontractors: EIFS, window, door, waterproofing, flashing and sheet metal, and other subcontractors concerned with EIFS and adjacent construction installation.
 3. Notify Architect at least three days prior to meeting.
 4. Verify required submittals have been reviewed; verify acceptance of sample panel and mock-up.
 5. EIFS manufacturer and EIFS installer: Review and approve changes to previously reviewed penetration details.
 6. Record minutes of meeting; distribute to attending parties and Architect within seven working days of meeting and beginning work.

1.03 WARRANTY

- A. Special warranty:
1. Manufacturer: Warrant system for five year period against materials defects and water intrusion; include labor and materials required for repairs or remedial work at no additional cost.
 2. Installation:
 - a. Co-warrant installation with system manufacturer for two year period including water intrusion; include labor and materials required for repairs or remedial work at no additional cost.
 - b. Co-warranty sealant installation for same period indicated in Joint Sealants Section, WARRANTY Article.
 3. Begin warranties at Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable manufacturers:
1. Products specified as standard of quality are manufactured by Dryvit System, Inc.
 2. Products of manufacturers listed below meeting indicated standards and specified manufacturer's product data characteristics, except as modified below, are acceptable for use, subject to approval of product list and samples.
 - a. Finestone, Simplex Products Division.
 - b. STO Finish Systems, Division.
 - c. Senergy, Inc.

2.02 COMPONENTS

- A. Sheathing for EIFS: Section 07200.

- B. PB System; soft coat exterior insulation and finish system materials for water management system:
1. Moisture protective barrier; product quality standard: Dryvit System, Inc.; Backstop, 100% acrylic type high performance membrane.
 2. Adhesive; product quality standard: Dryvit System, Inc.; Primus, 100% acrylic type compatible with gypsum sheathing, insulation board, and reinforcing fabric.
 3. Portland cement, if required by listed manufacturers to meet system requirements: ASTM C150-96a, Type I.
 4. EPS insulation board:
 - a. Material:
 - 1) Field areas: ASTM C578-87a, Type VIII; grooved in accord with selected manufacturer's requirements.
 - 2) Detailed areas, include shaped cornices, complex trim and similar type areas: ASTM C578-87a, Type X.
 - b. Density:
 - 1) Field areas: 1.15 PCF, minimum.
 - 2) Detailed areas, include shaped cornices, complex trim and similar type areas: 1.35 PCF, minimum.
 - c. Thickness: 1", minimum at any point including rustications; required thicknesses and detailing indicated; exceeding code restricted thicknesses for fuel contribution of materials is prohibited.
 - d. Mark each board indicating code compliance; indicate information required by model code or other applicable codes in appropriate model code recognition and system manufacturer's hallmark.
 - e. "R" Factor @ 75°F: 3.80 per inch thickness for board aged minimum of seven weeks.
 - f. Residual pentane: Less than 0.5%.
 5. Reinforcing fabric:
 - a. Type: Balanced open weave mesh glass fiber fabric treated for compatibility with other system materials.
 - b. Weights:
 - 1) Standard duty; product quality standard: Dryvit System, Inc.; Dryvit Standard Mesh.
 - 2) Intermediate duty; product quality standard: Dryvit System, Inc.; Dryvit Intermediate Mesh.
 - 3) Heavy duty; product quality standard: Dryvit System, Inc.; Panzer Mesh.
 6. Other materials:
 - a. Flashing tape: Manufacturer's recommended highly adhesive rubberized asphalt compound bonded completely and integrally to high density cross laminated polyethylene film.
 - b. Vent assembly: Manufacturer's standard aggregate matrix material encased in EPS providing positive drainage capabilities.
 - c. Closure blocks and starter strips: Solid EPS blocks; 6" minimum height.
 - d. Vent tracks and "J" tracks at heads of penetrations and base of system above starter strip: Manufacturer's standard PVC engineered for required location; slotted for system base.
 7. Base coat; product quality standard: Dryvit System, Inc.; Primus, compatible with insulation board and reinforcing fabric.

8. Primers: May be required by system manufacturer as adhesion intermediaries.
9. Finish coat:
 - a. Type: Factory mixed integrally colored 100% acrylic finish system modified for texture product standard of quality indicated below.
 - b. Texture; product quality standard: Dryvit System, Inc.; Trowelable 100% Acrylic Finish Sandblast®; final texture approved by Architect under SUBMITTALS Article.
 - c. Colors: Refer to elevations
10. Water: Clean and potable.
11. Sealant: Two part polyurethane or one part silicone for working and control joints; listed and approved by system manufacturer for selected system; specified and installed in Joint Sealants Section.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protection:
 1. Protect surrounding areas and surfaces during wall system application.
 2. Protect system when work ceases or when area is completed to prohibit water infiltration behind system.
 3. Immediately cover tops of walls with final trim or temporarily protect to prevent water infiltration behind system.
 4. Coordinate cap flashing installation as soon as possible after finish coat installation.
- B. Protect exposed edges of system from weather with temporary polyethylene sheet covering at end of day's work. Secure covering in place.
- C. Install sealants in timely manner.

3.02 INSTALLATION

- A. Sheathing:
 1. Specified in Rough Carpentry Section.
 2. Correct unsatisfactory conditions before system application.
 3. Perform strictly in accord with selected system manufacturer's current published instructions.
 4. Mixing: Label materials requiring preparation in field with complete mixing instructions; follow instructions.
 5. Adhesive/insulation method: Apply in accord with EIFS manufacturer's installation instructions.
63. Standard reinforcing fabric and base coat:
 - a. Rasp flush EPS irregularities greater than 1/16" prior to base coat/reinforcing fabric application.
 - b. Apply base coat to entire EPS surface to 1/16" thickness DFT, minimum, in accord with ASTM PS49-96.

- c. Fully embed reinforcing fabric in wet base coat; trowel from center to edge of reinforcing fabric to avoid wrinkles. Install continuous reinforcing fabric at corners; lap minimum 2-1/2" at mesh joints.
- 74. Impact layers:
 - a. Higher impact performance may be accomplished by:
 - 1) Multiple layers of reinforcing fabric.
 - 2) Incorporating higher impact resistant fabrics.
 - 3) Using heavy duty mesh.
 - b. Install impact layer or layers at areas within 9'-0" above any exterior grade line or elevated platform. Install in accord with system manufacturer's installation instructions.
- 8. Finish application:
 - a. Allow base coat/reinforcing fabric application to set prior to finish coat application.
 - b. Apply finish coat to dry base coat; maintain wet edge at all times to obtain uniform appearance.
 - c. Finish coat thickness: Required by system manufacturer's installation instructions to obtain desired texture.
 - d. Match approved sample for finish texture and color.
 - e. Utilize same equipment and techniques to achieve finish uniformity and texture as sample.
- 9. Completed installation: Uniform and true to line and plane within 1/8" in 12'-0"; finished surfaces free of projections, irregularities, or telegraphing substrate.
- 10. Perform weathering sealant installation at control and expansion joints, door and window perimeters, and other EIFS penetrations under Joint Sealants Section only. Give notice for sealant application to prevent water intrusion into system. Install temporary cover until sealant installation is complete.

3.03 FIELD QUALITY CONTROL

- A. Manufacturer's field service:
 - 1. Provide services of qualified manufacturer's representative for weekly site visits during EIFS materials application.
 - 2. Verify applicator's installation methods are in accord with EIFS manufacturer's criteria.

3.04 CLEANING AND PROTECTION

- A. Remove stains or materials having adverse effect on finishes.
 - 1. Final clean not more than 48 hours prior to Date of Substantial Completion.
 - 2. Repair damaged areas; match adjacent area finish exactly or entire section may be required to be refinished.

END OF SECTION 07240

SECTION 07270 – FIRESTOPPING

PART 1 – GENERAL

1.01 SUMMARY

- A. Work Included: General Contractor shall be responsible for the firestopping installation and the work of this section shall include, but is not necessarily limited to the following:
1. Any and all penetrations (including by other trades) through fire resistance rated construction; including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 2. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
 3. Sealant joints in fire resistance rated construction at intersection of dissimilar materials including at wall and deck locations, etc.
 4. Furnishing of dams, clips and closures for support and containment of fire safing materials and installation of dams, clips and closures where possible to install after completion of floors, walls or other construction.
- B. Related Sections:
1. Section 03300 – Cast – In – Place Concrete
 2. Section 04200 – Unit Masonry
 3. Section 07210 – Building Insulation
 4. Section 07250 – Fireproofing
 5. Section 07900 – Joint Sealers
 6. Section 09255 – Gypsum Board Assemblies
 7. Division 15 and 16 – Mechanical and Electrical

1.02 QUALITY ASSURANCE

- A. Qualifications: The work of this section shall be performed by a qualified and experienced installer, acceptable to the Architect. The term “installer” as used herein, shall mean a firm of established reputation; which has been trained by the

Manufacturer in the proper installation of fire safing materials and which is regularly engaged in, and maintains a regular force of workmen skilled in the installation of fire safing materials of the type specified.

- B. Installer's Qualifications: Before proceeding with the work, submit three (3) copies of a list of several comparable projects of similar work that the installer has completed within the past five (5) years, giving the job locations, names of the owners, their telephone numbers and the date on which the work on each project was started and completed.

1.03 REFERENCES

- A. Codes and Regulations: Fire safing work shall conform to the New York State Fire Prevention and Building Code and all applicable regulations of governmental authorities having jurisdiction, including safety, health and anti-pollution regulations.

1.04 SUBMITTALS

- A. Product Data: Submit product data consisting of Manufacturer's latest published catalog information or technical description and installation instructions; obtain approval before materials are fabricated or delivered to the site.
- B. Test Reports: Submit three (3) certified copies of test reports, by an independent testing laboratory, approved by the Architect, indicating that the fire safing materials are in conformance with the requirements specified herein.
- C. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through penetration fire stop systems are installed per specified requirements.
- D. The School District may employ and pay a qualified inspection agency to check installed firestopping systems for compliance with requirements.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original tightly sealed containers or unopened packages, with legible mixing and application instructions.
- B. Store materials out of weather in original containers as recommended by manufacturer.

PART 2 – PRODUCTS

2.01 FIRESTOPPING, GENERAL

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
- B. Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with “System Performance Requirements” article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated systems. Accessories include but are not limited to the following items:
 - 1. Permanent forming/damming/backing materials including the following:
 - a. Semirefractory fiber (mineral wool) insulation.
 - b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
 - c. Fire rated form board.
 - d. Joint fillers for joint sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.
 - 6. Safing Clips.
 - 7. Metal support plates.
- C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

2.02 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

- A. Mineral Wool: Loose or formed mineral wool rated non-combustible when tested according to ASTM 136, free of asbestos and glass fiber, and suitable for stuffing to an in place density of 6 to 12 psf.
- B. Endothermic, Latex Compound Sealant: Single component, endothermic, latex formulation.
- C. Intumescent, Latex Sealant: Single component, intumescent, latex formulation.
- D. Intumescent Putty: Nonhardening, dielectric, water resistant putty containing no solvents inorganic fibers, or silicone compounds.
- E. Intumescent Wrap Strips: Single component, elastomeric sheet with aluminum foil on one side.
- F. Job Mixed Vinyl Compound: Prepackaged vinyl based powder product for mixing with water at project site to produce a paintable compound, passing ASTM E 136, with flame spread and smoke developed ratings of zero per ASTM E 84.
- G. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at project site to form a nonshrinking, homogenous mortar.
- H. Pillow/Bags: Re-usable, heat expanding pillows/bags composed of glass fiber cloth cases filled with a combination of mineral fiber, water insoluble expansion agents and fire retardant additives.
- I. Silicone Sealant: Moisture curing, single component, silicone based, neutral curing elastomeric sealant of grade indicated below:
 - 1. Grade: Pourable (self leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self leveling) grade for openings in floors and other horizontal surfaces.
 - 3. Grade for Vertical Surfaces: Nonsag grade for openings in vertical and other surfaces.

- J. Solvent Release Curing Intumescent Sealant: Solvent release curing, single component, synthetic polymer based sealant of grade indicated below:
1. Grade: Pourable (self leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
- K. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to the following:
1. Endothermic, Latex Sealant:
Fyre-Shield, Tremco Inc.
 2. Endothermic, Latex Compounds:
Flame-Safe FS500/600 Series, International Protective Coatings Corp.
Flame-Safe FS900/FST900 Series, International Protective Coatings Corp.
 3. Intumescent Latex Sealant:
Metacaulk 950, The RectorSeal Corporation
Fire Barrier CP 25WB Caulk, 3M Fire Protection Products.
 4. Intumescent Putty:
Series SSP, STI Spec Seal FireStop Products
Flame-Safe FSP1000 Putty, International Protective Coatings Corp.
Fire Barrier Moldable Putty, 3M Fire Protection Products.
 5. Intumescent Wrap Strips:
Series SSP, STI Spec Seal FireStop Products
Dow Corning Fire Stop Intumescent Wrap Strip 2002, Dow Corning Corp.
Fire Barrier FS-195 Wrap/Strip, 3M Fire Protection Products
 6. Job Mixed Vinyl Compound:
USG Firecode Compound, United States Gypsum Co.
 7. Mortar:
SpecSeal Mortar, STI Spec Seal FireStop Products
Novasit K-10 Firestop Mortar, Bio Fireshield, Inc.
KBS-Mortar Seal, International Protective Coatings Corp.
 8. Pillow/Bags:
Firestop Pillows, Bio Fireshield, Inc.
SpecSeal Pillows, STI Spec Seal FireStop Products
 9. Silicone Foams:
Pensil 200 Foam, STI Spec Seal FireStop Products

Dow Corning Fire Stop Foam 2001, Dow Corning Corp.

10. Silicone Sealants:

Dow Corning Firestop Sealant 2000, Dow Corning Corp.

Pensil 300, STI Spec Seal FireStop Products

CS240 Firestop Sealant, Hilti Construction Chemicals, Inc.

Metacaulk 880, The RectorSeal Corporation

11. Solvent Release Curing Intumescent Sealants:

Biostop 500 Intumescent Firestop Caulk, bio Fireshield, Inc.

Fire Barrier CP 25N/S Caulk, 3M Fire Protection Products

Fire Barrier CP25S/L Caulk, 3M Fire Protection Products

12. Mineral Fiber Fire Safing:

Therma Fiber Safing Insulation by USG Interiors Inc.

Fire Master Bulk, 3M

Fire Protection Products

2.03 MIXING

- A. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 – EXECUTION

3.01 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 firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.

2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form release agents from concrete.
- B. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

3.03 INSTALLING THROUGH-PENETRATION FIRESTOPS

- A. General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:
1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 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 Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
 4. Provide 20 gage minimum metal plates where required for fire safing support to comply with fire rating.

5. For mineral safing insulation, apply in continuous length using manufacturer's standard safing clips compress insulation until stable without movement.

3.04 INSTALLING FIRE-RESISTIVE JOINT SEALANTS

- A. General: Comply with "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depth of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.
- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint width that optimum sealant movement's capability. Install sealants at the same time joint fillers are installed.
- D. Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begin. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.05 FIELD QUALITY CONTROL

- A. Inspecting agency employed and paid by Government will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.
- B. Inspecting agency will report observations promptly and in writing to Contractor and Architect.
- C. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.
- D. Where deficiencies are found, repair or replace firestopping so that it complies with requirements.

3.06 CLEANING

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

- B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to produce firestopping complying with specified requirements.

SECTION 07300 - ROOF SHINGLES

07300.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements" which form a part hereof whether attached hereto or not.

7300.200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of all roof shingles and grade ice and water shield underlayment and related work, complete, in strict accordance with the Contract Drawings and as herein specified, or reasonably implied. Roof shingles to be "Hatteras" style by GAF, color selected by Owner. Provide stop flashings and related flashings at any and all junctions with dissimilar materials and surfaces.

07300.0300 SHOP DRAWINGS

1. Submit product literature for approval of the following items herein specified in accordance with the requirements of the Supplementary General Conditions.

07300.0400 SAMPLES

1. Submit for approval in accordance with the requirements of the Supplementary General Conditions, samples of all materials herein specified as requested by the Architect and as follows:
 - a. Insulations

07300.0500 GUARANTEE

1. The Contractor shall and hereby does guarantee all workmanship and materials entering into this Section of the specifications to be free of all leaks and other defects for a period of five years. Should any defects in the work develop within the five year period, the Contractor shall and hereby does agree to repair such defective work and to make all repairs to work of others damaged in correcting the defective work, and further, he agrees to and shall repair or replace work of others damaged by leaks in his defective work without additional cost to the Owner. All repairs shall be made within five (5) days after notice to the Contractor. Such guarantee shall be made in writing to the Owner and transmitted to the Architect.
2. Submit manufacturer's 40 year warranty including 5 year sure start protection.

07300.0600 MATERIALS

1. General: Materials shall be delivered in unbroken containers, stored and handled so as to prevent inclusion of foreign substances and damage by water or breakage. All manufactured materials shall bear the manufacturer's labels. All materials shall be the product of one manufacturer.
2. Roof shingles shall be Certainteed Hatteras with integral ridge and hip vents (shingle vent II) by Air Vent Inc.

07300.0700 PRELIMINARY INSPECTION

1. Before starting work, carefully examine surfaces on which work of this Section is dependent. Check and verify lines, elevations, contours, and general condition of preliminary work. Any defects in surfaces to which materials of this Section are to be applied must first be corrected. Report any unsatisfactory conditions to the Architect before starting work, and do not commence work until so directed by the Architect. Start of installation will be considered acceptance of preceding work and acceptance of responsibility for correcting defects.

07300.0800 COOPERATION

1. Coordinate work of this section with work of contiguous trades under this and other Contracts. Flashings built into masonry shall be formed in advance so as not to delay work.

SECTION 07550
MODIFIED BITUMINOUS MEMBRANE ROOFING
Display hidden notes to specifier. (Don't know how? [Click Here](#))

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Project Scope of Work – Metal Deck:

1. Remove existing roofing materials down to deck.
2. Mechanically fasten new ½" Dens Deck Prime and new polyiso insulation to obtain a minimum finished slope of 1/4:12, and a minimum of R-30. Install ½" crickets.
3. Torch apply Garland HPR Torch Base Sheet.
4. Torch apply Garland StressPly IV Plus Mineral Cap Sheet.
5. Install 2-ply flashings, same rolls, torch down.
6. Install new drain bodies.
7. Install new termination bars and ensure all flashings are counterflashed with metal, where needed.
8. Install new metal edging and copings in R-Mer Force.

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Torch Applied 2-Ply Asphalt Roofing (StressPly IV). (2.16)(3.8)
- B. Accessories. (2.19)

1.2 RELATED SECTIONS

- A. Section 06114 - Wood Blocking and Curbing: Wood nailers and cant strips.
- B. Section 07220 - Insulation Board: Insulation and fastening.
- C. Section 07620 - Sheet Metal Flashing and Trim: Weather protection for base flashings.
- D. Section 15120 - Piping Specialties: Roof Drains, Sumps.

1.3 REFERENCES

- A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- B. ASTM D 312 - Standard Specification for Asphalt used in Roofing.
- C. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
- D. ASTM D 1970 - Specification for Sheet Materials, Self-Adhering Polymer Modified Bituminous, Used as Steep Roofing Underlayment for Ice Dam Protection.
- E. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
- F. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- G. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.

- H. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.
- I. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
- J. ASTM D 6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
- K. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- L. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings
- M. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- N. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- O. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- P. ASCE 7, Minimum Design Loads for Buildings and Other Structures

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.
- B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings :
- C. Design Requirements:
 - 1. Uniform Wind Uplift Load Capacity – Wind Uplift Calculation to be provided

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.
- C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.
- D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins.
- E. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

- F. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.
- G. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. Testing must be performed at 77 deg. F. Tests at 0 deg. F will not be considered.
- H. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.7 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to commencing Work of this section.
- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
 - 1. Record minutes of the conference and provide copies to all parties present.
 - 2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
 - 3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.

- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.9 COORDINATION

- A. Coordinate Work with installing associated metal flashings as work of this section proceeds.

1.10 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.11 WARRANTY

- A. Upon completion of the work, provide the Manufacturer's written and signed NDL Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
 - 1. Warranty Period:
 - a. 30 years from date of acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: (**Basis of Design**): Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. ASD. Toll Free: 800-321-9336. Phone: 216-641-7500. Fax: 216-641-0633. Web Site: www.garlandco.com. Contact: Tim Roth (917) 662-7385 / troth@garlandind.com.
 - 1. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
 - 2. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors request for manufacturer substitution.

2.2 TORCH APPLIED 2-PLY ASPHALT ROOFING

- A. Base (Ply) Sheet:
 - 1. HPR Torch Base
- B. Modified Cap (Ply) Sheet:
 - 1. StressPly IV Plus Mineral:
- C. Flashing Base Ply:
 - 1. HPR Torch Base:
- D. Flashing Cap (Ply) Sheet
 - 1. StressPly IV Plus Mineral:

2.3 ACCESSORIES:

- A. Roof Insulation: In accordance with Section 07220.
- B. Roof Insulation: Provide G-P Gypsum DenDeck Prime.
- C. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel, Fasteners shall be self-clinching type of penetrating type as recommended by the deck manufacturer. Fasten nails and fasteners flush-driven through flat metal discs not less than 1 inch (25 mm) diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than 1 inch (25 mm) diameter are used.
- D. Glass Fiber Cant - Glass Cant: Continuous triangular cross Section made of inorganic fibrous glass used as a cant strip as recommended and furnished by the membrane

2.4 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. Pre-Manufactured Coping Cap: R-Mer Edge Coping Cap Cover and Splice Plate.
 - 1. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 24 gauge, 22 gauge or 20 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
 - 2. Aluminum, ASTM B209, alloy 3105-H14, in thickness of .040" nom. or .050" nom. or .063" nom
- B. Pre-Manufactured Coping Cap: R-Mer Edge Coping Chairs
 - 1. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 0.0635 nom./ 16 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
- C. Flashing Boot - Rubbertite Flashing Boot: Neoprene pipe boot for sealing single or multiple pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.
- D. Vents and Breathers: Heavy gauge aluminum and fully insulated vent that allows moisture and air to escape but not enter the roof system as recommended and furnished by the membrane manufacturer.

- E. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design.
- F. Drain Flashings should be 4lb (1.8kg) sheet lead formed and rolled.
- G. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.
- H. Liquid Flashing - Tuff-Flash LO: An asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings.
 - 1. Tensile Strength, ASTM D 412: 400 psi
 - 2. Elongation, ASTM D 412: 300%
 - 3. Density @77 deg. F 8.5 lb/gal typical
- I. Fabricated Flashings: Fabricated flashings and trim are specified in Section 07620.
 - 1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the CDA Copper Development Association "Copper in Architecture - Handbook" as applicable.
- J. Manufactured Roof Specialties: Shop fabricated copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are specified in Section 07710.
 - 1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the NRCA "Roofing and Waterproofing Manual" as applicable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Inspect and approve the deck condition, slopes and fastener backing if applicable, parapet walls, expansion joints, roof drains, stack vents, vent outlets, nailers and surfaces and elements.
- C. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- D. If substrate preparation and other conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. General: Clean surfaces thoroughly prior to installation.
 - 1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - 2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
 - 3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
 - 4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
 - 5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
 - 6. Fasteners and plates for fastening components mechanically to the substrate shall

- provide a minimum pull-out capacity of 300 lbs. (136 k) per fastener. Base or ply sheets attached with cap nails require a minimum pullout capacity of 40 lb. per nail.
7. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.
- B. Metal Deck: Metal deck shall be installed as specified in Section
1. Fastening of the deck should comply with the anticipated live and dead loads pertaining to the building as well as applicable Code.
 2. Steel decks shall be minimum 22-gauge factory galvanized or zinc alloy coated for protection against corrosion.
 3. Suitable insulation shall be mechanically attached as recommended by the insulation manufacturer.
 4. Decks shall comply with the gauge and span requirements in the current Factory Mutual FM Approval Guide and be installed in accordance with Loss Prevention Data Sheet 1-28 or specific FM approval.
 5. When re-roofing over steel decks, surface corrosion shall be removed, and repairs to severely corroded areas made. Loose or inadequately secured decking shall be fastened, and irreparable or otherwise defective decking shall be replaced.
- C. Cementitious Wood Fiber
1. Protect decks from the weather during storage and application. Any wet or deformed decking shall be removed and replaced.
 2. Cementitious wood fiber decks shall not be installed over high humidity occupancies.
 3. Cementitious wood fiber decks shall have a minimum design load as recommended by the deck manufacturer.
 4. Anchor cementitious wood fiber deck panels against uplift and lateral movement.
 5. Install deck level. Correct or replace deck with any deflection, irregularities, or otherwise damaged panels.
 6. Install a mechanically attached base sheet prior to installation of insulation or roofing membrane.
- D. Insulation: Roof insulation is specified in Section
1. All insulation and coverboard joints between layers should be staggered when multiple layers of insulation are installed. Insulation greater than 2.5 inches shall be installed in multiple layers.
 2. Insulation shall be kept dry at all times. Install only as much insulation as can be covered with completed roofing membrane before the end of the day's work or prior to onset of inclement weather.
 3. Edges shall butt tightly and all cuts shall fit neatly against adjoining surfaces to provide a smooth overall surface. Gaps of greater than 1/4 inch width shall be filled with insulation.
 4. Install 8' x 8' tapered insulation and coverboards around roof drains and penetrations to provide adequate slope for proper drainage.
 5. Mechanically attached insulation shall be fastened in accordance with code and insurance requirements for the applicable geographic zone with the required number and type of fasteners and plates.
- ### 3.3 INSTALLATION - GENERAL
- A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.
- B. General: Avoid installation of modified bitumen membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:

1. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
 2. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must be replaced with roll from a heated storage area.
- C. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water

3.4 INSTALLATION TORCH APPLIED 2-PLY ASPHALT ROOFING

- A. Base Ply: Install torch base sheet to a properly prepared substrate. Shingle in proper direction to shed water on each area of roofing.
1. Lay out the roll in the course to be followed and unroll 6 feet (1.8 m).
 2. Using a roofing torch, heat the surface of the coiled portion until the burn-off backer melts away. At this point, the material is hot enough to lay into the substrate. Progressively unroll the sheet while heating and press down with your foot to insure a proper bond.
 3. After the major portion of the roll is bonded, re-roll the first 6 feet (1.8 m) and bond it in a similar fashion.
 4. Repeat this operation with subsequent rolls with side laps of 4 inches (101 mm) and end laps of 8 inches (203 mm).
 5. Give each lap a finishing touch by passing the torch along the joint and spreading the melted bitumen evenly with a rounded trowel to insure a smooth, tight seal.
 6. Extend underlayment 2 inches (50 mm) beyond top edges of cants at wall and projection bases.
 7. Install base flashing ply to all perimeter and projections details.
- B. Modified Cap (Ply) Sheet: Over torch base sheet underlayment, lay out the roll in the course to be followed and unroll 6 feet (1.8 m). Stagger seams over the torch base sheet seams.
1. Using a roofing torch, heat the surface of the coiled portion until the burn-off backer melts away. At this point, the material is hot enough to lay into the substrate. Progressively unroll the sheet while heating and press down with your foot to insure a proper bond.
 2. After the major portion of the roll is bonded, re-roll the first 6 feet (1.8 m) and bond it in a similar fashion.
 3. Repeat this operation with subsequent rolls with side laps of 4 inches (101 mm) and end laps of 8 inches (203 mm).
 4. Give each lap a finishing touch by passing the torch along the joint and spreading the melted bitumen evenly with a rounded trowel to insure a smooth, tight seal.
- C. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and fasteners.
- D. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips as specified in Section 06114.
1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
 2. Wood nailers should match the height of any insulation, providing a smooth and even

- transition between flashing and insulation areas.
3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
 4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.
- E. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07620 or Section 07710. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.
- F. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if required.
- G. Flashing Base Ply:
1. Seal all curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 2. Prepare all walls, penetrations, expansion joints, and other surfaces to be flashed with asphalt primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 3. Adhere modified flashing base to the underlying base flashing ply with specified flashing ply adhesive. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 4. Solidly adhere the entire sheet of flashing membrane to the substrate. Tops of all flashings that are not run up and over curb shall be secured through termination bar 6 inches (152 mm) and sealed at top
 5. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and fiberglass mesh.
 6. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work.
 7. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work. When using mineralized cap sheet all stripping plies type IV felt / Versiply 40 shall be installed prior to cap sheet installation.
- H. Flashing Cap Ply: Install flashing cap sheets by the same application method used for the base ply.
1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 4. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
 5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
 6. All stripping shall be installed prior to flashing cap sheet installation.
 7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
 8. Secure the top edge of the flashing sheet using a termination bar only when the wall

surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.

- I. Roof Walkways: Provide walkways in areas indicated on the Drawings.

3.5 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

A. Pre-manufactured Snap-On Coping Cap:

1. Install miters first.
2. Position base flashing of the Built-Up and/or Modified Roofing membrane over the wall edge covering nailers completely, fastening 8 inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
3. Install minimum 16 gauge, 16 inch long by specified width anchor chair at [Contact Garland Representative] feet on center.
4. Install 6 inch wide splice plate by centering over 16 inch long by specified width anchor chair. Apply two beads of sealant to either side of the splice plate's center. Approximately 2 inches from the coping cap joint. Install Coping Cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.

B. Liquid Flashing:

1. Mask target area on roof membrane with tape.
2. Clean all non-porous areas with isopropyl alcohol.
3. Apply 32 wet mil base coat of liquid flashing over masked area.
4. Embed polyester reinforcement fabric into the base coat of the liquid flashing.
5. Apply 48-64 wet mil top coat of the liquid flashing material over the fabric extending 2 inches (51 mm) past the scrim in all directions.
6. Apply minerals immediately or allow the liquid flashing material to cure 15-30 days and then install reflective coating.

C. Roof Drain:

1. Plug drain to prevent debris from entering plumbing.
2. Taper insulation to drain minimum of 24 inches (609 mm) from center of drain.
3. Run roof system plies over drain. Cut out plies inside drain bowl.
4. Set lead/copper flashing (30 inch square minimum) in 1/4 inch bed of mastic. Run lead/copper into drain a minimum of 2 inches (50 mm). Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
5. Install base flashing ply (40 inch square minimum) in bitumen.
6. Install modified membrane (48 inch square minimum) in bitumen.
7. Install clamping ring and assure that all plies are under the clamping ring.
8. Remove drain plug and install strainer.

D. Pitch Pocket:

1. Run all plies up to the penetration.
2. Place the pitch pocket over the penetration and prime all flanges.
3. Strip in flange of pitch pocket with one ply of base flashing ply. Extend 6 inches (152 mm) onto field of roof.
4. Install second layer of modified membrane extending 9 inches (228 mm) onto field of the roof.
5. Fill pitch pocket half full with non-shrink grout. Let this cure and top off with pourable sealant.
6. Caulk joint between roof system and pitch pocket with roof cement.

3.6 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove asphalt markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.7 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.8 FIELD QUALITY CONTROL

- A. Inspection: Provide manufacturer's field observations at start-up and at intervals of approximately 30 percent, 60 percent and 90 percent completion. Provide a final inspection upon completion of the Work.
 - 1. Warranty shall be issued upon manufacturer's acceptance of the installation.
 - 2. Field observations shall be performed by a Sales Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
 - 3. Provide observation reports from the Sales Representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
 - 4. Provide a final report from the Sales Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

3.9 SCHEDULES

- A. Modified Cap (Ply) Sheet:
 - 1. StressPly IV Plus Mineral: 195 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced rubber modified roofing membrane with a fiberglass and polyester composite scrim. Designed for torch applications with a burn-off backer that indicates when the material is hot enough to be installed.
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in./min. @ 73.4 +/- 3.6 deg. F MD 310 lbf/in XD 310 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 54.25 kN/m XD 54.25 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in./min. @ 73.4 +/- 3.6 deg. F MD 510 lbf XD 510 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 2269 N XD 2269 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in./min. @ 73.4 +/- 3.6 deg. F MD 9% XD 8%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 9% XD 8%
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -40 deg. F (-40 deg. C)

- B. Flashing Base Ply:
1. HPR Torchbase: SBS modified, torch applied sheet material. ASTM D 6163, Type II.
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 210 lbf/in XD 210 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 210 lbf/in XD 210 lbf/in
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 300 lbf XD 300 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 1334 N XD 1334 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 6 % XD 6 %
 - 2) 50 mm/min @ 23 +/- 2 deg. C MD 6 % XD 6 %
 - d. Low Temperature Flexibility, ASTM D 5147:
 - 1) Passes -30 deg. F (-34 deg. C). Meets or Exceeds ASTM D 4601 Type II Performance Criteria.
- C. Surfacing:
1. Flashing Cap (Ply) Sheet:
 - a. StressPly IV Plus Mineral: 195 mil SBS (Styrene-Butadiene- Styrene) mineral surfaced rubber modified roofing membrane with a dual fiberglass scrim. This membrane is designed for torch applications and has a burn-off backer that indicates when the material is hot enough to be installed. Surfaced with a highly reflective Sunburst mineral.
 - 1) Tensile Strength, ASTM D 5147
 - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 225 lbf/in CMD 225 lbf/in
 - b) 50 mm/min. @ 23 +/- 3 deg. C MD 39.0 kN/m CMD 39.0 kN/m
 - 2) Tear Strength, ASTM D 5147
 - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 300 lbf CMD 300 lbf
 - b) 50 mm/min. @ 23 +/- 3 deg. C MD 1335 N CMD 1335 N
 - 3) Elongation at Maximum Tensile, ASTM D 5147
 - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 9% CMD 8%
 - b) 50 mm/min. @ 23 +/- 3 deg. C MD 9% CMD 8%
 - 4) Low Temperature Flexibility, ASTM D 5147: Passes -20 deg. F (-29 deg. C)
 - 5) Reflectivity (DNS Method) 73%

END OF SECTION

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Paratet flashings.
- B. Scuppers.
- C. Roof and sill flashings.
- D. Counterflashings over roofing.
- E. Counterflashings at roof mounted mechanical equipment and vent stacks.
- F. Counterflashings for roof hatches and skylights.

1.02 RELATED WORK

- A. Section 07530 Roofing.
- B. Section 07724 - Roof Hatches.
- C. Section 07900 - Joint Sealers.

1.03 REFERENCES

- A. ASTM B370 - Copper Sheet and Strip for Building Construction.
- B. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- C. CDA (Copper Development Association) - Contemporary Copper, A Handbook of Sheet Copper Fundamentals, Design, Details and Specifications.
- D. CDA - Copper Roofing - A Practical Handbook.
- E. FS O-F-506 - Flux, Soldering, Paste and Liquid.
- F. FS QQ-S-571 - Solder, Tin Alloy.
- G. NRCA (National Roofing Contractors Association) - Roofing Manual.

H. SMACNA - Architectural Sheet Metal Manual.

1.04 SYSTEM DESCRIPTION

A. Work of this Section is to physically protect membrane roofing and cavity walls, heads and sills, etc. from damage that would permit water leakage to building interior.

1.05 QUALITY ASSURANCE

A. Applicator: Company specializing in sheet metal flashing work with 5 years minimum experience.

1.06 SUBMITTALS

A. Submit product data under provisions of Section 01300.

B. Describe material profile, jointing pattern, jointing details, fastening methods, and installation details.

C. Submit manufacturer's installation instructions under provisions of Section 01300.

D. Submit samples under provisions of Section 01300.

1.07 STORAGE AND HANDLING

A. Store products under provisions of Section 01600.

B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation.

C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Copper: ASTM B370, cold rolled; 20 oz/sq ft, thick; natural finish.

2.02 ACCESSORIES

A. Fastener: Copper

- B. Underlayment: ASTM D266; No. 15 asphalt saturated roofing felt. 6 mil (0.15 mm) polyethylene.
- C. Slip Sheet: Rosin sized building paper.
- D. Bedding Compound: Rubber-asphalt type.
- E. Solder: FS QQ-S-571.
- F. Flux: FS O-F-506.

2.03 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.
- C. Form pieces in longest practical lengths.
- D. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- E. Form material with flat lock seam.
- F. Prein edges of copper sheet.
- G. Solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean.
- H. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- I. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- J. Fabricate flashings to allow toe to extend 6 inches over roofing. Return and brake edges.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed, and secure.

C. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Field measure site conditions prior to fabricating work.

B. Install starter and edge strips, and cleats before starting installation.

C. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

D. Insert flashings into reglets to form tight fit. Secure in place with lead wedges at maximum 24 inches on center. Seal flashings into reglets with sealant.

E. Secure flashings in place using concealed fasteners.

F. Lap and seal all joints.

G. Apply plastic cement compound between metal flashings and felt flashings.

H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

I. Seal metal joints watertight.

3.03 INSTALLATION

A. Conform to drawing details and "Copper and Common Sense" handbook and NRCA manual.

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SECTION 07715 - ALUMINUM GUTTERS & LEADERS

PART 1 GENERAL

1.01 DESCRIPTION

A. GUTTERS

1. Furnish and install Industrial Gutter System at upper roof and at garage alternate with accessories as manufactured by Perimeter Systems, Division of Southern Aluminum Finishing Company (SAF), or equal. Provide Profile No. G4-(R) manufactured of Aluminum .063" thickness 14 gauge, White Kynar 500 finish.
2. Gutters shall be manufactured in 10'-0" lengths, tapered and notched to provide a 1" telescoping lap joint. Gutters shall be pre-punched at 12" O.C. to provide for thermal movement after installation.
3. Provide manufacturer's standard support brackets and interior straps for installation at 30" O.C. Bracketry shall be of a compatible material to gutter, with matching finish and color.

B. DOWNSPOUTS

1. Furnish and install manufacturer's standard downspout Profile No. DS manufactured of Aluminum, .050" thickness 16 gauge, White Kynar 500 finish.
2. Downspout shall be manufactured in 10'-0" lengths, factory offset on one end to provide for a 3/4" telescope joint. Downspout shall contain a factory mounted back, which is non-sealed to allow seepage of water in overflow conditions.
3. Elbows for downspouts shall be of welded construction, with matching finish applied after welding. Such finish shall be of quality equal to finish for non-welded parts. Grinding and spray painting of parts to match will not be permitted. Elbows will be provided with a factory offset on its lower end to allow a 3/4" telescope joint.
4. Provide manufacturer's standard wall brackets of compatible material to downspout with matching finish and color.

1.02 QUALITY ASSURANCE

- A. Installing contractor shall be responsible for installing gutter system in accordance with manufacturer's printed instructions. Follow primary roofing

material manufacturer's printed instructions for installation of joining eave trims.

1.03 SUBMITTALS

- A. Prior to start of installation, the installing contractor shall furnish details or catalog cuts indicating products to be used conform to these specifications.

1.04 DELIVERY & PRECAUTIONS

- A. All products delivered shall be stored in a clean, dry location prior to installation.
- B. Products furnished with strippable protective plastic film should have film removed prior to installation. Such film coated products shall not be exposed to sunlight for more than 30 minutes without removing film.
- C. Workmen shall use diligent care to avoid damage, scars, and abrasions to product when handling. Moreover, contractor shall wear protective gloves and clothing to avoid bodily injury when handling products.

PART 2 INSTALLATION

2.01 SUBSTRATE PREPARATION

- A. All horizontal blocking to receive gutters shall be installed true and straight and free of splinters, knots, or other irregularities. Follow local building codes or Factory Mutual Loss Prevention Data 1-49 (whichever is greater) for proper attachment of plates.
- B. Fascia boards shall be installed in a vertical fashion, true and straight and free of knots, splinters, or other irregularities. Soffits, extenders, or cladding to be applied to fascias shall be installed prior to gutter installation.
- C. Wall Conditions: Wall surfaces, which shall be subject to water runoff from gutters, shall be protected when project conditions do not allow immediate installation.

2.02 INSTALLATION PROCEDURES

- A. Review carefully and follow primary roof materials manufacturer's general recommendations as to installing waterproof membranes to this gutter system.
- B. Support Bracket Installation: Locate low and high points of gutter installation and chalk a guide line to allow a maximum 1/4"/40' slope. Install support brackets at 30" on center aligned with the chalk or other type of guideline. Take

care to avoid locating bracket directly over downspout outlet locations. Attach brackets with 2" x #10 wood screw.

- C. Gutter Installation: Install gutter sections from left to right (roof side) into support brackets. Insert each telescoping section into previous section for a distance of 1" seal and rivet at 2" O.C. Provide sealants and fasteners as provided by manufacturer. Nail rear upper portion of gutter with 2" self-drilling screws through pre-punched elongated holes at 12" O.C.
- D. Inside Strap Installation: Install straps at 30" O.C. alternating with support brackets. Strap shall be hooked into leading edge (bead) of gutter and riveted at its rear side. In no case shall strap be nailed, screwed, or otherwise fastened which would restrain thermal movement of product.
- E. Expansion Joints: At 40'-0" intervals, or as shown on plans, install manufacturer's standard elastomeric expansion joint assembly.
 - 1. Provide manufacturer's standard elastomeric expansion joint assembly. Install in strict accordance with printed instructions taking diligent care to allow:
 - a. Proper spacing between gutter sections.
 - b. Ample curing time for primers and adhesives prior to application of membrane.
 - c. Smooth, wrinkle free application of membrane.
 - 2. Follow plans and details for proper location of expansion joints.
- F. Miter Corners: Install manufacturer's welded miter units at locations shown on plans. Corners shall have 30" legs, pre-punched, notched, and telescoping to match gutter. All units shall be finished after fabrication, grinding and touch-up painting will not be allowed.
- G. End Caps/Terminations: Install manufacturer's end caps at all end terminations. End caps shall be riveted at 2" O.C. and sealed.
- H. Outlets: Locate all outlet locations and field cut hole in a neat workmanlike manner. Hole shall be located a distance of 1" from backside of gutter. Insert manufacturer's stainless steel outlet, fasten in place with 4 rivets (one being located on each flange), and seal.

SECTION 07900 - CAULKING AND SEALANTS

07900.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

07900.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of caulking and all related work, complete, in strict accordance with the Contract Drawings and as specified herein or reasonably implied.
 - a. Complete caulking between structure and frames of all windows, doors, louvers and any and all other items in exterior walls, between concrete, door saddles and other joints and/or openings without exception as required for tightness.
 - b. Caulking around all interior frames.
 - c. Caulking of control and/or expansion joints.
 - d. Other caulking as shown on the drawings, and not specified under other sections of the specifications.

07900.0300 RELATED WORK SPECIFIED ELSEWHERE

1. Doors and Windows - Division 8.

07900.0400 DELIVERY AND STORAGE

1. Deliver, store and handle materials in a manner to prevent the inclusion of foreign materials and damage. Deliver and store packaged materials in original sealed containers until ready for use. Delivery materials in ample time to facilitate inspection and test.
2. Package materials showing evidence of damage will be rejected.

07900.0500 SAMPLES

1. Submit the following samples of material for approval, in accordance with the requirements of the Supplementary General Conditions:
 - a. Caulking compound: 1/2 pint containers of each in original manufacturer's containers with labels intact and seals unbroken.

- b. Primer: Pint containers.
- c. Oakum: 1 pound.
- d. Joint Packing: 10'-0" strip.
- e. Install sample caulked joint of each type, at the site and obtain approval of same before proceeding with the work.

07900.0600 MATERIALS

- 1. Caulking and Sealing Compound (Exterior): Construction joints around door frames and window enframements, under sills and door saddles and where shown on the drawings; shall be Tremco Manufacturing Company's "Dymetric" plus or equal. Colors as selected by the Architect.
- 2. Caulking Compound (Interior): For around windows and interior door frames, for door saddles and where shown on the drawings; shall be "Tremco Manufacturing Company's "Spectrem" or other approved equal. Colors as selected by the Architect.
- 3. Primers: Apply as required to the surfaces to be caulked; shall be as made by the manufacturer of the caulking and sealing compounds as approved by the Architect; of composition which will not stain or discolor the materials with which it comes in contact; and applied in accordance with the manufacturer's instructions.
- 4. Oakum: Hand picked dry spun oakum. Use for interior work only.
- 5. Joint Packing: Approved closed cell type as made by Everlastic or equal non-absorbing and non-staining.

07900.0700 APPLICATION

- 1. General: Apply in accordance with the manufacturer's instructions as approved by the Architect and as herein specified.
- 2. Preparatory work:
 - a. Joints and spaces to be caulked shall be cleaned thoroughly of mortar and other foreign and deleterious materials before caulking.
 - b. Joints and spaces shall be not less than 1/4" wide and 1/2" deep.
 - c. Joints and spaces shall be thoroughly dry before installing caulking compound.

3. Priming: Immediately prior to caulking, prime sides of joints as required with specified primer.
4. Caulking shall not be applied at a temperature of below 40 degrees F.
5. Caulking:
 - a. Unless otherwise indicated and specified herein, caulking joints and spaces which are open to depth greater than 3/4" shall be solidly filled with picked oakum or joint packing to within 3/4" of surface before caulking. Pack tightly and make continuous throughout length of joints.
 - b. In joints less than 1/4" wide, omit packing and completely fill with caulking compound. Solidly, fill open depth of joints with caulking compound. (For joints other than masonry).
 - c. If maximum depth of joint is less than 3/4", due to design, then fill completely with caulking compound.
6. Method of Application: Apply caulking compound by approved type of caulking gun in accordance with the manufacturer's instructions, and as herein specified. Where use of gun is not practicable, use suitable hand caulking tools. Avoid applying compound to surfaces outside caulking joints.
 - a. Frames: Caulk joints at perimeter of outside face of all exterior doors, window enframements, louver and other frames and penetrations. Perimeter includes sills, heads, jambs, also mullions where detail requires caulking.
 - b. Jambs and Mullions: Caulk joints at bottom of jambs and mullions at exterior openings.
 - c. Door Saddles: Spread bed of caulking compound over entire seat of exterior metal door saddles and sills. Thickness of compound shall be sufficient to form solid bed. Remove excess compound after setting and neatly point joints between sills or saddles and sub-sills. Caulk joints between sills, saddles and frames at jambs and mullions.
 - d. Caulk around items passing through walls, at outside faces.
 - e. Caulking Generally: Caulk joints where indicated, specified or required for tightness.
 - f. Pointing: Neatly point caulking and finish to match adjacent mortar joints, unless otherwise required. Point exterior joints window, door and other frames to make a slightly concave joint, the edges flush with the surfaces of the frames. Caulked

joints on the interior side of the frames shall be neatly pointed flush with adjoining work.

7. Cleaning: Immediately clean thoroughly adjacent materials which have been soiled. Leave work in neat and clean condition as approved.

07900.0800 DEFECTIVE WORK

1. Work under this Section shall be watertight. Repair defects in work due to faults in materials, method and workmanship. Do all work necessary to make work watertight. Correct other defects. Make good any work damaged by such defects or by renewal of caulking.

07900.0900 GUARANTEE

1. Guarantee in accordance with the Supplementary General Conditions that the caulked joints will be thoroughly watertight for a period of two years after completion and acceptance, as evidenced by date of final payment.

* * * * *

DUPONT™ TYVEK® PROTEC™

ROOFING UNDERLAYMENTS INSTALLATION GUIDELINES

INSTALLATION GUIDELINES ACCEPTABLE FOR USE WITH

- Tyvek® Protec™ 120
- Tyvek® Protec™ 160
- Tyvek® Protec™ 200

SPECIFICATIONS

- Tyvek® Protec™ is available in 10 square rolls: 48" x 250'/1.2m x 76.2m (92.9m²)
- Tyvek® Protec™ is for use on roofs with slopes $\geq 2:12$.
- Tyvek® Protec™ must be covered with the final roof cladding within:
 - 3-months with Tyvek® Protec™ 120
 - 6-months with Tyvek® Protec™ 160 or Tyvek® Protec™ 200

Tyvek® Protec™ should not be considered a final roofing system/primary water barrier. Tyvek® Protec™ is a secondary layer applied over sheathing, under a primary roofing system as specified for the following:

- Tyvek® Protec™ 120 - asphalt shingles, metal or cedar roof cladding
- Tyvek® Protec™ 160 - asphalt shingles, tile, metal, cedar, or slate roof cladding
- Tyvek® Protec™ 200 - asphalt shingles, tile, metal, cedar, or slate roof cladding

BUILDING CODE COMPLIANCE

- Consult local building code and roof cladding manufacturer for use of underlayment.
- Consult local building code and roof cladding manufacturer for underlayment edge and end overlap and fastening requirements that may differ from Tyvek® Protec™ instructions. Follow the more restrictive requirements.
- Where required by local building code, apply self-adhering waterproof underlayment as required by code according to manufacturer's instructions and Tyvek® Protec™ for successive courses.

- Tyvek® Protec™ provides protection against leaks under all types of roof coverings identified by ICC-ES AC188.
- Tyvek® Protec™ has code approval per ICC-ES AC188. For use in Canada, reference Intertek Report #CCRR-1062.

PRECAUTIONS AND SAFETY

- Apply Tyvek® Protec™ taut and wrinkle-free. Do not stretch.
- Plastic or metal cap fasteners with ring shank or smooth shank nails for safe, secure installation are recommended.
- Do not apply Tyvek® Protec™ over wet or frost-covered roof sheathing.
- Caution should be taken when walking on Tyvek® Protec™ until it has been fastened according to instructions.
- Caution should be taken when walking on Tyvek® Protec™ when it is wet or frost-covered.
- Use fall protection when working on roof. Refer to OSHA safety regulations 29 CFR1926 subpart M.
- Consult your local DuPont™ Tyvek® Specialist for additional information.

PREPARATION

- Apply Tyvek® Protec™ over a dry, smooth, clean and defect-free roof deck.
- Tyvek® Protec™ is a vapor barrier. Ensure that the space beneath the roof sheathing is properly ventilated before installing to avoid condensation problems.



DUPONT™ TYVEK® PROTEC™ ROOFING UNDERLAYMENTS INSTALLATION GUIDELINES

DUPONT™ TYVEK® PROTEC™ INSTALLATION INSTRUCTIONS

The following are recommended:

1. Lay courses of Tyvek® Protec™ horizontally in “shingle style” fashion following the lap lines provided in 4" course overlaps and 6" end laps beginning along the eave edge. Offset end laps in successive courses by 6 feet.
2. Attach Tyvek® Protec™ to the roof sheathing with minimum 3/4" length and 1" diameter metal or plastic cap-nails or cap-staples driven flush with the roof deck surface. All anchoring must be performed flush to the roof and 90 degrees to the roof deck.
3. Space fasteners at 6" on center (o.c.) along course and end laps and a single row 12" o.c. in the field of the sheets per recommended fastener guide printed on product.
4. In high wind zones (at or above 100 mph per IRC R301.2), space fasteners at 4" o.c. along courses and end laps and two rows 12" o.c. in the field of the sheets.
5. Apply Tyvek® Protec™ with two layers on roofs with slopes between 2:12 and 4:12. Begin with a 26" undercourse strip parallel to the eave edge, and then cover with a full width sheet. Overlap successive sheets by 26".
6. Install Tyvek® Protec™ over drip edges along eave edge and under drip edges along rake edges.
7. Lap Tyvek® Protec™ 8" (min) onto walls.
8. Line roof valleys with a sheet of Tyvek® Protec™ prior to installing horizontal courses of Tyvek® Protec™. Lap the ends of horizontal Tyvek® Protec™ courses over the valley sheet by 6".
9. At ridges and hips where ridge vents will not be applied, cross-lap Tyvek® Protec™ from one roof plane onto the other by 6". For additional weather protection, apply a 24" wide sheet of Tyvek® Protec™ across hips and ridges.

WARRANTY

Tyvek® Protec™ is covered by a limited product replacement warranty:

- Tyvek® Protec™ 120: 30-years
- Tyvek® Protec™ 160: 40-years
- Tyvek® Protec™ 200: 50-years

Warranty is offered by DuPont for builders, general contractors, or professional installers. This is not a consumer warranty. To obtain a copy of the warranty please visit www.tyvek.com/protec or call 1-800-448-9835.

For more information about DuPont™ Tyvek® Protec™, please call 1-800-448-9835 or visit us at www.tyvek.com/protec

SECTION 07 41 00

STANDING SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Work described in this section includes installation of new underlayment and specified pre-formed metal roofing system complete with clips, perimeter and penetration flashing, closures, gutter system, and downspouts.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General Supplementary Conditions apply to this section.
- B. Related work specified elsewhere:
 - 1. Division 6 Section "Rough Carpentry" for wood nailers and blocking, and for wood-based, structural-use roof deck.
 - 2. Division 7 Section "Re-Roofing Procedures".
 - 3. Division 7 Section "Joint Sealers".
 - 4. Division 7 Section "Manufactured Roof Specialties".

1.3 REFERENCES

- A. American Architectural Manufacturer Association (AAMA):
 - 1. AAMA 501.1 Standard Test Method for Metal Curtain Walls for Water Penetration using Dynamic Pressure.
- B. American Iron and Steel Institute (AISI):
 - 1. 1996 Ed. Specification for the Design of Cold-Formed Steel Structural Members.
- C. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7-10 Minimum Design Loads for Buildings and Other Structures.
- D. American Society for Testing and Materials (ASTM):
 - 1. A792-96 Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 2. A875-99 Specification for Steel Sheet, Zinc-5% Aluminum Alloy-Coated by the Hot Dip Process.

3. A653-96 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 4. B209-96 Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 5. D1056-91 Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
 6. D3575-84 Test Methods for Flexible Cellular Materials made from Olefin Polymers.
 7. E283-93 Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 8. E331-86 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 9. E1592-95 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
 10. E1646-95 Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
 11. E1680-95 Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
- E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
1. 1993 Ed. Architectural Sheet Metal Manual, 5th edition.
- F. Underwriters' Laboratories (UL):
1. UL-263 Fire Tests of Building Constructions and Materials.
 2. UL-790 Tests for Fire Resistance of Roof Covering Materials.

1.4 SUBMITTALS

A. Shop Drawings

1. Show roofing system with flashings and accessories in plan, sections and details. Include metal thickness' and finishes, panel lengths, joining details, anchorage details, flashings, and special fabrication provisions for termination and penetrations; thermal expansion provisions and special supports.

2. Indicate relationships with adjacent and interfacing work. Indicate fastener types and spacing; and provide fastener pullout values.
 3. Shop drawings must be specific to this project and completed by the metal panel manufacturer's engineering department. Any and/or all changes recommended by the successful bidder must be approved by the manufacturer in writing prior to submittal.
- B. Product Data: Include manufacturer's detailed material and system description, sealant and closure installation instructions, engineering performance data and finish specifications. Indicate fastener types and spacing; and required fastener pullout values.
- C. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7-10, Method 2 for Components and Cladding, prepared by a an engineer employed by the system manufacturer as a full-time staff engineer. In no case shall the design loads be taken to be less than those detailed in article 1.9 of this specification.
- D. Design Test Reports: Provide certified test reports from an independent testing laboratory that bear the seal of a registered professional engineer to show compliance with the performance criteria specified in article 1.9. Each of the following test reports must be submitted:
1. ASTM E1592-95: Test results must clearly demonstrate compliance with the following requirements:
 - a. The ultimate test failure load shall be reduced by the safety factor specified in article 1.9 to determine the **allowable working load** for the panel system.
 - b. The proposed system has been tested to insure that the **allowable working load** of the panel system meets or exceeds the specified negative wind uplift pressures listed in article 1.9 of this specification for all roof zones.
 - c. The test results are applicable for the panel material, grade, thickness, width, and profile specified. Results are not applicable for systems that are thinner, wider, lower grade, or different material/profile than the system which was tested.
 - d. The results must clearly show that the allowable clip spacing meets or exceeds the requirements specified in article 3.3 C for all roof areas. Clip spacing shall not be increased for any roof zone from that which is specified.
 2. ASTM E283-93 and E331-86: Test results must clearly demonstrate compliance with the performance requirements specified in article 1.9.

3. ASTM E1646-95 and E1680-95: Test results must clearly demonstrate compliance with the performance requirements specified in article 1.9. Results are not applicable for systems that are thinner, wider, lower grade, or different material/profile than the system which was tested. The differential test pressures must be equal to those specified in article 1.9.

1.5 DISCLOSURE OF MATERIALS

- A. Disclosure of Materials: The materials outlined herein are the basis of design and the type of materials to be used on this project. When a particular make or trade name is specified, it shall be indicative of the minimum standard required. This specification is based on the performance characteristics of the system identified in section 2.1.

1.6 INSTALLER QUALIFICATIONS

- A. Engage an experienced metal roofing contractor (erector) to install standing seam system who has a minimum of five (5) years experience specializing in the installation of structural standing seam metal roof systems.
- B. Contractor must be certified by manufacturer specified as supplier of structural standing seam system and obtain written certification from manufacturer that installer is approved for installation of specified system. If requested, contractor must supply owner with a copy of this certification.
- C. Successful contractor is required to maintain a full-time supervisor/foreman who is on the job-site at all times during installation of new roof system. Foreman must have a minimum of five (5) years experience with the installation of system similar to that specified.
- D. Successful contractor must obtain all components of roof system from a single manufacturer, including any roll good materials if required. Any secondary products that are required which cannot be supplied by the specified manufacturer must be recommended and approved in writing by primary manufacturer prior to bidding.
- E. If required, fabricator/installer shall submit work experience and evidence of adequate financial responsibility. The owners representative reserves the right to inspect fabrication facilities in determining qualifications.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Manufacturer's responsibility:
 1. Protect components during fabrication and packing from mechanical abuse, stains, discoloration, and corrosion.
 2. Provide protective interleaving between contact areas of exposed surfaces to prevent abrasion during shipment, storage, and handling.

- B. Installer's responsibility:
 - 1. Store materials off ground providing for drainage; under cover providing for air circulation; and protected from wind movement, foreign material contamination, mechanical damage, cement, lime or other corrosive substances.
 - 2. Handle materials to prevent damage to surfaces, edges and ends of roofing sheets and sheet metal items. Damaged material shall be rejected and removed from the site.
 - 3. Protect panels from wind-related damages.
 - 4. Inspect materials upon delivery. Reject and remove physically damaged or marred material from project site.

1.8 JOB CONDITIONS

- A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for pre-formed metal roofing system.
- B. Protection:
 - 1. Provide protection or avoid traffic on completed roof surfaces.
 - 2. Do not overload roof with stored materials.
 - 3. Support no roof-mounted equipment directly on roofing system.
- C. Ascertain that work of other trades which penetrates the roof or is to be made watertight by the roof is in place and approved prior to installation of roofing.

1.9 DESIGN AND PERFORMANCE CRITERIA

- A. Thermal Expansion and Contraction.
 - 1. Completed metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.
 - 2. The design temperature differential shall be not less than 200 degrees F.
 - 3. Interface between panel and clip shall provide for **unlimited** thermal movement in each direction along the longitudinal direction.
 - 4. Location of metal roofing rigid connector shall be at roof ridge unless otherwise approved by the Manufacturer. Metal ridge connector may require design as per job conditions by specified manufacturer.

- B. Uniform Wind Uplift Load Capacity. (Calculations to be provided)
1. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria. Anchor clips shall be installed exactly as spacing given in article 3.3 C.
 - a. Design Code: ASCE 7-10, Method 2 for Components and Cladding.
 - b. Safety Factor: TBD
 - c. Category TBD
 - d. Wind Speed: TBD
 - e. Ultimate Pullout Value: TBD
 - f. Exposure Category: TBD
 - g. Design Roof Height: 34 feet
 - h. Minimum Building Width: 80 feet
 - i. Roof Slope: 8:12

<u>Roof Area</u>	<u>Design Uplift Pressure:</u>
Zone 1 – Mid Roof	TBD
Zone 2 – Eaves, Rakes & Ridge	TBD
Zone 3 – Corners	TBD

2. Capacity shall be determined using pleated airbag method in accordance with ASTM E 1592, testing of sheet metal roof panels. Allowable safe working loads shall be determined by dividing the ultimate test load by the safety factor specified above. In order to comply with the building code, panel system must be tested to withstand these listed pressures at clip spacings no closer than those listed in article 3.3.C.
- C. Uniform Positive Load Capacity.
1. The installed roof system shall be capable of resisting the following positive uniform roof loads: Roof Live Load of 30 psf; Ground Snow Load of 40 psf; Balanced Uniform Roof Snow Load of 30.5 psf; and Maximum Unbalanced Surcharged Load of 26.3 psf; and an Unbalanced Width of 8.78 feet.
 2. Capacity to resist positive loads shall be determined by empirical calculations in accordance with AISI. Calculation shall be sealed by a registered professional engineer.

3. Installed roof system shall carry positive uniform design loads with a maximum system deflection of L/180 as measured at the rib (web) of the panel.

D. ASTM E283: **Static pressure air infiltration (doors, windows, curtain walls):**

<u>Pressure</u>	<u>Leakage Rate</u>
1.57 PSF	0.0007 cfm/sq.ft.
6.24 PSF	0.0002 cfm/sq.ft.
20.0 PSF	0.0036 cfm/sq.ft.

E. ASTM E331: **Static pressure water infiltration (doors, windows, curtain walls):**

<u>Pressure</u>	<u>Result</u>
5 Gal/Hr Per S.F. and Static Pressure Of 20.0 Psf for 15 minutes	No Leakage

F. ASTM E1680: **Static pressure air infiltration (roof panels):**

<u>Pressure</u>	<u>Leakage Rate</u>
1.57 PSF	0.0012 cfm/sq.ft.
6.24 PSF	0.0001 cfm/sq.ft.
20.0 PSF	0.0011 cfm/sq.ft.

G. ASTM E1646: **Static pressure water infiltration (roof panels):**

<u>Pressure</u>	<u>Result</u>
5 Gal/Hr Per S.F. and Static Pressure Of 20.0 Psf for 15 minutes	No Leakage

- H. Water penetration (dynamic pressure): No water penetration, other than condensation, when exposed to dynamic rain and 70 mph wind velocities for not less than five minutes duration, when tested in accord with principles of AAMA 501.1.

- I. Capacities for gauge, span or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolation for conditions outside test range are not acceptable.

1.10 WARRANTIES

- A. Owner shall receive ONE (1) warranty from manufacturer of roof panels covering all of the following criteria.

1. Manufacturer's 30 year No Dollar Limit (NDL) watertight warranty, including coverage for all roof panels, trim, flashings, and penetrations associated with the standing seam roof area.

2. 30 year coverage on finish including checking, crazing, peeling, chalking, fading and/or adhesion.
3. 20 year material coverage.
4. Warranty shall commence on date of substantial completion.
5. Installer shall provide manufacturer with a five (5) year warranty covering roofing system installation and watertightness.
6. At the request of the Owner, the Manufacturer will provide an annual inspection. The request for annual inspections shall be applicable for the life of the warranty.

1.11 MANUFACTURER'S INSPECTIONS

- A. When the project is in progress, the roofing system manufacturer will provide the following:
 1. Keep the Owner informed as to the progress and quality of the work as observed.
 2. Provide job site inspections a **minimum of three (3) days a week with reports to the Architect.**
 3. Report to the Architect in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
 4. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

PART 2 - PRODUCTS

2.1 STANDING SEAM ROOFING SYSTEM

- A. General.
 1. Whenever a particular make of material, trade name and/or manufacturer's name is specified herein, it shall be regarded as being indicative of the minimum standard of quality required. A bidder who proposes to quote on the basis of an alternate material and/or system will only be considered if the proposed alternate is submitted and approved as being equivalent or superior in quality to the specified system in accordance with article 1.5. Additionally, all manufacturer and contractor/fabricator guidelines, performance criteria and warranty criteria must be met as specified in article 1.4, 1.5, 1.6, 1.9, and 1.10.
 2. Product names for the metal roof panel system and waterproofing materials used in this section shall be based on performance characteristics of the R-MER Span System manufactured by **The Garland Company, Cleveland, OH (516) 717-5051 and shall form the basis of the contract documents.**
 3. Manufacturers: The following manufacturers are acceptable, providing they meet these specifications and the minimum standards stated.

- A. **The Garland Company, Inc. (Basis of Design).** Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. ASD. Toll Free: 800-321-9336. Phone: 216-641-7500. Fax: 216-641-0633. Web Site: www.garlandco.com. Contact: Tim Roth (917) 662-7385 – troth@garlandind.com
- B. Materials.
1. Panel material: 24 ga., Galvanized steel, smooth as per ASTM A653-96.
 2. Flashing and flat stock material: Unless noted otherwise, fabricate in profiles indicated on approved manufacturer's shop drawings of same material, thickness, and finish as roof system, unless indicated otherwise. Gutters, downspouts, and leaders shall be fabricated as specified in 0.050" aluminum with a kynar paint finish to match the roof panel. Gutter mill finished external brackets shall be covered with aluminum having a kynar paint finish to match the roof panel.
- C. Finish on surfaces:
1. Exposed surfaces for coated panels:
 - a. Two coat coil applied, baked-on full-strength (70% resin) fluorocarbon coating system (polyvinylidene fluoride, PVF2), applied by manufacturer's approved applicator.
 - b. Coating system shall provide nominal 1.0 mil dry film thickness, consisting of primer and color coat.
 - c. Color shall be from Garland's Standard Color offering.
 2. Unexposed surfaces for coated panels shall be baked-on polyester coating with .20 - .30 dry film thickness (DFT).
- D. Characteristics:
1. Provide the same panel profile from a single manufacturer for ALL standing seam roof areas.
 2. Configuration: Provide standing seam panels incorporating mechanically interlocked, concealed anchor clips allowing unlimited thermal movement, and of configuration which will prevent entrance or passage of water.
 - a. Panel/Cap configuration must have a total of four (4) layers of steel surrounding anchor clip for prevention of water infiltration and increased system strength designed to limit potential for panel blow-off.

- b. Profile of panel shall have mesa's every two (2) inches on center continuous throughout panel which are a minimum of one point five (1.5) inches wide. These will absorb thermal stresses, reduce oil canning, and increase load carrying capacity.
 - c. Exposed fasteners, screws and/or roof mastic are unacceptable and will be rejected. System configuration only allows for exposed fasteners at trim details (as per manufacturer's guidelines).
 - d. **Panels must be fabricated and furnished in continuous lengths from eave to eave with no joints/splices/overlaps.**
 - e. Panels lengths which exceed maximum shipping lengths shall be field rolled on equipment owned by the panel manufacturer. Contractor rolling equipment is NOT allowed. Equipment shall have at least 12 rolling stations and provide a product identical to factory manufactured product. The equipment shall be operated by a trained full time experienced technician. All requirements of Section 1.5 B shall apply.
 - f. Seam caps shall be manufactured in the factory and shall be installed with NO endlaps. Seam sealant must be factory applied.
3. Seam must be two and three-eighths (2-3/8) inches minimum height for added upward pressures and aesthetic appeal. Seam shall have continuous anchor reveals to allow anchor clips to resist positive and negative loading and allow unlimited expansion and contraction of panels due to thermal changes. Integral (not mechanically sealed) seams are unacceptable.
4. Concealed Standard Anchor Clips: Clips must be sixteen (16) gauge galvanized steel, ONE (1) piece clip with projecting legs for additional panel alignment and provision for unlimited thermal movement in each direction along the longitudinal dimension.
- a. Two-piece (2) clips are **NOT** acceptable.
 - b. Sealant applied in panel cap must be isolated from clip to insure that no sealant damage occurs from the movement of the panel during expansion and contraction.
 - c. Clip must maintain a clearance of a minimum of three-eighths (3/8) inches between panel and substrate for proper ventilation to help prevent condensation on underside of panel and eliminate the contact of panel fastener head to panel.

5. Seam cap: Snap-on cap shall be a minimum of 1" wide "T" shaped of continuous length up to forty-five (45) feet according to job conditions and field seamed by means of manufacturer's standard seaming machine.
 - a. Cap shall be designed to receive two (2) beads of continuous hot applied gasketing sealant which will be applied independent of anchor clip to allow unlimited thermal movement of panel without damage to cap sealant.
 - b. Sealant shall be a SIS (Styrene-Isoprene-Styrene) block copolymer type thermoplastic rubber adhesive, non-fatigue water barrier.
6. Standing Seam Panel Width: 18"
7. Stiffening ribs: Located in flat of panel to minimize oil canning and telegraphing of structural members.
8. Replaceability: Panels shall be of a symmetrical design with snap on cap configuration such that individual panels may be removable for replacement without removing adjacent panels.
9. Panel ends shall be panned at ridge or where applicable per the manufacturer's approved shop drawings.

10. Panel length: Full length without joints.

E. Accessories.

1. Gable anchor clips: Standing Seam style, galvanized steel, minimum thickness 16 gauge.
2. Fasteners:
 - a. Standing Seam Roof Clip fasteners and Concealed fasteners: Corrosion resistant steel fasteners (zinc plated, stainless steel or equal) designed to meet structural loading requirements and in accordance with recommendations from the manufacturer of the wood roof decking and wood blocking. Provide #14-13 DP1 as the minimum fastener size.
 - b. Exposed fasteners: Series 410 stainless steel fasteners or one-eighth (1/8) inch diameter stainless steel waterproof rivets. All exposed fasteners shall be factory painted to match the color of the standing seam panels.
3. Closures: Factory precut closed cell foam meeting ASTM D1056 or ASTM D3575, enclosed in metal channel matching panels when used at ridge, rake, and jamb.
4. Provide all miscellaneous accessories for complete installation.

2.2 ACCESSORY PRODUCTS

A. Sealant:

1. Acceptable product:
 - a. Concealed Application : Garland Butyl Sealant or approved equal.
 - b. Exposed Application : Garland Tripolymer Sealant or approved equal.
2. Colors: As selected by Architect from sealant manufacturer's standard selection.

B. Roof Deck Substrate:

1. Continuous wood roof deck over metal framing stud structure.

C. Underlayment:

1. Underlayment shall be applied over entire roof area, and turned down over the perimeter edge blocking in accordance with the manufacturer's approved shop drawings.
2. Underlayment shall be R-Mer Seal, a 45 mil self-adhering, SBS modified membrane, fiberglass reinforced, high temperature underlayment. Install in accordance with manufacturer's recommendations.

E. Prefabricated Shims:

1. Install prefabricated high density polyethylene plastic shims under the roof panel clip and over the bearing plates to maintain a level/plumb plane to prevent buckling of the roof panel.

F. Snow Retention System:

1. Shall be S-5 Snow Retention System as supplied by the standing seam panel manufacturer designed for the appropriate local code ground snow load of 40 psf resulting in the required balanced and unbalanced snow loads, specified roof slopes and lengths, and an 18 inch wide panel. Two (2) rows of the S-5! Color Guard snow retention system will be required on each roof section. One (1) row at the eave end of the roof section, and one (1) row mid point of the roof section. An S-5! Clip shall be installed at each panel seam, and one (1) Snow Clips between each panel. Color shall match standing seam roof panel color.

2.3 FABRICATION

- ### A.
- Shop fabricate metal roofing and flashing components to the maximum extent possible, forming metal work with clear, sharp, straight, and uniform bends and rises. Hem exposed edges of flashings.

- B. Form flashing components from full single width sheet in minimum ten (10'-0") foot lengths. Provide mitered corners, joined using closed end pop rivets and joint sealant.
- C. Fabricate roofing and related sheet metal work in accord with approved shop drawings and applicable standards.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Inspection: Examine the alignment and placement of the building structure and substrate. Correct any objectionable warp, waves or buckles in the substrate before proceeding with installation of the pre-formed metal roofing. The installed roof panels will follow the contour of the structure and may appear irregular if not corrected.
- B. Establish straight side and crosswise benchmarks.
- C. Use proper size and length fastener for strength requirements. Approximately five-sixteenths (5/16) inch is allowable for maximum fastener head size beneath the panel.
- D. Rectangular shaped roofs shall be checked for square and straightness. Gable ends may require setting a true line for the gable clips and setting with string line.
- E. Measure the roof lengthwise to confirm panel lengths, overhangs, coverage of flashings at eaves and ridges and verify clearances for thermal movement.
- F. Pre-roofing conference:
 - 1. Prior to beginning metal roofing work, a pre-roofing conference shall be held to review work to be accomplished.
 - 2. Owner, contractor, metal roofing subcontractor, metal roofing system manufacturer's representative and all other subcontractors who have equipment penetrating roof or whose work involves access to roof shall be present.

3.2 METAL FABRICATION AND EQUIPMENT

- A. Mechanical panel fabrication for field panels shall be operated by a trained full time experienced technician.
- B. Mechanical equipment shall have a least twelve (12) rolling stations and provide a product identical to factory manufactured product.

3.3 ROOFING AND FLASHING INSTALLATION

- A. Comply with all details and install roofing materials and flashings in accordance with approved manufacturer's shop drawings and manufacturer's product data, within specified erection tolerances.
- B. Prepare roof for the installation of standing seam panels, including:
 - 1. The roof barrier board shall be installed with joints in continuous straight lines, perpendicular to roof slopes with end joints and side laps staggered between rows. Tightly butt substrate boards together. Substrate boards shall be attached to the deck with the specified fasteners using the approved mechanical fastening system. As a minimum, the amount of fasteners shall be in accordance with the following:
 - Fix (5) fasteners per 4' x 4' board
 - a. Filler pieces of roof barrier board require at least two fasteners per piece if size of roof barrier board is less than four square feet.
 - b. Placement of any fastener from edge of the roof barrier board shall be a minimum of three inches, and a maximum of six (6) inches.
 - c. Minimum penetration into deck shall be as recommended by the fastener manufacturer. There is a one (1) inch for wood roof decks where not specified by the manufacturer.
 - 2. Install the specified and approved underlayment as required in this specification over the properly installed roog barrier board. The specified underlayment shall be applied over the entire roof area.
- C. Directly over the completed roof substrate, install one (1) piece panel anchor clips. All anchor clips shall be fastened with two (2) approved fasteners through the underlayment and into the wood roof deck based on the following fastener spacing pattern. As required, install prefabricated high density polyethylene plastic shims to maintain a level/plumb surface/plane for the standing seam panel to prevent buckling.

Roof Section

1. Field clip spacing must be TBD ft. o.c. for Zone 1 (mid roof)
2. Field clip spacing must be TBD ft. o.c. for Zone 2 (eaves, rakes and ridge).
3. Field clip spacing must be TBD ft. o.c. for Zone 3 (corners)
4. Gable clip spacing must be TBD ft. o.c. (rakes)
 - * This clip spacing must be followed to ensure integrity of the completed installation. These have been determined based on the uplift calculations for the specified roof and the test results of ASTM E-1592.

- D. Installation of Roof Panels: Roof panels can be installed by starting from either end and working towards the opposite end. Due to the symmetrical design of the specified panel system, it is also acceptable to start from the middle of the roof and work toward each end.
1. Stainless steel pop rivets shall be secured through the anchor reveal of the panel leg and extend into the arms of the panel clip located at the ridge of the roof. The panel is then anchored at both sides of each of the clip. Four (4) rivets per panel are required and shall be installed.
 - a. **Be sure to capture all drilling debris during this operation with a rag or cloth placed on the panels at the drilling operation.**
 - b. Panels are not securely attached to the roof until fixed to the anchor clip. To avoid damage and injury, all panels shall be fixed to the anchor clip immediately as they are installed.
 2. The seam caps are shipped with two (2) beads of factory applied hot melt sealant located inside the caps. To install the caps, hook one side of the cap over the panel edge and rotate over the opposite panel leg. For ease of installation, start at one end of the panel and work toward the opposite end.
 3. A hand crimping tool is used to crimp the cap around the top of two adjacent panels
 4. Caps shall then be permanently seamed with manufacturers mechanical seamer.
 5. At the end of each day's work, seam caps shall be mechanically seamed or hand crimped (crimp 4 inches every 8 feet) to reduce the possibility of wind damage prior to completion of the project.
 6. Un-installed panels which are temporarily stored on the ground or roof shall be secured in place at the end of each day's work to prevent possible damage or injury.

- E. Isolate dissimilar metals and masonry or concrete from metals with bituminous coating. Use gasketed fasteners where required to prevent corrosive action between fastener, substrate, and panels.
- F. Limit exposed fasteners to extent indicated on shop drawings.
- G. Anchorage shall allow for temperature expansion/contraction movement without stress or elongation of panels, clips, or anchors. Attach clips to structural substrate using fasteners of size and spacing as determined by manufacturer's design analysis to resist specified uplift and thermal movement forces.
- H. Seal laps and joints in accordance with roofing system manufacturer's product data.
- I. Coordinate flashing and sheet metal work to provide weathertight conditions at roof terminations. Fabricate and install in accordance with standards of SMACNA Manual.
- J. Provide for temperature expansion/contraction movement of panels at roof penetrations and roof mounted equipment in accordance with system manufacturer's product data and design calculations.
- K. Installed system shall be true to line and plane and free of dents, and physical defects. In light gauge panels with wide flat surfaces, some oil canning may be present. Oil canning does not affect the finish or structural integrity of the panel and is therefore not cause for rejection.
- L. Maximum variation from true planes or lines shall be one-fourth (1/4) inch in twenty (20) feet and three-eighth (3/8) inch in forty (40) feet or more.
- M. Form joints in linear sheet metal to allow for one-fourth (1/4) inch minimum expansion at twenty (20) feet on center maximum and eight (8) feet from corners.
- N. At joints in linear sheet metal items, set sheet metal items in two(2), one-fourth (1/4) inch beads of butyl sealant. Extend sealant over all metal surfaces. Mate components for positive seal. Allow no sealant to migrate onto exposed surfaces.
- O. Remove damaged work and replace with new, undamaged components.
- P. Touch up exposed fasteners using paint furnished by roofing panel manufacturer and matching exposed panel surface finish.
- Q. Clean exposed surfaces of roofing and accessories after completion of installation. Leave in clean condition at date of substantial completion. Touch up minor abrasions and scratches in finish.
- R. Snow Retention System

1. At all eaves and mid point of each roof section, install one (1) row of the S-5! Color Guard Snow retention system as as supplied by the standing seam panel manufacturer in accordance with the manufacturer's recommendations. This will result in two (2) rows per roof section. S-5! Clamps are require at EACH panel seam, and the S-5! Clamp set screws shall be tightened to a tension of 115 in-lbs per each screw with proper torque setting tightening equipment. Additionally, a S-5! Snow Clip is required in each panel.

END OF SECTION 07 41 00

DIVISION 8 - DOORS AND WINDOWS

SECTION 08100 - METAL DOORS AND FRAMES

08100.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

08100.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of all related work, complete, in strict accordance with the contract drawings, and as specified herein or reasonably implied.
2. Provide and install all hollow metal doors and steel door frames, as manufactured by Curries or equal as noted on schedule.
3. All material, labor and equipment necessary to furnish and deliver to the job site material as specified in this section.

08100.0300 RELATED WORK SPECIFIED ELSEWHERE

1. Metal doors and frames; wood doors and frames; structural steel frames; finish hardware; automatic door closers; glass and glazing; caulking and weatherstripping; field painting.

08100.0400 QUALIFICATIONS

1. Hollow metal doors and steel door frames, including appropriate anchorage, shall be fabricated from prime materials in accordance with manufacturer's normal standards and accepted industry practice. Assembly and installation, including field modifications and custom fabrication, shall be done by a hollow metal contractor.

08100.0500 SHOP DRAWINGS

1. All doors, frames and hollow metal work shall be fabricated as shown on the shop drawings, submitted to and approved by the architect before fabrication.

08100.0600 DELIVERY AND STORAGE OF MATERIALS

1. Doors and frames shall be delivered to the contractor at the job site. They shall be handled so as to avoid damage and stored upright in a protected area on wood skids, covered with tarpaulins or plastic, vented to avoid condensation and entrapped moisture, until ready for installation. Damaged or deteriorated materials shall be removed from the premises.

08100.0700 PRODUCTS

1. Materials

- a. Doors - Hollow metal, full flush seamless Type D steel construction, Series 400 and UL400, 1-3/4" thick, completely filled with small cell phenolic resin-impregnated kraft honeycomb core bonded to 16 ga. skin sheets with heat and pressure-activated adhesive, 14 ga. channel perimeter reinforcement spot-welded to skin sheets top and bottom, skin sheets continuous lock-seamed along vertical edges. Top of exterior swing-out doors filled flush with additional channel to prevent moisture accumulation. Lock edge bevel 1/8" to 2". Provide R-7 polystyrene for all exterior doors as noted on our schedule.
- b. Hinge and lock reinforcements integral with vertical perimeter channel, additional reinforcing box for lock specified, internal reinforcing for overhead-surface mounted closers, and for surface-mounted hardware as required, for field drilling and tapping by contractor. Hinge mortise drilled and tapped, 3 full threads minimum, for standard weight 4 1/2" x 4 1/2" hinges.
- c. Doors to be cleaned, phosphatized and primed with oven-baked enamel of neutral color, ready for finish painting (by GC), and shipped in individual cartons. Cartons to be protected from moisture during shipping and handling.
- d. Door Accessories:

Kick plates – Plate size to equal door size less 2" x 12" high. Finish shall match door hardware and to be installed on both sides of door.

Glazing beads - 18 ga. steel, profile with max. 1/16" projection from door face, neatly coped and mitered at corners, (exterior sided nonremovable, interior side screw-attached) provided with all glassed styles.

- e. F-Line Frames - Prime, cold-rolled steel, assembled, arc-welded, ground and finished smooth, mortised, reinforced, drilled and tapped for standard weight, full mortise template hinges and template strike, mortar guards at all hardware preparations. Provide 1 welded-in floor anchor and 3 lock-in anchors each jamb for field insertion, 24" o.c. max., and furnish with rubber mutes, 3 for single

doors, 2 for pairs.

Frames to be cleaned, phosphatized and primed with oven-baked enamel or neutral color, ready for finish painting.

Series F416 frames, 16 ga., for 1 3/4" doors, hinge reinforcements 7 ga., strike reinforcement 14 ga. prepared for 1 1/2 pr. 4 1/2" x 4 1/2" hinges and ANSI 115.1 4 7/8" strike and UL-F416 labeled frames as required on above schedules.

Prepare frame for silencers, provide three (3) single rubber silencers for single doors on strike side, and two (2) single silencers on frame head at double doors without mullions.

- f. Labels - Nonremovable labels, of the hourly rating shown on door schedule, shall be permanently affixed to fire-rated doors and frames showing compliance with Underwriters Laboratories requirement (B-Label typical unless otherwise noted).
- g. Provide all door frames with special cut at latch for electrical devices. (verify make & model prior to order). All door frames that do not receive an electric strike at the time of project completion shall receive a fire rated finish cover plate at frame latch.

08100.0800 EXECUTION

1. Doors - Hang doors level and plumb, shimming as necessary at hardware mortises to provide proper clearances and smooth operation with no binding.
2. F-Line Frames - Set plumb and square, securely anchor to floor construction and brace for erection of surrounding walls. Apply 1 coat of bituminous paint to frame surfaces that will be concealed in masonry walls.
3. Labeled Frames - Install labeled frames in accordance with NFPA Publications No. 80 and No. 101, and all applicable codes.

* * * * *

SECTION 08200 - FLUSH WOOD DOORS

08200.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

08200.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of all related work, complete, in strict accordance with the contract drawings, and as specified herein or reasonably implied.
2. Except where noted on schedule otherwise, all new doors are to be white oak 1-3/4" solid core flush wood doors, or B label - 60 minute flush white oak wood doors.

08200.0300 QUALITY ASSURANCE

1. Doors shall meet or exceed NWMA Industry Standard IS-76.

08200.0400 SUBMITTALS

1. Submit manufacturer's certification that the doors meet requirements of specified standard.
2. Submit manufacturer's standard finish stains/varnish to be selected by owner.

08200.0500 PRODUCTS

1. Basic Materials
 - a. Cores shall be either: Particle Board designed for doors meeting or exceeding CS 236-66; or Glued-up cores of random short lengths of kiln dried softwood.
 - b. Faces rotary cut "good grade" three ply white oak 1/8" thick each side.
 - c. Rails top and bottom 2-7/8" wide softwood.
 - d. Styles, one piece 1-3/4" wide softwood.
 - e. All wood doors shall be as manufactured by Graham Manufacturing Co., 1920 E. 25th St., Marshfield, WI 54449 and shall conform to manufacturer's specifications which will be considered part of this specification. Provide lites, hinges, etc., as noted on the schedule.
 - f. Frames shall be 16 ga. stl as previously specified. See Section 08100.

2. Machine doors for butts, locks, etc., in accordance with approved templates. Pre-machined or field work will be accepted.
3. Doors noted to receive vision panels/lites shall get fire rated glass typical.
4. All wood doors shall be factory finished and sealed on all six (6) sides with stain/varnish selected by owner with manufacturer's color selection.

* * * * *

SECTION 08305 - ACCESS DOORS

1.01 GENERAL DESCRIPTION

- A. Bidding requirements, conditions of the contract and pertinent portions of sections in Division 1 of these specifications, apply to the section as fully as though repeated herein.
- B. Work under this section includes furnishing and installing access panels. Minimum of six (6) to be field verified for locations, 24"x24" minimum size unless otherwise noted.
- C. Related work:
 - 1. Section 09250, opening in partitions.
 - 2. Section 09900, painting; field paint finish.

1.02 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Include sizes, types, finishes, scheduled locations, and details of adjoining work.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.

1.03 DELIVERY

- A. Package, handle, deliver and store access panels at the project site in a manner that will avoid damage.

1.04 QUALITY ASSURANCE

- A. Manufacture's Fire Rated Access Doors and frames to conform to UL Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Access Panels listed as follows as provided by:
 - Larsen's Manufacturing Company
 - 7421 Commerce Lane N.E.
 - Minneapolis, MN 55432
 - (612) 571-1181

2.02 MATERIAL

- A. L-DWB: To be installed in sheetrock or drywall after the board is up.
- B. Latch to be knurled knob with interior release lever.
- C. Size as noted on drawings.

2.03 FABRICATION

- A. Furnish as necessary each access panel assembly manufactured complete with all parts ready for installation.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that wall and ceiling openings are correctly dimensioned to receive walls.

3.02 INSTALLATION

- A. Install according to manufacturers instructions.

3.03 ADJUST AND CLEAN

- A. Adjust latch and lock mechanism to operate.

SECTION 08330 - ROLL UP FIRE DOORS

1. Scope.
 - a. Provide 1 ½ hour manual roll up fire doors with stainless steel slats at Kitchen counter, Storage Mezzanine & Delivery area in Apparatus Bay.
2. Quality Assurance.
 - a. System shall be Atlas roll lite rolling fire door stainless steel finish complete with locks, hood 22 gauge with fusible link closing operation or approved equal. Note Delivery area roll up door to have fire rated vision lites.
3. Submittals.
 - a. Manufacturers product literature.
4. Installation
 - a. All materials, systems components, etc. shall be installed in strict compliance with the manufacturers printed product system specifications and installation instructions. Provide blockings, etc. as required to receive system installation.

SECTION 08360 UPWARD ACTING SECTIONAL DOORS

WORK INCLUDED

- A. Provide & install overhead doors where indicated on the drawings to include all materials, labor, installations, components, hangers, blocking, supports, motors, switches, etc. for complete installation of doors. All connections, supports, etc. shall be provided and installed by the door installer. Door installer to verify minimum headroom clearance.

PRODUCTS

1. Doors:
 - a. Doors shall be steel sectional overhead commercial/TM-300 series as manufactured by Raynor Garage Doors or equal.
 - b. Sections shall be 2" thick raised panel wood grain embossed commercial quality hot dip galvanized G60 steel per ASTM A-525 and A-526. Door sections constructed of 20 gauge wood grain textured embossed raised panel design colonial design, exterior and standard 26 gauge interior skins, mechanically interlocked and pressure bonded to a 1-7/8" thick expanded polystyrene core. Interior and exterior skins to be separated by a continuous dual durometer vinyl extrusion to form an effective thermal break and a complete weather-tight seal along section joint. Thermal break extrusion to be held in place by means of a mechanical interlock. End stiles to be minimum 14 gauge, separated from exterior skin with vinyl thermal break.
 - c. Finish - Exterior and interior of door skins pre-coated prior to roll forming with a two coat process of baked on polyester enamel finish over epoxy primer. Base bid color shall be white.
 - d. Weatherstripping - Door shall be furnished with complete weatherstripping system to reduce air infiltration. Top of door provided with EPDM rubber sealing strips. Bottom of door to have flexible U-shaped vinyl seal encased in extruded aluminum retainer to conform to irregularities in floor. Optional jamb seal to be EPDM rubber blade type attached to track angle mounting with rigid vinyl snap-on extrusion. Weatherstripping to be replaceable without removal of track, angle mounting, or door hardware. Maximum air leakage per foot of door perimeter (floor, jamb and header) shall not exceed .81 CFM @ 25 M.P.H. No air leakage shall be detected between section joints when tested in accordance with ASTM E-283.
 - e. Tracks - Galvanized track 3". Tracks to have Graduated Seal for weathertight closing. Tracks to be bracket mounted or continuous angle mounted and fully adjustable for sealing door to jamb. Continuous angle size to be not less than 2-

5/16" x 5" x 3/32" on 2" track. Horizontal track to be adequately reinforced with continuous angle. Use low head room track if required by clearance.

- f. Hardware - All hinges and brackets made from galvanized steel. Track rollers shall have ten 1/4" diameter hardened steel balls per roller (2") (Series TC), seven 1/4" diameter steel balls (TC-II) and ten 5/16" diameter hardened steel balls per roller (3").
 - g. Spring Counterbalance - Heavy duty oil tempered wire torsion springs on continuous ball bearing cross header shaft. Galvanized aircraft type lifting cables with minimum safety factor of 5 to 1.
 - h. Wind Load – Doors designed to withstand 20lbs. per sq. ft. Deflection of door in horizontal position to be maximum 1/120th of door width. Contact Raynor Engineering for details.
 - i. Glazing - Lite inserts to be 16" x 34" thermal type, 5/8" insulated glass. Glass unit to be encased in one piece vulcanized EPDM rubber frame. DSB, 1/4" clear or wire glass. Layout of lites to be as per project elevations.
 - j. Framing - Door jambs and mounting pads to be furnished by other than door installer.
 - k. Insulating Value - Section set shall have overall installed R-value of 9.17 as tested in accordance with ASTM C-236.
 - l. Five Year Delamination and Twenty Year Insulation Limited Warranties – In addition to the Raynor one year limited warranty, and subject to the conditions and limitations, stated in that warranty, doors shall be free from delamination of the expanded polystyrene insulation and its exterior and interior skins for five years from installation date. The expanded polystyrene will maintain its R-value for twenty years from installation date as tested in accordance with ASTM C-236.
2. Motors:
- a. Operator shall be trolley type Model RBT as manufactured by Raynor Garage Doors 1/2 H.P., 115 V. or equal.
 - b. Trolley - Trolley rail shall consist of two 2" (50.8 mm) x 2" (50.8 mm) x 11 gauge galvanized steel angles to 14' (4267 mm) high or 2" (50.8 mm) x 2" (50.8 mm) x 10 gauge over 14' (4267 mm) high.
 - c. Motor - Provide a continuous duty capacitor start motor. Specify 115V or 230V single phase, 230V or 460V three phase. Motor shall be separate from reduction mechanism for ease of maintenance.

- d. Reduction - Furnish V-belt drive from motor to full ball bearing power train with additional reduction by chain and sprockets. All power train shafts shall be minimum 3/4" (19 mm) diameter.
 - e. Roller Chain Drive – Door shall be driven by roller chain at 6" (15.2 mm) to 12" (30.4 mm) per second.
 - f. Adjustable Friction Clutch - Shall be provided to protect door and operator if door movement is obstructed.
 - g. Starter-Reversing Contractor Type - Furnish heavy duty across the line reversing type with mechanical interlock.
 - h. Limit Switches - Provide positive chain drive screw type limit switch, enclosed in electrical control box, easily accessible for precision setting. 3 sets of cam operate limit switches for each door.
 - i. Control Wiring - Control voltage shall be 24 volts for safety.
 - j. Overload Protection - Provide manual reset for overload protection.
 - k. Electrical Enclosure - All electrical components shall be in NEMA 1 enclosure.
 - l. Emergency Operation - A disconnect shall be provided so door can be manually operated.
 - m. Magnetic Brake - Furnish a magnetic solenoid brake for positive stop.
3. Controls:
- a. All controls shall be 24 volts and shall include contactors as follows:
 - OPEN: 2 Normal Open, 2 Normal Closed
 - STOP: 2 Normal Open, 2 Normal Closed
 - CLOSE: 2 Normal Open, 2 Normal Closed
 - b. Provide open, close, stop 3 button recess station at each door.
 - c. Provide radio control operation for all doors.
 - d. Provide bottom safety edge control reversing edge.
 - e. Coordinate and provide additional contactors as required for interlock with HVAC controls. Coordinate with Mechanical Contractor.

QUALITY ASSURANCE

1. Install door in accordance with Raynor Door Corporation instructions and standards, using an authorized distributor.

SUBMITTALS

1. Submit complete detailed shop drawings for the entire installation.
2. Submit sample of door components.

F-SERIES: FF300 SPECIFICATIONS Four-Fold Door Systems

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Four-Fold metal doors with surface mounted tube frames.
- B. Operation of Four-Fold metal doors includes overhead mounted electro-mechanical operators.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified consisting of manufacturer's technical Product Data and installation instructions for each type of door required, including data substantiating that products comply with requirements.
- C. Submittal Drawings showing fabrication and installation of Four-Fold metal doors including plans, elevations, sections, details of components, hardware, operating mechanism, and attachments to the other units of Work. Include wiring diagrams for coordination with electrical trade.
- D. Reference list including (5) successful installations of this type of door within the past two (2) years.

1.4 QUALITY ASSURANCE

- A. Doors shall be designed to withstand external or internal horizontal wind loads of **120mph (3 second gust) per ASCE 7-16**. The maximum allowable deflection shall not exceed 1/120 of the span. Fiber stresses in main members shall be limited to 27,000 pounds per square inch. Steel frames shall be designed in accordance with the AISC "Steel Construction Manual".
- B. Door manufacturer shall have at least 10 years experience in manufacturing door type specified.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store delivered materials and equipment in dry locations with adequate ventilation, free from dust and water, and so as to permit access for inspection and handling.
- B. Handle materials carefully to prevent damage.

1.6 WARRANTY

- A. The door manufacturer shall provide a written standard limited warranty for material and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Four-Fold industrial metal doors manufactured by Door Engineering and Manufacturing, 101 Power Dr, Mankato, MN 56001, (800)-959-1352 or equal products by other manufacturers approved in advance.

FF300 Series: Glazed

2.2 MATERIALS

- A. Steel Tube: ASTM A513 and ASTM A500/A500M
- B. Steel Sheets: Steel sheets of commercial quality, complying with ASTM A1008 cold-rolled steel sheet.
- C. Hardware: Manufacturer's standard components.
- D. Fasteners: Zinc-coated steel.

2.3 FOUR-FOLD DOORS

- A. Construction: Door framing shall be minimum 11-gauge structural steel tube with 16-gauge steel sheet on the exterior and interior faces. Sheeting shall be formed on the vertical edges with no visible welds on the interior or exterior panel faces. All frames and framing members shall be true to dimension and square in all directions, and no door shall be bowed, warped, or out of line, in the vertical or horizontal plane of the door opening by more than 1/8 inch in 20 feet. Exposed welds and welds which interfere with the installation of various parts shall be ground smooth and flush.
- B. Surface Mounted Tube Frame: Supply pre-hung tube frame system constructed of minimum TS6x4x3/16", designed to anchor to masonry wall construction or weld to steel structure. All hinges, track supports and operator supports shall be factory attached.
- C. Factory finish: Door Panels and Tube Frames shall be finished with manufacturer's standard PPG Spectracron epoxy primer and polyurethane top

coat. Customer to select from Manufacturer's standard color chart or furnish sample to match.

1. Operator and operating hardware shall be powder-coated manufacturer's standard gray.
- D. Hardware: Hardware shall include guide tracks and brackets, trolleys, center guides, not less than three pairs of jamb and fold hinges per opening, and all bolts, nuts, fasteners, etc. necessary for complete installation and operation.
1. All hardware, including hinges and trolleys, shall be bolted to the panel for easy removal for service or panel replacement.
 2. Doors up to 16' wide and under 30psf windload shall require no floor mounted supports, guides or tracks.
 3. Top tracks shall be adjustable on the end track hangers to allow for adjustment of the door panels in the open position and easily replaceable without removal of the door framing or operators.
- E. Hinges: Jamb hinges shall be dual shear and have two thrust bearings and two needle bearings. Fold hinges shall be stainless steel and be dual shear with two thrust bearings. All bearings shall be completely concealed within the hinge barrel and include grease zerks. All hinge pins shall be minimum 3/4" diameter hardened steel.
- F. Hinge Guards: Provide plastic guards at jamb hinges to prevent access through hinge space.
- G. Weatherstripping: Material shall be adjustable and readily replaceable and provide a substantially weather-tight installation. Weatherstripping at center shall be 1/16" EPDM and include no exposed fasteners on the exterior side of the panel. Weatherstripping at sill shall include two 1/16" EPDM sweeps with an aluminum retainer. The retainer shall be attached to the door with adhesive.
- H. Perimeter Weatherstripping: Provide full perimeter jamb and head weatherstripping.
- I. Vision Panels: Provide 1" insulated, tempered, vision panels of the size, shape and location as noted on the drawings.

2.4 OPERATOR

- A. Each Four-Fold door shall be operated by an overhead mounted electro-mechanical drive unit designed for high cycle operation. Operator consists of an electric motor, gear reducer, and rotating drive arm. The door shall be operated with connecting rods attached to the rotating drive arm on the operator and to control arms attached to the jamb door section and to the door lintel. The connecting rods shall be positive drive, keeping the door under firm control at all times. The connecting rods shall be fitted with spherical bearings and control arms shall be equipped with oil impregnated bronze bearings on polished shafts.

- B. Operator shall be instantly reversible, open and close rapidly and start and stop gradually. Operator shall be adjustable to allow door to fully clear the opening. Operator shall automatically lock the door in the closed position. Operator shall be equipped with disengaging mechanism to convert to manual operation.
- C. Electric motor shall be of sufficient size to operate doors under normal operating conditions at no more than 75 percent of rated capacity. The motor shall be wound for three phase 208/230/480 VAC, 60 Hertz operation.
- D. Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door, and built in accordance with the latest NEMA standards. **Incoming electrical shall be (Choose One): 120VAC single phase, 208VAC single phase, 208/230VAC 3-phase, 480VAC 3-phase.**
 - 1. Control panel assemblies shall be UL listed as per NFPA70.
 - 2. Controls shall include a programmable logic controller with digital message display. Controller shall include programmable close timers and programmable inputs/outputs.
 - 3. Controls shall include a variable frequency drive with independent adjustment of the opening and closing speeds.
 - 4. Enclosures shall be NEMA 4 with disconnect switch.
 - 5. Pushbuttons (interior) for each door shall have one (1) momentary pressure three-button push-button station marked "OPEN", "CLOSE" and "STOP". Push button enclosure shall be NEMA 4.
 - 6. Limit switches shall be provided to stop the travel of the door in its fully open or fully closed position.
 - 7. Safety edges: Provide monitored electric safety edges on leading edge of all doors to reverse door upon contact with obstruction.
 - 8. Photo eyes: Provide (1) exterior, jamb mounted, light Curtain type photo eyes, NEMA 4 rated. Photo eye shall cover from floor level to 72" above floor.
 - 9. Presence Sensor: Provide (1) interior, overhead mounted, presence sensor BEA IS40P or equal. Doors over 16' tall shall include LZR-Widescan or equal.
 - 10. Radio controls: Provide one (1) radio receiver and (1) single button remotes per door. Remotes to open and close doors with single button.
 - 11.(Option) Timer Activation Loop Detectors (fire station applications): Provide "pulse on exit type" loop detector to activate auto close timer once loop has been activated and cleared, include hand/auto switch to deactivate timer. G.C. to**

coordinate installation of preformed loop with installer prior to exterior apron being poured.

12. (Option) Warning Horn/Strobe: Provide warning light and strobe. Include outputs PLC to allow for activation while door is in motion both opening and closing, along with activation prior to closing. Include programmable "delay-to-close" timer which activates the warning horn for a set time, prior to the door closing.

13. Wiring: Door manufacturer shall supply controls and components only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.

PART 3 - EXECUTION

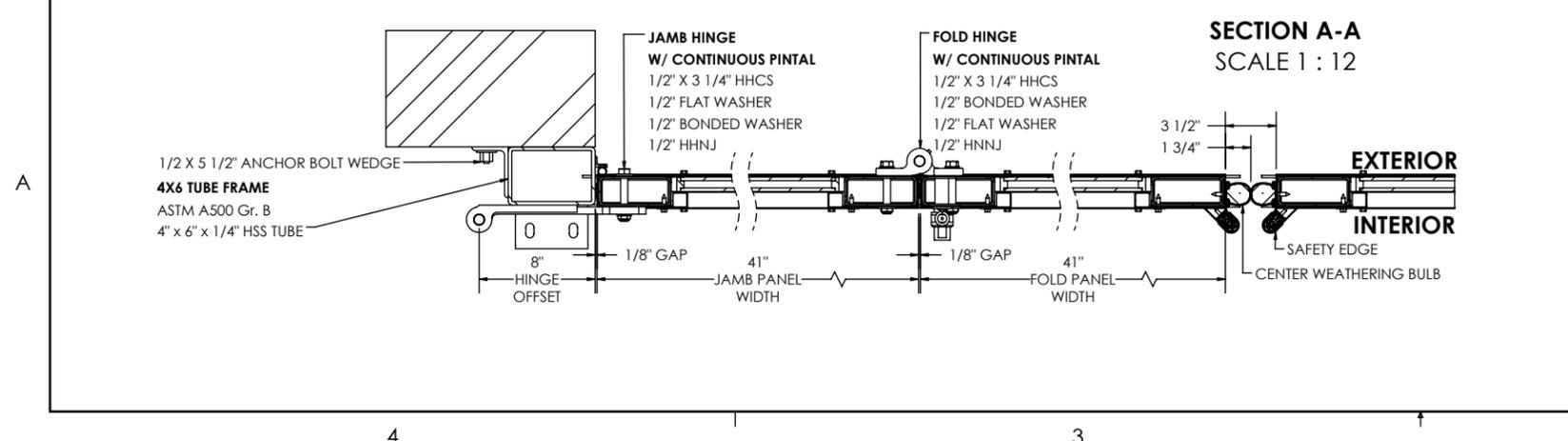
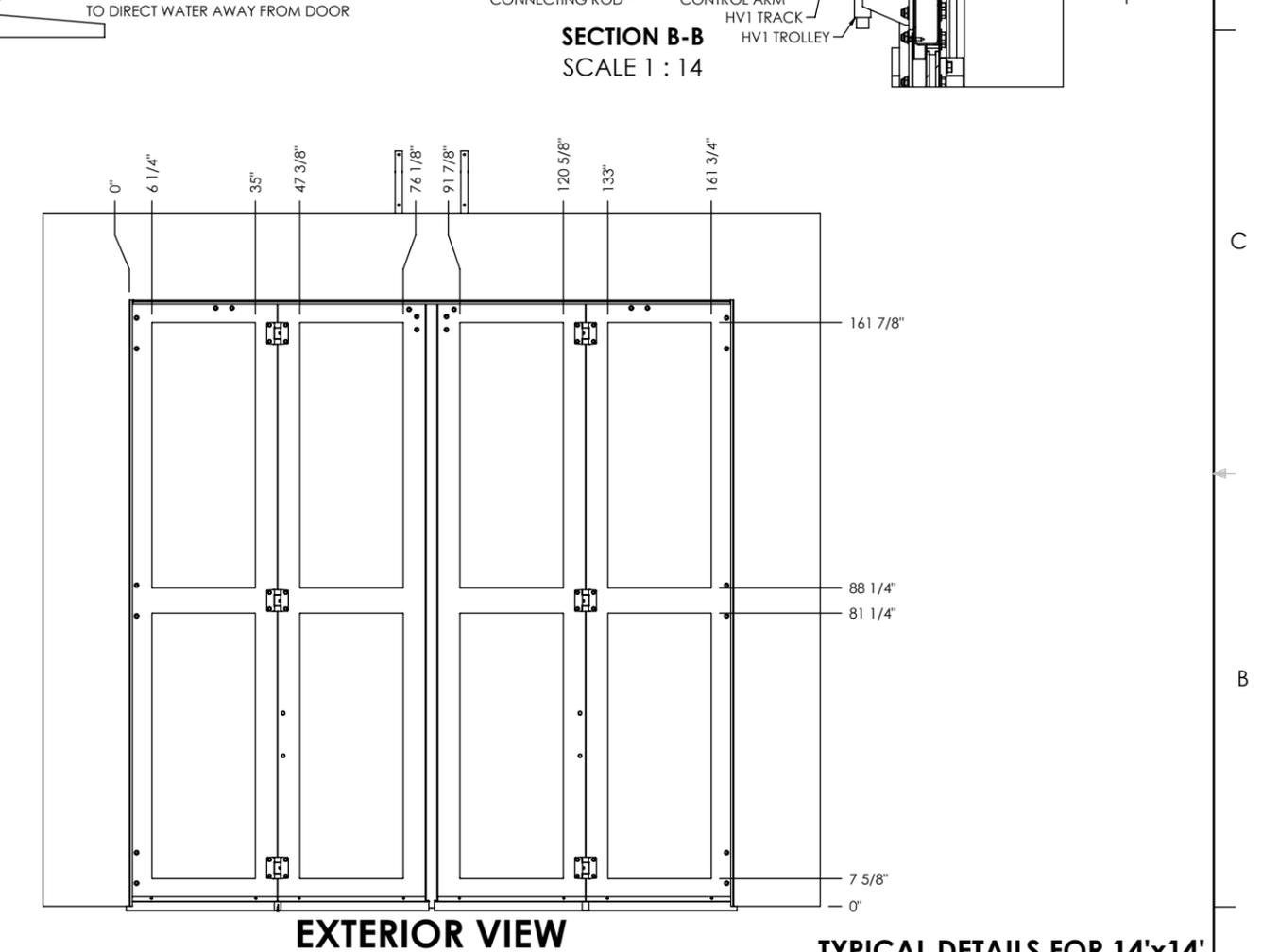
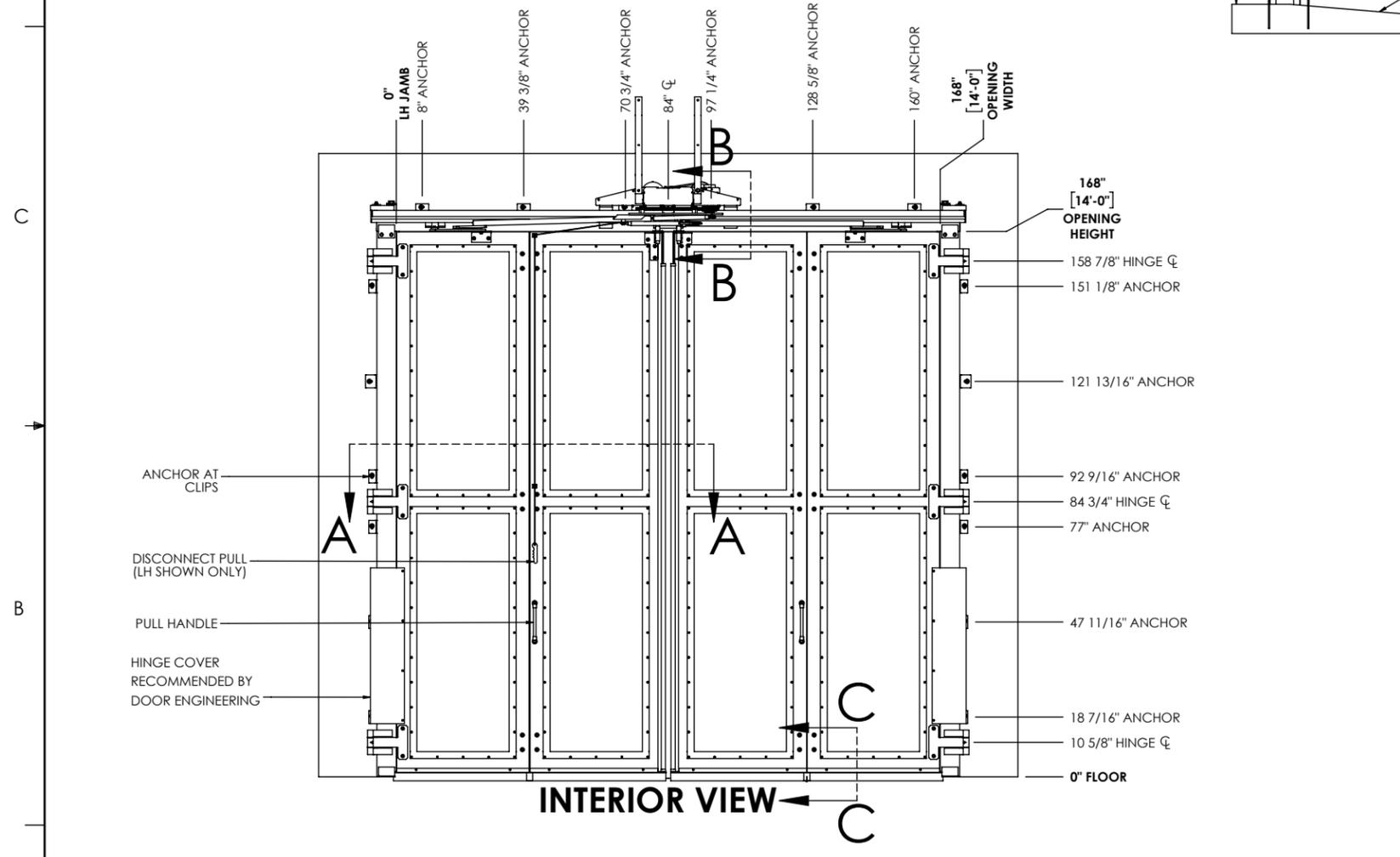
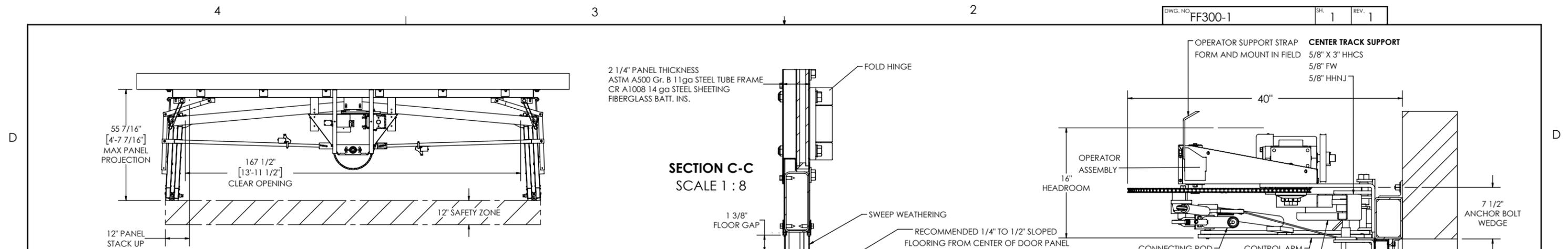
3.1 INSTALLATION

- A. Install Four-Fold metal doors in strict accordance with the approved drawings by qualified door erection crews. All door openings shall be completely prepared by the general contractor prior to the installation of the doors. Permanent or temporary electric wiring shall be brought to the door opening before installation is started and shall be completed so as not to delay the inspection test.
- B. Doors shall be set plumb, level, and square, and with all parts properly fastened and mounted. All moving parts shall be tested and adjusted and left in good operating condition.

3.2 ADJUSTING AND CLEANING

- A. Inspection of the doors and a complete operating test will be made by the installer in the presence of the general contractor or architect as soon as the erection is complete. Any defects noted shall be corrected. After door approval in the above test, the general contractor must assume the responsibility for any damage or rough handling of the doors during construction until the building is turned over to the owner and final inspection is made.
- B. Clean surfaces and repaint abraded or damaged finished surfaces to match factory-applied finish.

END OF SECTION



TYPICAL DETAILS FOR 14'x14' DESIGNED FOR 25 PSF WINDLOAD CONSULT MANUFACTURER FOR HIGHER WINDLOADS, ALTERNATE SIZES, AND LAYOUTS

DRAWINGS ARE THE EXCLUSIVE PROPERTY OF DOOR ENGINEERING AND MANUFACTURING, LLC AND CANNOT BE USED IN WHOLE OR PART WITHOUT WRITTEN CONSENT.			
MATERIAL	THICKNESS		
SEE PARTS LIST	N/A	THIRD ANGLE PROJECTION	
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES		TITLE: FourFold 300 Template	
TOLERANCES: ANGULAR: ± 2°		THIRD ANGLE PROJECTION	
X.X = ± .1 (1/8")			
X.XX = ± .03 (1/32")			
X.XXX = ± .015 (1/64")			
SIZE	DWG. NO.	REV	
B	FF300-1	1	
DRAWN BY	DATE	SCALE: 1:48	MASS: 3598.40
DSM	12/26/2018		
CHECKED BY			SHEET 1 OF 1

SECTION 08700 - FINISHING HARDWARE

08100.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms", whether attached hereto or not.

08700.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operation in connection with the installation of finishing hardware, complete, in strict accordance with the Contract Drawings, the Door Schedule and as herein specified or reasonably implied.
2. Provide all butts, locks, rosettes, estucheons, pulls, push plates, door closers, flush bolts, door stops, anti-panic bolts, kickplates, required panic hardware devices and all other items not specifically mentioned, but necessary and required to make a complete item of work in every respect.
3. All finishing hardware shall be received, stored and distributed and the responsibility for its safety assumed by the Contractor. The protection wrapped around pieces of hardware as it is installed and properly maintained until the final completion of the building.
4. Do not install finishing hardware in the building until all work has been fully completed and dry.
5. Hardware shall be accurately fitted and secured in place, adjusted to operate perfectly and free from scratches and/or other defacements.
6. The Contractor shall be responsible for the condition and operation of all finished hardware until the issuance of the Certificate of Final Acceptance or until the building is occupied, whichever event is sooner.
7. Face hardware shall, after being fitted, be removed before finish or painting is applied and neatly replaced after the finishing or painting is fully completed.
8. Provide and install all electric door strikes in door frames. Coordinate wiring with the electrician.
9. Immediately prior to completion of all work, go over the entire building with the Architect and see that each piece of hardware is undamaged, in perfect working order.
10. Coordinate keying schedule with Owner and provide/install full primary & secondary master keying for all installed lockset hardware.

08700.0300 QUALITY ASSURANCE

1. Manufacturer as quality standard for lock sets and latch sets: Schlage.
2. Standards for latch sets: Schlage.
3. Manufacturer as quality standard for hinges: Stanley Hardware.
4. All other requirements as noted on the drawings.
5. Provide lock sets on all exterior doors and doors called to be locked as called for in the door schedule. Panic bar all exterior doors.
6. Provide passage latch on all other doors not called for on the drawings and specifications.

08700.0400 SUBMITTALS

1. Manufacturer's literature.

08700.0500 PRODUCTS

1. Latch Sets
 - A. All new lock and latch sets to be Schlagelock, "D" Series. (Verify with Owner)
 1. Function:
 - a. Passage Latch - D105 Rhodes 625
 - b. Key Lock - D53PD, D405, D80PD, L9462, D12D Rhodes 626
 2. Finish: Satin Chromium 626
 3. Style: Rhodes
 - B. Approved substitutions shall be listed BHMA performance standards.
 - C. Install electric strikes provided by Owner in door frames to be coordinated with Electrician.
2. Door Stops (All Doors)
 - A. Floor type as FB13/FB14R by Glynn Johnson Corp.

B. Wall type as 50C by Glynn Johnson Corp.

3. Hinges

A. All doors to have 1 1/2" pair, 4 1/2" standard weight, full mortise hinges.

4. Templates

A. Provide templates for installation.

5. Door Closers

A. Norton - Series 1600 or equal. Provide integral closer at storefront type entry and exit doors to be supplied by door manufacturer.

08700.0600 FINISHES

1. All finishes to match that specified for lock and latch sets above. (Verify with Owner)

08700.0700 CUTTING, FITTING AND PATCHING

1. Do all cutting and fitting of woodwork necessary to accommodate the work of other trades, patch and make good and work cut or damaged from any cause.

08700.0800 KEYING

1. All locksets shall be keyed in compliance with key schedule to be provided by the Owner.

* * * * *

08730 WEATHERSTRIPPING AND THRESHOLDS

08730.0100 GENERAL

1. The work under this Section is subject to all applicable provisions of the "Bidding Requirements", the "General Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

08730.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with the installation of all related work, complete, in strict accordance with the contract drawings, and as specified herein or reasonably implied.
2. Provide and install thresholds and weatherstripping on all exterior doors, including those which must comply with ADA requirements for handicap access.
3. Provide thresholds on interior doors at all locations of adjoining (non-continuous) floor types. Threshold material to be aluminum, or as specifically noted on the drawings.
4. Provide carpet thresholds 404 Series at all carpet locations. (See schedule for all types and locations)

08730.0300 MATERIALS

1. Provide thresholds and weatherstripping shall be aluminum alloy extrusions of 6063 hardness T-5 with mill finish complete with all fasteners as required for installation, as manufactured by National Guard Products, Inc. (See schedule for all types and locations)

08730.0400 SUBMITTALS

1. Submit manufacturer's literature.

* * * * *

DIVISION 9 - FINISHES

SECTION 09260 - GYPSUM BOARD SYSTEMS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Metal stud wall framing.
- B. Metal channel ceiling framing.
- C. Acoustic insulation.
- D. Gypsum board.
- E. Taped and sanded joint treatment.

1.02 RELATED WORK

1.03 Section 05400 - Cold Formed Metal Framing.

- A. Section 07213: Thermal insulation.
- C. Section 08111 - Standard Steel Doors and Frames.
- D. Section 08305 - Access Doors: Metal access panels.
- E. Section 09111 - Metal Stud Framing System.
- F. Section 09900 - Painting.

1.05 REFERENCES

- A. ANSI/ASTM C36 - Gypsum Wallboard.
- B. ANSI/ASTM C79 - Gypsum Sheathing Board.
- C. ANSI/ASTM C442 - Gypsum Backing Board.
- D. ANSI/ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.
- E. ANSI/ASTM C557 - Adhesive for Fastening Gypsum Wallboard.
- F. ANSI/ASTM C630 - Water Resistant Gypsum Backing Board.

- G. ANSI/ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
 - H. ANSI/ASTM C646 - Steel Drill Screws for the Application of Gypsum Sheet Material to Light Gage Steel Studs.
 - I. ANSI/ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.
 - J. ANSI/ASTM E90 - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
 - K. ANSI/ASTM E119 - Fire Tests of Building Construction and Materials.
 - L. FS HH-I-521 - Insulation Blankets, Thermal (Mineral Fiber, for Ambient Temperatures).
 - M. GA-201 - Gypsum Board for Walls and Ceilings.
 - N. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.
- 1.06 SYSTEM DESCRIPTION
- A. Acoustic Attenuation for Interior Partitions in accordance with ANSI/ASTM E90.
- 1.07 QUALITY ASSURANCE
- A. Applicator: Company specializing in gypsum board systems work with 5 years documented experience approved by manufacturer.
- 1.08 SUBMITTALS
- A. Submit product data under provisions of Section 01300.
 - B. Provide product data on metal framing, gypsum board, joint tape.
 - C. Submit samples under provisions of Section 01300.
 - D. Submit manufacturer's installation instructions under provisions of Section 01300.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - GYPSUM BOARD SYSTEM

- A. Gold Bond or equal.

2.02 FRAMING MATERIALS

- A. Studs and Tracks: ANSI/ASTM C645; GA 201 and GA 216; galvanized sheet steel.
- B. Furring, Framing and Accessories: ANSI/ASTM C645.
- C. Fasteners: ANSI/ASTM C514.
- D. Adhesive: ANSI/ASTM C557.

2.03 GYPSUM BOARD MATERIALS

- A. Standard Gypsum Board: ANSI/ASTM C36; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.
- B. Fire Rated Gypsum Board: ANSI/ASTM C36; fire resistive type, UL rated; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.
- C. Moisture Resistant Gypsum Board: ANSI/ASTM C630; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.

2.04 ACCESSORIES

- A. Acoustical Insulation: FS-HH-I-521; preformed mineral wool, friction fit type without integral vapor barrier membrane.
- B. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- C. Corner Beads: Metal.
- D. Edge Trim: GA 201 and GA 216; Type U exposed reveal bead.
- E. Joint Materials: ANSI/ASTM C475; reinforcing tape, joint compound, adhesive, water, and fasteners.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that site conditions are ready to receive work.
- B. Beginning of installation means acceptance of existing surfaces and substrate.

3.02 METAL STUD INSTALLATION

- A. Install studding in accordance with ANSI/ASTM C754.
- B. Metal Stud Spacing: 16 inches on center.
- C. Partition Heights: Full height to floor or roof construction above. Install additional bracing for partitions extending above ceiling.
- D. Door Opening Framing: Install double studs at door frame jambs. Install stud tracks on each side of opening, at frame head height, and between studs and adjacent studs.
- E. Blocking: Bolt or screw steel channels to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, etc.
- F. Coordinate installation of bucks, anchors, blocking, electrical and mechanical work placed in or behind partition framing.

3.03 WALL FURRING INSTALLATION

- A. Erect wall furring for direct attachment to concrete block and concrete walls.
- B. Erect Z furring channels vertically. Secure in place on alternate channel flanges at maximum 24 inches on center.
- C. Space furring channels maximum 24 inches on center, not more than 4 inches from abutting walls.
- D. Install thermal insulation vertically and hold in place with Z-furring channels spaced maximum 24 inches on center, not more than 3 inches at external corners and 12 inches at internal corners.

- E. Erect free-standing metal stud framing tight to concrete masonry walls, attached by adjustable furring brackets in accordance with manufacturer's instructions.

3.04 CEILING FRAMING INSTALLATION

- A. Install in accordance with ANSI/ASTM C754 manufacturer's instructions.
- B. Coordinate location of hangers with other work.
- C. Install ceiling framing independent of walls, columns, and above-ceiling work.

3.05 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with GA 201 and GA 216 manufacturer's instructions.
- B. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- E. Use screws when fastening gypsum board to metal furring or framing.
- F. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- G. Place control joints consistent with lines of building spaces as directed.
- H. Place corner beads at external corners as indicated. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

3.06 JOINT TREATMENT

- A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
- B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
- C. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.
- D. Erect in accordance with manufacturer's instructions.

3.10 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09311 - CERAMIC TILE FLOOR FINISH

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Cleavage membrane and Portland cement mortar bed.
- B. Ceramic tile floor and base, installed using the thinset method, with cementitious grouted joints.
- C. Marble thresholds in wall openings.

1.02 RELATED WORK

- A. Section 03346 - Concrete Floor Finishing: Trowelling of floor slab for tile adhesive.
- B. Section 09312 - Ceramic Wall Tile Finish.
- C. Section 09330 - Quarry Tile.

1.03 REFERENCES

- A. ANSI A108.1 - Ceramic Tile Installed with Portland Cement Mortar.
- B. ANSI A108.4 - Ceramic Tile Installed with Water-Resistant Organic Adhesives.
- C. ANSI A108.5 - Ceramic Tile Installed with Dry-Set Portland Cement Mortar.
- D. ANSI A108.6 - Ceramic Tile Installed with Chemical Resistant, Water Cleanable Tile-Setting Epoxy.
- E. ANSI A118.1 - Dry-Set Portland Cement Mortar.
- F. ANSI-A118.3 - Chemical Resistant, Water Cleanable Tile- Setting Epoxy.
- G. ANSI A118.4 - Latex-Portland Cement Mortar.
- H. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.
- I. TCA 137.1 - Recommended Standard Specifications for Ceramic Tile.

1.04 QUALITY ASSURANCE

- A. Conform to ANSI - American National Standard Specifications for the Installation of Ceramic Tile.
- B. Conform to ANSI - Recommended Standard Specifications for Ceramic Tile - TCA 137.1.

1.05 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Indicate patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, thresholds setting details.
- C. Submit product data, specifications, and instruction for using adhesives and grouts.
- D. Submit samples under provisions of Section 01300.
- E. Mount tile, adhesive, and grout on 16 X 16 inch plywood panel, representative of pattern, color variations, and grout joint size variations.
- F. Submit manufacturer's certification that tile materials supplied conform to TCA 137.1.

1.06 MAINTENANCE DATA

- A. Submit maintenance data.
- B. Include cleaning methods, cleaning solutions recommended, stain removal methods, and polishes and waxes recommended.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 TILE MATERIALS

- A. Ceramic Floor Tile: Refer to finish schedule & notes.

- B. Thresholds: Marble type at all floor tile locations, color selected by architect, factory finish, 4 x 3/4 inch size by full width of wall or frame opening, beveled both sides, radiused edges from bevel to vertical face.

2.02 MORTAR MATERIALS

- A. Mortar Materials: ANSI Ceramic Tile Standard A-2.

2.03 ADHESIVE MATERIALS

- A. Organic Adhesive: ANSI A136.1, thinset bond type.
- B. Epoxy Adhesive: ANSI A118.3, thinset bond type.

2.04 MORTAR BED

- A. Mortar Bed: ANSI A118.1, thinset bond coat, dry-set cementitious mortar.

2.05 GROUT TYPE

- A. Grout: Cementitious type; color to be selected; resistant to shrinking.

2.06 ACCESSORIES

- A. Cleavage Membrane: 4 mil (0.1 mm) thick polyethylene film.

2.07 MORTAR MIX AND GROUT

- A. Mix and proportion pre-mix setting bed and grout materials in accordance with manufacturer's instructions.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install cleavage membrane
- B. Install ceramic tile floor, thresholds, and base in accordance with ANSI A108.1.
- C. Lay tile to pattern indicated. Verify pattern is uninterrupted through openings.
- D. Provide thresholds at wall or frame openings to other building areas not receiving ceramic tile floor finish.

- E. Cut and fit tile tight to protrusions and vertical interruptions. Form corners [and bases] neatly.
 - F. Work tile joints uniform in width, subject to variance in tolerance allowed in tile size. Joints: Watertight, without voids, cracks, excess mortar, or grout.
 - G. Sound tile after setting. Replace hollow sounding units.
 - H. Allow tile to set for a minimum of 48 hours prior to grouting.
- 3.02 PROTECTION
- A. Prohibit traffic from floor finish for 48 hours after installation.

END OF SECTION

SECTION 09312 - CERAMIC TILE WALL FINISH

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Ceramic tile walls and base, installed using thinset method, with cementitious grouted joints.
- B. Ceramic washroom accessories.

1.02 RELATED WORK

- A. Section 09210 - Gypsum Plaster.
- B. Section 09220 - Portland Cement Plaster: Base coat for ceramic tile finish.
- C. Section 09311 - Ceramic Tile Floor Finish.

1.03 REFERENCES

- A. ANSI A108.1 - Ceramic Tile Installed with Portland Cement Mortar.
- B. ANSI A108.4 - Ceramic Tile Installed with Water-Resistant Organic Adhesives.
- C. ANSI A108.5 - Ceramic Tile Installed with Dry-Set Portland Cement Mortar.
- D. ANSI A108.6 - Ceramic Tile Installed with Chemical Resistant, Water Cleanable Tile-Setting Epoxy.
- E. ANSI A118.1 - Dry-Set Portland Cement Mortar.
- F. ANSI-A118.3 - Chemical Resistant, Water Cleanable Tile- Setting Epoxy.
- G. ANSI A118.4 - Latex-Portland Cement Mortar.
- H. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.
- I. TCA 137.1 - Recommended Standard Specifications for Ceramic Tile.

1.04 QUALITY ASSURANCE

- A. Conform to ANSI - American National Standard Specifications for the Installation of Ceramic Tile.
- B. Conform to ANSI - Recommended Standard Specifications for Ceramic Tile - TCA 137.1.

1.05 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Submit product data specifications and instructions for using adhesives and grouts.
- C. Submit samples under provisions of Section 01300 for color selection.
- D. Mount tile, adhesive, and grout on 16 x 16 inch plywood panel, representative of pattern, color variations, and grout joint size variations.
- E. Submit manufacturer's certification that tile materials supplied conform to TCA 137.1.

1.06 MAINTENANCE DATA

- A. Submit maintenance data.
- B. Include cleaning methods, cleaning solutions recommended, stain removal methods, and polishes and waxes recommended.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 TILE MATERIALS

- A. Refer to finish schedule & notes.

2.02 MORTAR MATERIALS

- A. Mortar Materials: ANSI Ceramic Tile Standard A-2.

2.03 ADHESIVE MATERIALS

- A. Organic Adhesive: ANSI A136.1, thinset bond type.
- B. Epoxy Adhesive: ANSI A118.3, thinset bond type.

2.04 MORTAR BED

- A. Mortar Bed: ANSI A118.1, thinset bond coat, dry-set cementitious mortar.

2.05 GROUT TYPE

- A. Grout: Cementitious type; color to be selected; resistant to shrinking.

2.06 MORTAR MIX AND GROUT

- A. Mix and proportion pre-mix [setting bed and] grout materials in accordance with manufacturer's instructions.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install ceramic wall tile, in accordance with ANSI A108.1.
- B. Cut and fit tile tight to protrusions and perpendicular interruptions. Form corners and bases neatly.
- C. Form internal angles square and external angles bullnosed.
- D. Sound tile after setting. Replace hollow sounding units.
- E. Allow tile to set for minimum 48 hours prior to grouting.

3.02 PROTECTION

- A. Prohibit activities near wall finish for 48 hours after installation.

END OF SECTION

Division 0900-4000
Floor Resurfacing 4000
Flooring Specification

SECTION 1 – GENERAL

1.1 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data, installation instructions and general recommendation for each resinous flooring material required. Include certification indicating compliance of materials with requirements.
- B. Samples: Submit, for verification purposes, 4-inch square samples of each type of resinous flooring required, applied to a rigid backing, in color and finish indicated.

1.2 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer/installer (no subcontractors) with not less than twenty years of successful experience in manufacturing and installing principal materials described in this section. Manufacturer and installer must furnish certified documentation regarding the successful completion of at least 15 projects of similar size and complexity.
- B. Pre-Installation Conference
 - 1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
 - 2. Attendance
 - a. General Contractor
 - b. Architect/Owner's Representative
 - c. Manufacturer/Installer

1.3 MATERIAL DELIVERY, STORAGE AND HANDLING

- A. Material shall be delivered to job site and be checked by flooring installer for completeness and shipping damage prior to job start.
- B. Material shall be stored in a dry enclosed area, protected from exposure to moisture. Temperature of storage area shall be maintained between 60 and 85°F (16 and 30° C).

1.4 PROJECT CONDITIONS

- A. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier should be present for concrete subfloors on or below grade. Otherwise, contact the Engine Bay Floors Technical Department prior to the installation of the resinous flooring.
- B. Utilities, including electric, water, heat (air temperature between 60 and 85°F (16 and 30° C) and finished lighting to be supplied by the owner.
- C. Job area to be free of other trades during, and for a period of 24 hours, after floor installation.
- D. Protection of finished floor from damage by subsequent trades shall be the responsibility of the General Contractor.

SECTION 2 – PRODUCTS

2.1 MANUFACTURERS

- A. The products of Engine Bay Floors (800-573-9198) are identified below as the basis of design, or equal.

2.2 RESINOUS FLOORING SYSTEM

Floor Resurfacing 4000 Primer - a two component, greater than 95% solids, lower than 50 g/l VOC, epoxy primer cured with modified cycloaliphatic amine hardener with additive offering enhanced adhesion to concrete substrates.

Floor Resurfacing 4000 Mortar - a three component (epoxy resin, modified cycloaliphatic amine, silica sand mortar) with greater than 95% solids, lower than 50 g/l VOC, cementitious modified silica aggregate offering enhanced coefficient of thermal expansion resulting in better adhesion to concrete.

Floor Resurfacing 4000 Grout Coat - a three component (epoxy resin, modified cycloaliphatic amine, colorant) with greater than 95% solids, lower than 50 g/l VOC. The coating should be fast curing to minimize outgassing typically less than 6-7 hours and modified with adhesion promoters.

Floor Resurfacing 4000 Topcoat - a dimer aliphatic isocyanate urethane coating with UV blockers with greater than 92% solids, lower than 100 g/l VOC. Urethane cannot contain any extenders or diluents that are not reactive or do not come out of the film.

2.3 **SYSTEM CHARACTERISTICS**

- A. Color and Pattern: As selected by engineer/architect/owners agent from manufacturer's standard colors. A minimum of three colors will be used.
- B. Wearing Surface: Textured for slip resistance per engineer/architect/owner's agent from manufacturer's full range.
- C. Integral Cove Base: 6 inches high with 1-1/2 inch radius.
- D. Striping: Striping guide lines must be included. Striping shall be four inches in width. Color selected for these guide lines shall be one of three to be used. Exact location shall be confirmed by the engineer architect or owner.
- E. Physical Strength Qualification: Flooring system must be durable enough to resist the constant loads of heavy engines and apparatus. The floor must be capable of dissipating high temperatures from hot tires and guaranteed to stay bonded and resistant to delamination. The contractor, in conjunction with the manufacturer, is responsible for gathering the data in regards to engine weights, load points, and temperature exposure required to guarantee this qualification.

2.3 **SYSTEM COMPONENTS**

- A. Primer: Type recommended by manufacturer for substrate and body coat(s) indicated.
- B. Body Coat(s):
 - 1. Resin: Epoxy
 - 2. Application method: troweled
- C. Pigmented Grout Coating
 - 1. Resin: Epoxy
 - 2. Application method: squeegee/back roll
- D. Pigmented Top Coating
 - 1. Resin: Epoxy aliphatic polyester polyurethane
 - 2. Application method: squeegee/back roll

2.5 **ACCESSORY MATERIALS**

- A. Patching and Fill Material: Resinous product of resinous flooring manufacturer.

- B. Joint Sealant: Type produced by manufacturer or resinous flooring system for type of service and joint condition indicated.

SECTION 3 – EXECUTION

3.1 INSPECTION

- A. Ensure area is clean and dry with adequate heat, light and ventilation. The surface must be clean and dry, physically sound, and free of contamination. Surfaces must be free of holes, voids or defects. Cracks and abrupt changes in the surface profile must be corrected. Area shall be free of other trades to allow smooth flow of installation process to ensure optimum installation.

3.2 SURFACE PREPARATION

- A. Prepare surface utilizing mechanical means where possible (i.e. self-contained Blastrac, scarifiers, scabblers, etc.)
- B. Saw cut and chase perimeter edges to provide a “key-in” of material.
- C. Ensure all static (non-moving) cracks are filled as recommended by manufacturer/installer.
- D. Identify and mark all active (moving) joints.
- E. Enlarged cracks and spalled areas shall be filled and leveled with an epoxy fill material before coatings are applied (Engine Bay Floor’s fine crack fill).
- F. Pre-fill all divots/holes in the concrete surface that are larger than 2” with Engine Bay Floor’s epoxy patching compound.
- G. Existing coatings greater than 4 mils must be removed by the PrepMaster diamond grinding process. No other method of removal will be accepted.

3.3 INSTALLATION

- A. General: Apply components of flooring system according to manufacturer’s written instructions to produce a uniform monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer’s written instructions. Prevent contamination during application and

- curing process.
3. At substrate expansion and isolation joints, provide joint in flooring to comply with flooring manufacturer's written recommendations.
- B. Installation
1. Saw cut and chase perimeter edges to provide a "key-in" of material.
 2. Prepare surface utilizing mechanical means where possible (i.e. self-contained Blastrac, scarifiers, scabblers, etc.).
 3. Notched rake apply hybrid epoxy mortar overlayment at ¼" minimum thickness.
 4. Grind based after initial cure to ensure smooth appearance.
 5. Apply pigmented 100% solids epoxy grout coat.
 6. Broadcast for texture, (if desired).
 7. Apply pigmented aliphatic polyester polyurethane topcoat.
- C. Application
- System Installation – Epoxy mortar system to be installed at a minimum total thickness of 250 mils. Finish coat to achieve even color consistency and non-slip texture as specified by owner.

3.4 FIELD QUALITY CONTROL

- A. The right is reserved to invoke the following material testing procedure at any time, and any number of times during period of floor application.
- B. If test results show material being used do not comply with specific requirements, Contractor may be directed by Owner to stop work; remove non-complying materials; pay for testing; reapply flooring materials to properly prepared surfaces which had previously been coated with unacceptable materials.

3.5 CURING, PROTECTION AND CLEANING

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.
- B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

- C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

SECTION 4 – WARRANTY

4.0 WARRANTY

- A. Guarantee and Warranty: Warranty shall be from a single source manufacturer/polymer systems applicator. The polymer system shall be warranted against defects in materials and workmanship for a period of ten years. Repair or replace any or all portions of the work that fail under normal conditions or use during the warranty period, promptly and at no cost to the customer and by using methods and materials specified for the initial construction.

SECTION 09500 - SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 WORK INCLUDED

Provide and install:

- A. Suspended metal grid ceiling system.
- B. Acoustical tile.
- C. Fire rated assembly with gypsum board boxes over light fixtures.
- D. Hold down clips and access clips.
- E. Perimeter trim.

1.02 REFERENCES

- A. ASTM C635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
- B. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- C. Armstrong Specification and Installation Guidelines.
- D. UL - Underwriter's Laboratories System Ratings.

1.03 SYSTEM DESCRIPTION

- A. Installed System: Conform to UL Assembly rating noted on plans.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacture of ceiling suspension system and ceiling tile 10 years minimum experience.
- B. Installer: Company with 5 years minimum experience.

1.05 SUBMITTALS

- A. Submit product data.

- B. Provide product data on metal grid system components, acoustic units, and related accessories.
- C. Submit samples of ceiling tile and grid components.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C) and humidity of 20 to 40 percent prior to, during, and after installation.

1.07 SEQUENCING/SCHEDULING

- A. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Schedule installation of acoustic units after interior wet work is dry.

1.08 EXTRA STOCK

- A. Provide one extra quantity of each type of acoustic units to Owner.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - SUSPENSION SYSTEM

- A. Armstrong 15/16" prelude fire guard heavy duty system with hold down clips at all locations, or equal. Refer to schedule for variations in grid types.

2.02 SUSPENSION SYSTEM MATERIALS

- B. Grid: ASTM C635, heavy duty, fire rated to 2 hour assembly, exposed T; components die cut and interlocking.
- C. Accessories: Stabilizer bars clips splices edge moldings and hold down clips required for suspended grid system.
- D. Grid Materials: Commercial quality cold rolled steel with galvanized coating.
- E. Grid Finish: White.

2.03 ACCEPTABLE MANUFACTURERS - ACOUSTIC UNITS

A. Armstrong and Celotex tile as indicated on plans/finish schedule notes or equal.

2.04 ACOUSTIC UNIT MATERIALS

A. Acoustic Panels shall conform to the Armstrong Physical Data (Refer to Finish Schedule for designations).

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that existing conditions are ready to receive work.
- B. Verify that layout of hangers will not interfere with other work.
- C. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

- A. Install system in accordance with ASTM C636 and manufacturer's instructions and as supplemented in this Section.
- B. Install fire rated system in accordance with UL Design No. G250.
- C. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- D. Supply hangers with instructions for their correct placement. If metal deck is not supplied with hanger tabs, coordinate the installation of hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- E. Hang system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers to span the extra distance.
- G. Locate system on room axis according to reflected plan.

- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
- I. Do not eccentrically load system, or produce rotation of runners.
- J. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions. Field rabbet panel edge. Where bullnose concrete block corners or round obstructions occur, provide preformed closers to match edge molding.
- K. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- L. Lay directional patterned units one way with pattern parallel to shortest room axis. Fit border neatly against abutting surfaces.
- M. Install acoustic units level, in uniform plane, and free from twist, warp and dents.
- N. Install hold-down clips to retain panels tight to grid system.
- O. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with UL assembly requirements.

3.03 TOLERANCES

- A. Variation from Flat and Level Surface: 1/8 inch in 10 ft.
- B. Variation from Plumb of Grid Members Caused by Eccentric Loads: Two degrees maximum.

SECTION 09650 - RESILIENT FLOORING

PART 1 GENERAL

1.01 WORK INCLUDED

Provide, prep and installation of the following:

- A. Preparation of substrate surfaces.
- B. Rubber bases at all areas which are effected by new work.
- C. Application of vinyl tile with up to three (3) colors at any location with pattern as provided by Architect.
- D. Application of rubber stair treads from first floor to Attic, where designated by architect.
- E. Cleaning of all surfaces and areas of work.

1.02 RELATED WORK

- A. Section 03346 - Concrete Floor Finishing: Finish trowelling of floor slab.

1.03 REFERENCES

- A. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl- Asbestos.
- B. FS L-F-450 - Flooring, Vinyl Plastic.
- C. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.04 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Describe floor pattern, scaled design, color of various materials, and location of floor accessories.
- C. Submit samples under provisions of Section 01300.]

- D. Include duplicate 12 x 12 inch sized samples of each flooring material, color, and pattern selected.
- E. Include duplicate 12 x 12 inch long samples of base and stair tread selected.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Maintain minimum 70 degrees F (21 degrees C) air temperature at flooring installation area for three days prior to, during, and for 24 hours after installation.
- B. Store flooring materials in area of application. Allow three days for material to reach equal temperature as area.

1.06 EXTRA STOCK

- A. Deliver 25 sq ft of each color and pattern of floor tile material required for project, for maintenance use.
- B. Clearly identify each box or roll.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Armstrong or equal.

2.02 FLOOR COVERING MATERIALS

- A. Vinyl Tile: 12 x 12 inch size x 1/8 inch thick, marbled pattern; color; to match existing.

2.03 BASE MATERIALS

- A. Base: Conforming to FS SS-W-40, Type I rubber; top set coved, 4 inch high, 1/8 inch thick including premolded end stops and external corners, color as selected.

2.04 ACCESSORIES/ADHESIVES/SEALERS

- A. Edge Strips: rubber type; factory finish; color selected by Architect/Engineer.
- B. Sub-Floor Filler: White premix latex, mix with water to produce cementitious paste.
- C. Primers and Adhesives: Waterproof; of types recommended by resilient flooring manufacturer for specific material.
- D. Sealer and Wax: Type recommended by resilient flooring material manufacturer for material type and location.

PART 3 EXECUTION

3.01 INSPECTION

- A. Ensure floor surfaces are smooth and flat with maximum variation of 1/8 inch in 10 feet (1 1/960).
- B. Ensure concrete floors are dry (maximum 7 percent moisture content) and exhibit negative alkalinity, carbonization, or dusting.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- B. Clean floor and apply, trowel and float filler to leave smooth, flat hard surface. Prohibit traffic until filler is cured.

3.03 INSTALLATION - FLOORING

- A. Open floor tile cartons, enough to cover each area, and mix tile to ensure shade variations do not occur within any one area.
- B. Clean substrate. Spread cement evenly in quantity recommended by manufacturer to ensure adhesion over entire area of installation. Spread only enough adhesive to permit installation of flooring before initial set.
- C. Set flooring in place; press with heavy roller to ensure full adhesion.
- D. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

- E. Install with minimum tile width 1/2 full size at room or area perimeter, to square grid pattern with all joints aligned with pattern grain parallel for all units and parallel to width of room.
- F. Terminate resilient flooring at centerline of door openings where adjacent floor finish is dissimilar.
- G. Install edge strips at unprotected or exposed edges where flooring terminates.
- H. Scribe flooring to walls, columns, cabinets, floor outlets and other appurtenances to produce tight joints.
- I. Install flooring in pan type floor access covers. Maintain floor pattern.
- J. Continue flooring through areas to receive moveable type partitions without interrupting floor pattern.
- K. Install feature strips and floor markings where indicated. Fit joints tightly.

3.04 INSTALLATION - BASE

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches (457 mm) between joints.
- B. Miter internal corners. Use premolded sections for external corners and exposed ends.
- C. Install base on solid backing. Adhere tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other obstructions.
- E. Install straight and level to variation of plus or minus 1/8 inch over 10 feet (1/960).

3.06 PROTECTION

- A. Prohibit traffic from floor finish for 48 hours after installation.

3.07 CLEANING

PROPOSED FIREHOUSE PROJECTS
TAPPAN FIRE DISTRICT
TAPPAN, NY

RESILITENT FLOORING
DIVISION 9 – FINISHES
SECTION 09650

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09688 - CARPETING GLUE DOWN

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Prepare surfaces to receive carpeting.
- B. Apply glue down carpeting on floor surfaces where indicated, complete with required accessories.
- C. Install edge strips where carpeting terminates at other floor finishes.

1.02 RELATED WORK

- A. Section 03346 - Concrete Floor Finishing: Finish trowelling of concrete floor slabs.

1.03 REFERENCES

- A. FS DDD-C-0095 - Carpet and Rugs, Wool, Nylon, Acrylic, Modacrylic, Polyester, Polypropylene.

1.04 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Clearly indicate the location of all seams, method of joining seams, direction of carpet, type of adhesive to be used, method of integrating edge strips with carpet, and installation procedures.
- C. Submit samples under provisions of Section 01300.
- D. Submit one sample of each type of carpet to be used, sufficiently sized to clearly indicate construction. In addition, submit one duplicate sample of each color selected.
- E. Also submit one 12 inch long sample of each type of edge stripping to be used.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Do not commence with carpet installation until painting and finishing work is complete and ceilings and overhead work, tested, approved, and completed.
- B. Maintain room temperature at minimum 60 degrees F (15 degrees C) for at least 24 hours prior to installation, and relative humidity at approximately that at which the area is to be maintained.
- C. Provide sufficient lighting.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Lees 24" x 24" Modular Compositions Collection Volume II Commercial Carpets or equal.

2.02 MATERIALS

- A. Carpet: Ives Ellington manufactured by Lees.
- B. Adhesive: Type recommended by carpet manufacturer to suit application and expected service.
- C. Edge Strips: Rubber type; factory finish; color selected by Architect.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean floors of dust, dirt, solvents, oil, grease, paint, plaster, and other substances detrimental to proper performance of adhesive and carpet. Allow floors to thoroughly dry.
- B. Ensure floors are level, with maximum surface variation of 1/4 inch in 10 feet, noncumulative.
- C. Ensure concrete floors are free from scaling and irregularities and exhibit neutrality relative to acidity and alkalinity.

- D. Use an approved cementitious filler to patch cracks, small holes, and for levelling.

3.02 INSTALLATION

- A. Lay out pattern of carpet for Architect/Engineer approval.
- B. Check matching of carpet before cutting and ensure there is no visible variation between dye lots.
- C. Cut carpet, where required, in manner to allow proper seam and pattern match. Ensure cuts are straight and true and unfrayed.
- E. Join seams in recommended manner so as not to detract from the appearance of the carpet installation and decrease its life expectancy. Ensure seams are straight, not overlapped or peaked and free of gaps.
- F. Vacuum clean substrate. Spread adhesive in quantity recommended by manufacturer after primer application to ensure proper adhesion over full area of installation. Apply only enough adhesive to permit proper adhesion of carpet before initial set.
- I. Cut and fit carpet neatly around projections through floor and to walls and other vertical surfaces.
- J. Fit carpet snugly to walls or other vertical surfaces where no base is scheduled, leaving no gaps.
- K. Do not place heavy objects such as furniture on carpeted surfaces for minimum of 24 hours or until adhesive is set.
- L. Entire carpet installation is to be laid tight and flat to subfloor, well fastened at edges, and present a uniform pleasing appearance. Ensure monolithic color, pattern, and texture match within any one area.
- M. Install edging strips where carpet terminates at other floor coverings. Use full length pieces only. Butt tight to vertical surfaces. Where splicing cannot be avoided, butt ends tight and flush.
- N. Carpet in second floor lobby corridor, meeting room and conference room shall have 12" solid color edge and 8" accent strip at all perimeters typical.

END OF SECTION

09688-3

PROPOSED FIREHOUSE PROJECTS
TAPPAN FIRE DISTRICT
TAPPAN, NY

CARPETING GLUE DOWN
DIVISION 9 – FINISHES
SECTION 09688

09688-4

SECTION 09900 PAINTING

09900.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the "Bidding Requirements", the "Conditions of the Contract", "Contract Forms" and Division 1 - "General Requirements", which form a part hereof whether attached hereto or not.

09900.0200 WORK INCLUDED

1. Include all labor, materials and appliances and perform all operations in connection with painting and finishing and all related work, complete, in strict accordance with the Contract Drawings, the Schedule of Finishes and as specified herein.
2. Examine the Specifications and Drawings for the various other trades. Let it be understood that all surfaces normally requiring painting or colored finish that are left unfinished by the requirements of other Specifications shall be painted or finished as part of this Section.
3. All exposed surfaces, interior and exterior, of every description except glass and not designated in the contract drawings to be finished with a special coating as specified herein or to be factory finished or pre-finished, shall be finished as part of the work of this Section, all as required for a complete job or as specified herein including, but not limited to the following:
 - a. Painting of all exterior metal work excepting aluminum, copper and other non-ferrous metals unless otherwise noted on the drawings.
 - b. Painting of all interior metal work, trims, hollow metal work not factory finished as part of this contract and all exposed miscellaneous metal, etc., excepting non-ferrous metals.
 - c. Interior painting and/or finishing of all gypsum board, doors, miscellaneous trim, door frames, moulding, concrete block walls, etc.
 - d. Exterior wood trim, fascias, soffits, wood siding, doors, etc., to be finished as hereinafter specified and as noted on drawings.
 - e. Painting of all ferrous metal access panels, ducts, registers and grilles and convactor enclosures, piping, conduit and component parts, etc., not factory finished. The inside of all ducts at register and grille openings shall be painted black.
 - f. Paint colors, textures, finishes, etc., shall be as selected by the Architect.

1. Painting and finishing products for use in work shall be standard best or top brands produced for each particular kind of material required, as manufactured by Pittsburgh Plate Glass Co., Pratt and Lambert, Benjamin Moore & Co. or Sherwin Williams. All materials shall bear original manufacturer's identifying label on each container.
 - a. Each kind of coating for the several types of paint finish shall be factory mixed to match samples and colors and consistencies for immediate application to the surface involved.
2. Materials for succeeding coats on any one surface shall be products of same manufacturer furnishing first or primer-sealer coat for that particular surface, except where red lead paint or other metal primer is used. Compatibility with finish coats must be verified before application of finish.
3. Raw linseed oil: ASTM D-234
4. Boiled linseed oil: ASTM D-260
5. Turpentine: ASTM D-13
6. Shellac: Pure, white or orange gum, cut in pure denatured alcohol, using 5 pounds of gum to gallon. Orange shellac shall be used for painting over knots, sap and resinous woods.
7. Spackling Compound: Finely ground, grit-free; when dry shall set easily and take any finish.
8. Putty: ASTM D-219, Class "B", white lead whiting putty.
9. Patching Plaster: White, non-shrinking, containing no lime; uniform in set and quality.
10. Tinting colors: Where required for oil paint shall be ground in pure linseed oil. Colors shall be non-fading and shall be as recommended by manufacturer of tinting coating.
11. Required Samples and Colors:
 - a. Colors: As selected by the Architect. Obtain approval before starting work. Color shall include up to three (3) colors per area to allow for accent walls & soffits, etc.
 - b. Following approval of manufacturers, submit samples of materials described

- herein in one pint containers. Approval of samples will be based upon information from paint manufacturers certifying that products proposed for use are standard, best or top brands produced by then for purpose intended and are readily obtainable as such in "over the counter" sales to consumer market. Do not proceed with work until samples are approved.
- c. Before placing orders for materials, submit name or names of paint manufacturers and brands for approval. Such submission to be made within 30 days after approval.
 - d. Do not construe approval of advanced samples as total guarantee of acceptance of materials as they will be subjected to field inspection, from time to time, as work progresses.
 - e. Where directed, prepare a Schedule of Colors as selected by the Architect. Prepare sample panels in accordance with the Schedule of Colors to be approved before work proceeds. panels will be considered standard for workmanship throughout.

12. Other materials as hereinafter specified:

- a. All materials used shall be in compliance with current Federal Regulations concerning use of lead in paint.
- b. All paints, stains and coatings applied shall be in conformance with current Federal and/or local regulations regarding hydrocarbon emissions. (air pollution, etc.)

09900.0400 RELATED WORK SPECIFIED ELSEWHERE

1. Priming, backpainting, factory finishing, painting of concealed work as described under various Divisions of the Contract.
2. Finishes - Division 9.

09900.0500 GENERAL REQUIREMENTS

1. Order materials in advance, in large enough quantities. Deliver in unopened containers in ample time to facilitate work.
2. Store materials on premises where directed. Keep storage space clean and accessible. Remove oil, paint soaked rags, waste, overall and the like at close of each day's work. Take every precaution to avoid damage by fire.
3. Provide suitable coverings, clean drop cloths and the like to protect work of this

Section, adjacent surfaces, equipment, objects such as adjacent woodwork, glass and metal work and the like.

4. Upon completion of work, remove from premises surplus materials, protective coverings, empty containers, rags, dirt, other debris resulting from work of this Section. Retouch finished work where ever necessary, as directed. Remove daubs, paint spatters and the like from walls, floors, glass, metal and other surfaces.
5. The Contractor shall take every precaution he deems necessary to prevent damage by fire. In addition, keep two (2) fire extinguishers, 5 pounds, CO2 or dry chemical type, Underwriters' approved, in paint storage room at all times, prominently located one near entrance to room, another near windows. Keep not less than three (3) buckets of sand near materials at all times. Buckets shall have round bottoms, shall be prominently located and painted bright red and shall have the word "FIRE" stencilled thereon in large, white letters. All other precautions and requirements as required by the institution and other authorities having jurisdiction shall be adhered to.
6. Rooms or spaces assigned for the storage and mixing of paint shall be kept locked. At least one key of each room or space shall be deposited with the Owner's field representative or custodial service so as to provide access thereto during non-working hours.

09900.0600 PREPARATION OF SURFACES

1. General: Properly prepare surfaces required to receive paint and other finishes. Broom clean rooms and spaces before painting is started. Surfaces to be painted shall be perfectly dry.
2. Sandpaper woodwork required to be painted or finished. Remove roughness; brush and remove dust. Wash off grease, dirt with approved cleaner. Give knots and sappy streaks, two thin coats of orange shellac. Cracks, nail holes and surface defects shall be filled with putty after priming coat, filler or shellac has been applied. Putty shall be brought up flush with surface.
3. Plaster Surfaces: Clean thoroughly of grit, grease, dirt, loose material, etc. Cut off, fill with patching plaster of affected surfaces. Give patched portions coat of primer-sealer in addition to other specified coats.
 - a. The priming coat on plaster shall be tinted to the approximate shade of the final coat. All suction sports or "hot spots" in plaster or cement after the application of the first coat, shall be touched up before applying the second coat, to product an even result in the finished coat. Obtain color schedules for rooms before priming walls.
4. Thoroughly clean bare metal surfaces required to be painted of foreign matter such as

grease, rust, scale and dirt, before applying priming coat. Where solder flux has been used, clean with benzine before applying paint. Clean shop coated metal surfaces of foreign materials; touch up spots where marred. Remove rough surfaces by sandpapering.

5. Galvanized metal surfaces scheduled to be painted shall be thoroughly cleaned with solvent until they are completely free from dirt, oil and grease. Thoroughly treat the cleaned surface with phosphoric acid etch. Remove all excess etching solution and allow to dry completely before application of paint.
6. Dents, cracks and the like, hollow places, open joints and other irregularities in metal work to be painted shall be filled with approved metal filler suitable for purpose. After setting, sand to smooth hard finish.

09900.0700 MIXING

1. Mix materials thoroughly. Strain if necessary before using. Addition of thinners, such as linseed oil or turpentine shall be added to ready mixed materials only in accordance with paint manufacturers' printed instructions. If no printed instructions appears on containers, obtain this information in writing from paint manufacturer.

09900.0800 WORKMANSHIP

1. General

Use only qualified painters for the mixing and application of paint on exposed surfaces. In the acceptance or rejection of installed painting, no allowance will be made for lack of skill on the part of painters. All paint shall be applied in accordance with the materials manufacturer's instructions.

2. Environment

- a. Do no painting or finishing when air is dust laden nor where weather or temperature conditions are suitable. Temperature within building shall be maintained at a minimum of 60 degrees F. during painting and drying period.
- b. Plaster, mortar, brick, concrete or any masonry related surfaces shall not be painted if its moisture content exceeds 12% -- an alkali resistant primer is to be used in place of scheduled primer if moisture content is between 8% and 12%.
- c. Exterior wood shall not be painted if moisture content exceeds 15%.
- d. When necessary, an approved moisture meter will be used to determine moisture conditions.

3. Operating Units

When painting operating units, do not apply paint to sliding contact surfaces, where bare metal is necessary for proper operation.

4. Undercoats shall approximate shade of finish coat.
5. Exposed Duct Covering: Painted top, bottom, sides and ends, except where these surfaces are inaccessible.
6. Number of Coats: Except as otherwise specified under paragraph SCHEDULE, paint coats described herein are in addition to prime coats applied under this and other Sections: unless otherwise specified.
7. Mechanics: All work shall be executed by skilled mechanics in conformance with the requirements of the specifications.
8. Conditions for Painting: Surfaces shall be clean, dry and free from frost. Atmosphere must be free from dust and dirt, preventing the lodgement of foreign material on fresh paint. Floors must be broom swept clean before painting is started.
9. Sanding: Except for final coat, each coat on metal shall be thoroughly and uniformly sanded with No. 00 sandpaper, or other equal abrasive, removing all surface defects and providing a smooth, even surface for subsequent coats.
10. Puttying: Putty-stop nail holes, imperfections and defacements after priming coat of paint, filler or shellac has been applied. Putty stopping shall be brought flush with finished surface in a neat and workmanlike manner. Defacement about interior metal work shall be corrected. Open joints, broken surfaces by unused holes, screws; bolts and the like shall be closed and smoothed, producing a finished piece of work.
11. Fixture Removals: Hardware, lighting fixtures, switch and receptacle plates, etc., shall be removed wherever practicable before painting and replaced after completion of painting, or these items which are in place shall be adequately protected during painting operations.

Plumbing or heating equipment adjacent to surfaces which are to be painted shall be disconnected and removed if necessary to complete all of painting required by these Specifications and shall be replaced upon completion of painting, the removal and replacement of fixtures and equipment shall be done by the trades responsible for the installation thereof.
12. All work where a coat of material has been applied must be inspected and approved by the Architect before the application of the succeeding specified coat, otherwise no

credit for the coat applied will be given and the Contractor automatically assumes the responsibility to recoat the work in question. The Contractor shall furnish the Architect a report of the particular coat applied when completed for inspection and approval to comply with the above.

13. If this Contractor finds problems arising in connection with the successful application of the paint, stain or coating to a surface so as to prevent a good, workmanlike job, work on that area should be stopped at once. The Architect, paint supplier to be contacted directly to see what must be done to rectify the condition.

Failure to do so by the subcontractor shall be construed as acceptance of the surface and conditions with the full responsibility thereof to produce a satisfactory job.

14. Protection: Provide, install and maintain over entire period of painting work all drop cloths, barricades and other forms of protection as may be necessary to safeguard and keep clean such adjoining work of others as will not be painted and as required to preserve painted work free from damages of every nature. Freshly painted surfaces shall be legibly posted as such immediately following their completion.

09900.0900 COATS AND COLORS

1. The number of coats herein specified are the minimum to be applied over exposed surfaces or shop coats as designated. Each coat shall be of proper ground color for each succeeding coat and shall appreciably differ in tint. Colors shall be as selected by the Architect.
2. Unless otherwise specified, paint designation refers to the "Pittsburgh Paints". Products of equal quality as manufactured by other manufacturers may be used, as approved by the Architect.
3. Color in general will be limited to:
 - a. There shall be up to two (2) deep tone accent colors used in each space.
 - b. Colors in general will be soft pastel colors.

09900.1000 SCHEDULE

All references to products of PPG Industries (Pittsburgh Paints)

1. Exterior Ferrous Metal:

1 Coat PPG Speedhide Inhibitive Primer, 7-858; 2 coats PPG Speedhide

Exterior/Interior Alkyd Enamel, 7-814 series.

2. Exterior Galvanized Metal:

1 coat PPG Speedhide Galvanized Steel Primer, 9-712; 2 coats PPG Speedhide Exterior/Interior or Alkyd enamel, 7-814 series.

3. Wood (not specified or noted elsewhere):

1 coat PPG Speedhide 6-855 Enamel Primer
2 coats PPG 7-814 Series Alkyd Gloss Enamel

4. Interior Ferrous Metal

- a. Prime with PPG Speedhide Interior Primer, 7-858 (red) or 6-208 (red) or 6-212 (white).
- b. Finish coat: 1 coat PPG Speedhide Alkyd enamel, semi-gloss 7-814 series or gloss, 6-250 series. (As designated by Architect).

5. Interior Galvanized Steel

Same as ferrous metal except that primer shall be PPG Speedhide Galvanized Steel Primer, 90-712.

6. Interior Dry Wall

- a. Ceilings: 1 coat PPG Speedhide Latex Sealer/Primer, 6-2; 2 coat PPG Speedhide Alkyd flat, 6-51 series.
- b. Walls: 1 coat PPG Speedhide Latex Sealer/Primer, 6-2; 2 coat PPG Speedhide Alkyd flat, 6-70 series.

7. Interior Conc. Block Walls

- a. 1 coat PPG Maestro-prime quick drying primer & Sealer 6-12 3.6 mils per coat.
- b. 2 coats PPG fast dry Alkyd Industrial Gloss Enamel 7-814 lines series. MWF 3.6 mils per coat. Color as selected by Architect.

8. Insulated Pipes, Conduits, Etc.

1 Coat PPG Speedhide Latex Sealer, 6-2

2 Coats to match adjacent wall/ceiling finish.

9. Uncovered Piping (Ducts)

PPG Speedhide Inhibitive Metal Primer (white) 6-70.

PPG Speedhide LoSheen Alkyd Enamel, 6-70 series.

10. Other items (requiring finishing as shown by the drawings, details or finish schedule).

09900.1100 CLEANING

1. When so directed by the Architect, the Contractor shall go over all of the building where he has worked, retouch where necessary, restore where damaged or defaced and clean off all paint spots from floors, walls, finish hardware, glass and other unpainted surfaces and shall leave all painted surfaces clean and in a satisfactory condition.
2. At the end of each working day and upon completion of all work, all surplus materials, empty packages and/or containers and all debris shall be removed from the site.

09900.1200 GUARANTEE

1. All work under this Section of the Specifications shall be guaranteed against checking, cracking, peeling, chalking, discoloration or other defects due to improper materials or workmanship, due to improper preparation of the surface, or due to the painting, varnishing, etc. of surfaces which were not in proper condition to receive, paint, varnish or other painters' materials and such unsatisfactory work shall be refinished at no additional cost to the Owner.

09900.1300 PAINT MANUFACTURER'S REPRESENTATIVE

1. Notify and permit representatives of paint manufacturers, whose materials are used, access to the premises for the purpose of inspecting materials and proper use thereof.

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SECTION 10200 - LOUVERS & VENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Provide & install metal wall louvers and screens exposed to view in finish work, including:
 - 1. Exterior metal louvers.
 - 2. Louvers at locations where HVAC ductwork terminates at exterior walls.
 - 3. Other exposed exterior and interior louvers indicated on Drawings.
- B. Extent: Extent of exterior louvers is shown on architectural drawings. Coordinate requirements, quantities and sizes with mechanical drawings. Louvers not shown on architectural drawing, but indicated on mechanical drawings shall be provided & installed as part of work of this section.
- C. Related Sections: Section(s) related to this section include:
 - 1. Sealant and Caulking: Division 7 Joint Treatment Section.
 - 2. Dampers and Ductwork: Division 15 Dampers and Ductwork Sections.
 - 3. Grilles and Registers: Division 15 Grilles and Registers Sections.

1.02 REFERENCES

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title, or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM B209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 2. ASTM B221 - Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- C. Air Movement and Control Association (AMCA):
 - 1. AMCA Standard 500 - Test Method for Louvers, Dampers, and Shutters.
 - 2. AMCA Publication 261 - Directory of Licenses Products, current edition.
- D. Sheet Metal and Air Condition Contractors National Association (SMACNA)
 - 1. SMACNA - Architectural Sheet Metal Manual, current edition
- E. American Architectural Manufacturer's Association (AAMA):
 - 1. AAMA Standard 605 - Voluntary Specification for High Performance Organic Coating on Architectural Extrusions and Panels.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide louvers, which have been manufactured, fabricated and installed to maintain performance criteria stated by manufacturer without defects, damage, or failure.
- B. Louver Performance: where louvers are indicated to comply with specific performance requirements, provide units whose performance ratings have been determined in compliance with Air Movement and Control Association (AMCA) Standard 500.

1.04 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures section.
- B. Product Data: Submit product data sheet for specified products.
 - 1. Performance Certificates: Submit performance certification, if not included in product data
- C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
 - 1. Include information necessary for fabrication and installation of louvers. Indicate materials, sizes, thickness, fastenings and profiles.
- D. Quality Assurance Submittals: Submit the following:
 - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
 - a. Submit certified test results from an approved testing laboratory showing that the louvers proposed meet the criteria specified herein.
 - 2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements.

1.05 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirements Sections.
- B. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 1. Deliver, store and handle products to avoid any distortion or damage due to moisture, physical abuse or other cause Louvers shall be free from nicks, scratches and blemishes. Replace defective or damaged materials with new.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.07 WARRANTY

- A. Project warranty refers to Conditions of the Contract for project warranty provisions. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights owner may have under Contract Documents.

PART II PRODUCTS

2.01 WALL LOUVERS

- A. Manufacturer: Industrial Louvers Inc. (ILI).
 - 1. Contact: 511 South 7th Street, Delano, MN 55328; Telephone: (763) 972-2981; Fax: (763) 972-2911.
- B. Other Available Manufacturers – subject to compliance with requirements stated within.

2.02 DRAINABLE BLADE LOUVERS

- A. ILI Model 458XP:
 - 1. Extruded aluminum frame and blades shall be designed to collect and drain water to exterior at sill by means of gutters in front edges of blades and of channels in jambs. Frames and blade thickness to be .081" (2.06 mm) extruded aluminum 6063 alloy. Sill and jamb frames shall be continuously welded and caulked to prevent water penetration to interior wall construction. Blades are attached by means of all-welded construction.
 - 2. Louvers shall bear the AMCA Certified Ratings Seal for both air performance and water penetration. Louvers shall have a minimum of 8.91 sq., ft. (0.829 m²) (56 %) free area on 48" x48" (1219 x 1219) louver. Rating shall show a maximum water penetration of .01 oz. at an air flow rate of 1046 FPM. Static Pressure Loss shall be not more than 15 inch of water gauge at an air flow of 914 FPM free area velocity.

2.03 LOUVER ACCESSORIES

- A. Exterior Aluminum Sill: Provide sill flashing of same material and finish as louvers where indicated on the drawings.
- B. Louver Screens: Provide framed removable screens for exterior louvers.
 - 1. Screens shall be ½" (12.7 mm) mesh .063 (1.6 mm) flattened expanded aluminum mounted in extruded aluminum rewirable frames.
 - 2. Locate screens on inside face of louvers.

1. Screen frames shall have welded corners and be secured to the louver frame with machine screws, at each corner and at 12" (304.8 mm) c.o. between.

2.04 MATERIALS

- A. Aluminum Sheet: ASTM B209 Alloy 3003 or 5005 with temper as required for forming or as otherwise recommended by metal producer to provide required finish.
- B. Aluminum Extrusions: ASTM B221, Alloy 6063.
- C. Fastenings: Provide stainless steel screws and fasteners for aluminum louvers and zinc-coated or stainless steel screws and fasteners for steel louvers. Provide other accessories as required for complete and proper installation.

2.05 FABRICATION

- A. Fabrication Requirements:
 1. Performance: Fabricate as required for optimum performance with respect to water penetration, strength, durability and uniform appearance.
 2. Size:
 - a. Fabricate louvers in masonry walls to outside dimensions indicated, with allowance of 1/4" (6.4 mm) on each side for sealant joints.
 - b. Verify sizes with final HVAC shop drawings, including detail dimensions of ductwork, dampers or other fittings abutting louvers.
 3. Field Measurements: Verify size, location and placement of louver units prior to fabrication.
 4. Shop Assembly:
 - a. Fabricate to minimize field adjustments, splicing, mechanical joints and field assembly of units.
 - b. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling.
 - c. Clearly mark units for reassemble and coordinated installation.
 5. Accessories: Include supports, anchorages and accessories required for complete assembly.
 6. Vertical Mullions: Provide vertical mullions of type and spacing indicated but not further apart than recommended by the manufacturer.
 7. Horizontal Mullions: Provide horizontal mullions at horizontal joints between louver units except where continuous vertical assemblies are indicated.
 8. Connections: Join frame and blade members to one another by welding, except where field bolted connections between frame members are made necessary by size of louvers.
 9. Spacing: Maintain equal blade spacing to produce uniform appearance.

1.06 FINISHES (FACTORY)

- A. Shop Finishing: Factory finish louvers and accessories with an organic coating.
 1. Organic Coating: Clean and prime exposed aluminum surfaces and apply a Kynar 500/Hylar 5000 2-coat finish conforming to AAMA 605 in a standard color. Minimum dry film thickness shall be 1.2 mil.

B. Finish Protection: Provide finish protection as recommended by louver manufacturer.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions for installation.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.03 INSTALLATION Louver Installation:

1. Louvers shall be installed in accordance with manufacturers approved shop drawings and as shown. Provide all necessary fastenings and anchors required to a complete installation. Units to be installed plumb, level and in proper alignment with adjacent work.
2. Form tight joints within work of this Section. Fit exposed connections accurately.
3. Louvers shall be protected from damage from subsequent building operations.
4. Protect metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces, which shall be in contact with concrete, masonry or dissimilar metals.

SECTION 10350 - FLAGPOLE

1. Scope:
 - a. Provide & install flagpole where indicated on drawings.
2. Quality Assurance:
 - a. Materials will be PLP Composite Technologies, Inc or equal.
3. Submittals:
 - a. Manufacturers catalog cuts for specified items.
4. Products:
 - a. Aeolus series vertical wall mount v15-v30 Flag Pole with halyard and brass snap hooks with vinyl covers, external stationary double sheave fiberglass with self-securing screws, and aluminum wall brackets.
5. Installation:
 - a. Provide fiberglass ground sleeve in concrete base with tamped stone sub-base.

SECTION 10500 - LOCKERS

1. Scope:
 - a. Provide & install metal lockers where indicated on drawings.
2. Quality Assurance:
 - a. Lockers shall be all welded lockers by Gear Grid or equal.
3. Materials:
 - a. Prime, high grade Class I mild annealed, cold-rolled steel free from surface imperfections. A.S.T.M.-A1008 Galvanized steel available for high humidity atmospheres. A.S.T.M.-A653. Bolts to be zinc-plated or subjected to other rust retardant treatment.
 - b. All lockers shall be pre-assembled, with all seams and joints welded for rigidity and durability.
 - c. Body – 16 gauge steel, flanged to give double thickness of metal at back vertical corners. 18 gauge backs.
 - d. Door Frame – 16 gauge formed steel channels. Vertical members shall Have an additional flange to form continuous door strike. Corners Shall be lapped and welded into a rigid assembly. In addition, bottom cross members shall have tang at each end that fits through slot in rear flange of upright frame member to prevent twisting out of alignment. Top and bottom cross members shall provide support for front edge of locker top and locker bottom.
 - e. One-piece, 14 gauge steel on single, double and triple tier with both vertical edges formed into channel shaped formation; top and bottom shall be flanged at 90° angle. On multiple tier lockers, hinge sides shall be formed into channel shaped formation with other three sides flanged at 90° angle.
 - f. Ventilation – Six (6) 6” louvers top and bottom
4. Submittals:
 - a. Manufacturer's catalog cuts for specified items and shop drawing of installation based on field verified dimensions. Color chart required for Owner selection.
5. Products:
 - a. Lockers shall be 43”W x 20”D x 83”H and 83”H frame locker with stainless steel recessed handle and padlock provisions.

- b. Lockers shall include:
 - 6"x6"x12" lockable/secure storage cabinet
 - top adjustable shelf
 - top standard power strip.
 - c. Set on continuous 4" high concrete base.
 - d. Slip joint filler for mounting as required.
 - e. Recess trim at ends as required.
6. Installation:
- a. Mount lockers in strict accordance with manufacturer's specifications.

SECTION 10520 – FIRE EXTINGUISHER CABINETS

1. Scope:
 - a. Provide & install eight (8) at Washington firehouse & three (3) at annex facility in Wester Highway. fully recessed fire extinguisher cabinets, to be installed where directed by Architect.
2. Quality Assurance:
 - a. Materials will be Larsen or equal.
3. Submittals:
 - a. Manufacturers catalog cuts for specified items.
4. Products:
 - a. Larsen Cosmopolitan 1035 V10 Recessed Stainless Cabinet with Flat Trim Series 1835.
 - b. Provide double strength glass contemporary V profile.
 - c. Finish to be Brushed Stainless Steel.
5. Installation:
 - a. Mount to solid blocking as per manufacturers specifications. Trim vinyl wall cover to rough opening prior to installation.
 - b. Review & adjust wall thickness at all install locations to allow for fully recessed cabinet.

SECTION 10800 - TOILET ACCESSORIES

1. Scope:
 - a. Provide accessories at all restroom locations, and where as indicated on drawings.
2. Quality Assurance:
 - a. Materials will be American Specialties, Inc. or equal.
3. Submittals:
 - a. Manufacturers catalog cuts for specified items.
4. Products:
 - AC-1 Surface mounted dual roll toilet paper dispenser Model 0030
(provide at compartments without framed walls).
 - AC-2 Recessed dual roll toilet paper dispenser Model 0031
(provide at all compartments with framed walls).
 - AC-3 Recessed waste receptacle Model 0458.
 - AC-4 Lavatory surface mounted soap dispenser Model 0362.
 - AC-5 Surface mounted baby changing table Model 9012
(provide one at each second floor restroom)
 - AC-6 Surface mount shower dispenser Model 9343.
(provide one at all shower stalls)
 - AC-7 Recessed heavy duty soap dish Model 0398 – D.
(provide one at all shower stalls)
 - AC-8 Towel Pin Model 7301. (provide one per shower stall)
 - AC-9 Extra heavy duty shower curtain rod Model 1204.
(provide one at all shower stalls)
 - AC-10 Grab Bars:
 - (1) 42" 3100 Series 1-1/4" dia. with concealed mounting, Stainless Steel.
 - (2) 36" 3100 Series 1-1/4" dia. with concealed mounting, Stainless Steel.
 - (3) 12" 3100 Series 1-1/4" dia. vertical with concealed mounting, Stainless Steel.
5. All finishes shall be #4 satin stainless steel.

6. Installation:
 - a. Mount handrails to solid blocking as per manufacturers specifications.

DIVISION 11 – EQUIPMENT

SECTION 11132 – PROJECTION SCREENS

1. GENERAL

- a. The work under this section is subject to all applicable provisions of the “Bidding Requirements”, the “Conditions of the Contract”, “Contract Forms” and Division 1 – “General Requirements”, which form a part hereof whether attached hereto or not.

2. WORK INCLUDED

- a. Include all labor, materials, and appliances and perform all operations in connection with providing and installing required projection screens.

3. MATERIALS

- a. Examine the Specifications and Drawings for the various other trades. Let it be understood that all surfaces normally requiring painting or colored finish that are left unfinished by the requirements of other Specifications shall be painted or finished as part of this Section
- b. DA-LITE or equal projection screens, 6 ft. (H) x 8 ft. (W), electrically operated 115 volt (60 Hz), 1.3 amps. Shall have specially designed motor mounted inside the roller with a patented noise silencer to be three wire quick reversal type, oiled for life, with automatic thermal overload cutout, integral gears, capacitor and an electric brake to prevent coasting. To have preset but adjustable limit switches to automatically stop picture surface in the “up” and “down” positions. The roller to be of rigid metal, 3” in diameter, mounted on two vibration and noise absorbing supports. Screen fabric to be flame retardant and mildew resistant fiberglass with glass beaded, matte white or spectra picture surface with black masking borders standard. Bottom of fabric shall be formed into a pocket holding a 3/8” metal rod. The ends of the rod shall be protected by heavy duty plastic caps. Case to be of wood with metal-lined wiring compartment. A section of the bottom of the case shall be an aluminum door equipped with hinges so that it opens and closes automatically with the lowering and raising of the picture surface. When the picture surface is being lowered, the door shall drop open by gravity. When the picture surface is being raised, the two ends of the slat in the bottom pocket of the screen fabric shall engage two hooks on the door to lift it to the closed position where a limit switch shall cut off the electrical current to the screen. The balance of the bottom of the case shall be a second hinged aluminum

PROPOSED FIREHOUSE PROJECTS
TAPPAN FIRE DISTRICT
TAPPAN, NY

PROJECTION SCREENS
DIVISION 11- EQUIPMENT
SECTION 11132

door with manual openings to provide access. Hinges shall be mounted to allow matching of the doors to the ceiling. Case to be finished with a primer coat, ready to accept final finish by others. To be complete with the three position control switch in box with cover plate. Screen to be listed by Underwriter's Laboratories and CSA.

END OF SECTION

SECTION 12100 – RELOCATED ITEMS

12690.0100 GENERAL

1. The work under this section is subject to all applicable provisions of the “Bidding Requirements”, the “Conditions of the Contract”, “Contract Forms” and Division 1 – “General Requirements”, which form a part whether attached hereto or not.

12690.0200 WORK INCLUDED

- A. Include all labor, materials, and appliances and perform all operations in connection with relocating and or re-installing the following items from the existing firehouse to the new firehouse (locate where directed by owner).
 - Stained glass cabinet doors to be used at new back bar (photo 1).
 - Stain glass sign to be used over new bar in soffit (photo 2).
 - Honor roll plaque (photo 3).
 - Maltese cross (photo 4).
 - Bronze plaque (photo 5).
 - Emergency defibrillator (photo 6).
 - Existing mirrors behind bar (no photo).

SECTION 14240

MACHINE ROOM-LESS HYDRAULIC ELEVATORS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Hydraulic passenger elevators as shown and specified. Elevator work includes:
 - 1. Standard pre-engineered hydraulic passenger elevators.
 - 2. Elevator car enclosures, hoistway entrances and signal equipment.
 - 3. Jack(s).
 - 4. Operation and control systems.
 - 5. Accessibility provisions for physically disabled persons.
 - 6. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
 - 7. Materials and accessories as required to complete the elevator installation.

- B. Related Sections:
 - 1. Division 1 General Requirements: Meet or exceed all referenced sustainability requirements.
 - 2. Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.
 - 3. Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.
 - 4. Division 5 Metals:
 - a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
 - b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
 - 5. Division 9 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
 - 6. Division 22 Plumbing:
 - a. Sump pit and oil interceptor.
 - 7. Division 23: Heating and Ventilation:
 - a. Heating and ventilating hoistways.
 - 8. Division 16 Sections:
 - a. Providing electrical service to elevators. (note: fused disconnect switch to be provided as part of elevator manufacture product, see section 2.11 Miscellaneous elevator components for further details.)
 - b. Emergency power supply, transfer switch and auxiliary contacts.
 - c. Heat and smoke sensing devices.
 - d. Convenience outlets and illumination in hoistway and pit.

- C. Elevator and General contractor shall field review and provide the following in accordance with the requirements of the Model Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Section 300 for hydraulic elevators. State or local requirements must be used if more stringent.
 - 1. Elevator hoist beam to be provided at top of elevator shaft. Beam must be able to accommodate proper loads and clearances for elevator installation and operation.
 - 2. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.
 - 3. Hatch walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2" at any point.
 - 4. Elevator hoistways shall have barricades, as required.
 - 5. Install bevel guards at 75° on all recesses, projections or setbacks over 2" (4" for A17.1 2000 areas) except for loading or unloading.
 - 6. Provide rail bracket supports at pit, each floor and roof. For guide rail bracket supports, provide

- divider beams between hoistway at each floor and roof.
7. Pit floor shall be level and free of debris. Reinforce dry pit to sustain normal vertical forces from rails and buffers.
 8. Pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42" minimum, (48" minimum for A17.1-2000 areas) shall be provided at the same height, above sill of access door or handgrips.
 9. All wire and conduit should run remote from the hoistways.
 10. When heat, smoke or combustion sensing devices are required, connect to elevator control cabinet terminals. Contacts on the sensors should be sided for 12 volt D.C.
 11. Install and furnish finished flooring in elevator cab to be terrazzo.
 12. Finished floors and entrance walls are not to be constructed until after sills and door frames are in place. Consult elevator contractor for rough opening size. The general contractor shall supply the drywall framing so that the wall fire resistance rating is maintained, when drywall construction is used.
 13. Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.
 14. To maintain legal fire rating (masonry construction), door frames are to be anchored to walls and properly grouted in place.
 15. The elevator wall shall interface with the hoistway entrance assembly and be in strict compliance with the elevator contractor's requirements.
 16. General Contractor shall fill and grout around entrances, as required.
 17. All walls and sill supports must be plumb where openings occur.
 18. Locate a light fixture (200 lx / 19 fc) and convenience outlet in pit with switch located adjacent to the access door.
 19. Provide telephone line, light fixture (200 lx / 19 fc), and convenience outlet in the hoistway at the landing where the elevator controller is located. Typically this will be at the landing above the 1st floor. Final location must be coordinated with elevator contractor.
 20. As indicated by elevator contractor, provide a light outlet for each elevator, in center of hoistway.
 21. For signal systems and power operated door: provide ground and branch wiring circuits.
 22. For car light and fan: provide a feeder and branch wiring circuits to elevator control cabinet.
 23. Controller landing wall thickness must be a minimum of 8 inches thick. This is due to the controller being mounted on the second floor landing in the door frame on the return side of the door. For center opening doors, the controller is located on the right hand frame (from inside the elevator cab looking out). These requirements must be coordinated between the general contractor and the elevator contractor.
 24. Cutting, patching and recesses to accommodate hall button boxes, signal fixtures, etc..

1.02 SUBMITTALS

- A. Product data: The elevator contractor will provide standard cab, entrance and signal fixture data to describe product for approval.
- B. Shop drawings:
 1. Show equipment arrangement in the pit and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
 2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
 3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
 4. Indicate electrical power requirements and branch circuit protection device requirements.

- C. Powder Coat Paint selection: Submit manufacturer's standard selection charts for exposed finishes and materials.
- D. Plastic laminate selection: Submit manufacturer's standard selection charts for exposed finishes and materials.
- E. Metal Finishes: Standard metal samples to be provided.
- F. Operation and maintenance data. Include the following:
 - 1. Owners Manual and Wiring Diagrams.
 - 2. Parts list, with recommended parts inventory.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An approved manufacturer with minimum fifteen years experience in manufacturing, installing, and servicing commercial elevators.
 - 1. Must be the manufacturer of the power unit, controller, signal fixtures, door operators cab, entrances, and all other major parts of the elevator operating equipment.
 - a. The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.
 - 2. The manufacturer shall have a documented, on-going quality assurance program.
 - 3. ISO-9001:2000 Manufacturer Certified.
 - 4. ISO-14001:2004 Environmental Management System Certified.
 - 5. LEED Gold certified elevator manufacturing facility.
- B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than fifteen years of satisfactory experience installing elevators equal in character and performance to the project elevators.
- C. Regulatory Requirements:
 - 1. ASME/ANSI A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
 - 2. Building Code: National.
 - 3. NFPA 70 National Electrical Code.
 - 4. NFPA 80 Fire Doors and Windows.
 - 5. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
 - 6. CAN/CSA C22.1 Canadian Electrical Code.
 - 7. CAN/CSA B44 Safety Code for Elevators and Escalators.
 - 8. California Department of Public Health Standard Method V1.1–2010, CA Section 01350
- D. Fire-rated Entrance Assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(B), and NFPA 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).
- E. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
 - 1. Arrange for inspections and make required tests.
 - 2. Deliver to the Owner upon completion and acceptance of elevator work.
- F. Product Qualifications:
 - 1. LCA, EPD and HPD data must be provided for all major components of the elevator system.
 - 2. LCA data must be compatible with GaBI Software.

3. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.
4. GreenScreen Chemical Hazard Analysis: All ingredients of 100 parts-per-million or greater evaluated using GreenScreen for Safer Chemicals Method v1.2.
5. Health Product Declarations (HPD v2 or later): Complete, published declaration with full disclosure of known hazards, prepared using the Health Product Declaration Collaborative's "HPD builder" on-line tool; Unknown hazard listed will not be considered acceptable.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Manufacturing will deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

1.05 PROJECT CONDITIONS

- A. Elevators shall be permitted to be used for temporary service during the construction period before Substantial Completion and acceptance by the purchaser and agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

1.06 WARRANTY

- A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months after completion of installation or acceptance thereof by beneficial use, whichever is earlier.

1.07 MAINTENANCE

- A. Furnish maintenance and call back service for a period of 12 months for each elevator after completion of installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours, excluding callbacks. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation.
 1. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer: ThyssenKrupp Elevator

2.02 MATERIALS, GENERAL

- A. Colors, patterns, and finishes: As selected by the Architect from manufacturer's standard colors, patterns, and finish charts.
- B. Steel:
 1. Shapes and bars: Carbon.
 2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
 3. Finish: Factory-applied baked enamel for structural parts, powder coat for architectural parts.

Color selection must be based on elevator manufacture's standard selections.

- C. Plastic laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness. Laminate selection must be based on elevator manufacture's standard selections.
- D. Terrazzo floor by general contractor.

2.03 HOISTWAY EQUIPMENT

- A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood subfloor. Underside of the platform shall be fireproofed. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.
- B. Sling: Steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.
- C. Guide Rails: Steel, omega shaped, fastened to the building structure with steel brackets.

9. Guide Shoes: Slide guides shall be mounted on top and bottom of the car.

10. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on a steel template that is fastened to the pit floor. Provide extensions if required by project conditions.

11. Jack: Jack unit shall be of sufficient size to lift the gross load the height specified. Factory test jack to insure adequate strength and freedom from leakage. Brittle material, such as gray cast iron, is prohibited in the jack construction. Provide the following jack type: Twin post holeless telescopic 2-stage. Two jacks piped together, mounted one on each side of the car with each having two telescopic sections designed to extend in a synchronized manner when oil is pumped into the Assembly. Each jack section will be guided from within the casing or the plunger assembly used to house the section. Each plunger shall have a high pressure sealing system which will not allow for seal movement or displacement during the course of operation. Each Jack Assembly shall have a check valve built into the assembly to allow for automatically re-syncing the two plunger sections by moving the jack to its fully contracted position. The jack shall be designed to be mounted on the pit floor or in a recess in the pit floor. Each jack section shall have a bleeder valve to discharge any air trapped in the section.

12. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the landings and correct for overtravel or undertravel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

Wiring, Piping, and Oil: Provide all necessary hoistway wiring in accordance with the National Electrical Code. All necessary code compliant pipe and fittings shall be provided to connect the power unit to the jack unit. Provide proper grade readily biodegradable oil as specified by the manufacturer of the power unit (see Power Unit section 2.04.G for further details).

Pit moisture/water sensor located approximately 1 foot above the pit floor to be provided. Once activated, elevator will perform "flooded pit operation", which will run the car up to the designated floor, cycle the doors and shut down and trip the circuit breaker shunt to remove 3 phase power from all equipment, including pit equipment.

15. Motorized oil line shut-off valve shall be provided that can be remotely operated from the controller landing service panel. Also a means for manual operation at the valve in the pit is required.

2.04 POWER UNIT

- A. Power Unit (Oil Pumping and Control Mechanism): A self-contained unit located in the elevator pit consisting of the following items:
 1. NEMA 4/Sealed Oil reservoir with tank cover including vapor removing tank breather
 2. An oil hydraulic pump.
 3. An electric motor.
 4. Electronic oil control valve with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and electro-magnetic controlling solenoids.
- B. Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.
- C. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating – motors shall be capable of 80 starts per hour with a 30% motor run time during each start.
- D. Oil Control Unit: The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.
 1. Relief valve shall be adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.
 2. Up start and stop valve shall be adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, ensuring smooth up starts and up stops.
 3. Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
 4. Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling after slowdown is initiated.
 5. Provided with constant speed regulation in both up and down direction. Feature to compensate for load changes, oil temperature, and viscosity changes.
16. Solid State Starting: Provide an electronic starter featuring adjustable starting currents.
17. A secondary hydraulic power source (powered by 110VAC single phase) must be provided. This is required to be able to raise (reposition) the elevator in the event of a system component failure (i.e. pump motor, starter, etc.)
18. Oil Type: Readily biodegradable that is USDA certified biobased product, ultra low toxicity, readily biodegradable, energy efficient, high performing fluid made from canola oil with antioxidant, anticorrosive, antifoaming, and metal-passivating additives. Especially formulated for operating in environmentally sensitive areas. USDA certified biobased product, 95% bio-based content, per ASTM D6866.

2.05 HOISTWAY ENTRANCES

- A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.
 - 1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
 - 2. Main landing door & frame finish: Stainless steel panels, no. 4 brushed finish.
 - 3. Typical door & frame finish: Stainless steel panels with no. 4 brushed finish.
- B. Integrated Control System: the elevator controller to be mounted to hoistway entrance above 1st landing. The entrance at this level, shall be designed to accommodate the control system and provide a means of access to critical electrical components and troubleshooting features. See section 2.09 Control System for additional requirements.
- C. At the controller landing, the hoistway entrance frame shall have space to accommodate and provide a lockable means of access (group 2 security) to a 3 phase circuit breaker. See section 2.11 Miscellaneous Elevator Components for further details.
- D. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Provide door restriction devices as required by code.
- E. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.
 - 1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
 - 2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
 - 3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.
- F. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

2.06 CAR ENCLOSURE

- A. Car Enclosure:
 - 1. Walls: Cab type TKLP, durable wood core finished on both sides with high pressure plastic laminate.
 - 2. Canopy: Cold-rolled steel with hinged exit.
 - 3. Ceiling: Downlight type, metal pans with suspended LED downlights.
 - 4. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
 - 5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
 - a. Door Finish: Stainless steel panels: No. 4 brushed finish.
 - b. Cab Sills: Extruded aluminum, mill finish.
 - 6. Handrail: Provide 2" flat metal bar on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a stainless steel, no. 4 brushed finish.
 - 7. Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.
- B. Car Top Inspection: Provide a car top inspection station with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station will give the inspector complete control of the elevator. The

car top inspection station shall be mounted in the door operator assembly.

2.07 DOOR OPERATION

- A. Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. AC controlled units with oil checks or other deviations are not acceptable.
1. No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.
 2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
 3. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel will reverse and the door will reopen to answer the other call.
 4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer will sound. When the obstruction is removed, the door will begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors will stop and resume closing only after the obstruction has been removed.
 5. Limited Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.
 6. Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors will recycle closed then attempt to open six times to try and correct the fault.
 7. Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors will recycle open then attempt to close six times to try and correct the fault.
 8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.
- B. Door Protection Devices: Provide a door protection system using 150 or more microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

2.08 CAR OPERATING STATION

- A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Swing return shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED's shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided.

- B. Emergency Communications System: Integral phone system provided.
- C. Auxiliary Operating Panel: Not Required
- D. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.
- E. Special Equipment: Not Applicable

2.09 CONTROL SYSTEMS

- A. Controller: Shall be integrated in a hoistway entrance jamb. Should be microprocessor based, software oriented and protected from environmental extremes and excessive vibrations in a NEMA 1 enclosure. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.
- B. Service Panel – to be located outside the hoistway in the controller entrance jamb and shall provide the following functionality/features:
 - 1. Access to main control board and CPU
 - 2. Main controller diagnostics
 - 3. Main controller fuses
 - 4. Universal Interface Tool (UIT)
 - 5. Remote valve adjustment
 - 6. Electronic motor starter adjustment and diagnostics
 - 7. Operation of pit motorized shut-off valve with LED feedback to the state of the valve in the pit
 - 8. Operation of auxiliary pump/motor (secondary hydraulic power source)
 - 9. Operation of electrical assisted manual lowering
 - 10. Provide male plug to supply 110VAC into the controller
 - 11. Run/Stop button
- C. Automatic Light and Fan shut down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.
- D. Special Operation: Not Applicable
- E. Emergency Power Operation: (Battery Lowering 10-DOC) When the loss of normal power is detected, a battery lowering feature is to be activated. The elevator will lower to a predetermined level and open the doors. After passengers have exited the car, the doors will close and the car will shutdown. When normal power becomes available, the elevator will automatically resume operation. The battery lowering feature is included in the elevator contract and does not utilize a building-supplied standby power source.

2.10 HALL STATIONS

- A. Hall Stations, General: Provide buttons with red-illuminating LED halos to indicate that a call has been registered at that floor for the indicated direction. Provide 1 set of pushbutton risers. Provide one pushbutton riser with faceplates having a brushed stainless steel finish.
 - 1. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.

- B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.
- C. Hall Position Indicator: Not Applicable
- D. Hall lanterns: Not Applicable
- E. Special Equipment: Not Applicable

2.11 MISCELLANEOUS ELEVATOR COMPONENTS

- A. Oil Hydraulic Silencer: Install multiple oil hydraulic silencers (muffler device) at the power unit location. The silencers shall contain pulsation absorbing material inserted in a blowout proof housing.
- B. Lockable three phase circuit breaker with auxiliary contact with shunt trip capability to be provided. Circuit breaker to be located behind locked panel (Group 2 security access) at controller landing entrance jamb and should be sized according to the National Electrical Code.
- C. Lockable single phase 110V circuit breaker for cab light and fan to be provided. Circuit breaker to be located behind locked panel (Group 2 security access) at controller landing entrance jamb should be sized according to the National Electrical Code.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and control space, as constructed and verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

- A. Install elevator systems components and coordinate installation of hoistway wall construction.
 - 1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
 - 2. Comply with the National Electrical Code for electrical work required during installation.
- C. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.
- D. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.
- E. Lubricate operating parts of system where recommended by manufacturer.

3.03 FIELD QUALITY CONTROL

- A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required by A17.1 Code and local authorities having jurisdiction. Perform other tests, if any, as required by governing regulations or agencies.
- B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.04 ADJUSTING

- A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.05 CLEANING

- A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless stall shall be cleaned with soap and water and dried with a non-abrasive surface; shall not be cleaned with bleached-based cleansers.
- A. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.
 - a. Use environmentally preferable and low VOC emitting cleaners for each application type. Cleaners that contain solvents, pine and/or citrus oils are not permitted.

3.06 PROTECTION

- A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.07 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
- B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

3.08 ELEVATOR SCHEDULE

- A. Elevator Qty. 1
 - 1. Elevator Model: enduraMRL Above-Ground (2-Stage)
 - 2. Rated Capacity: 4500 lbs.
 - 3. Rated Speed: 80 ft./min.
 - 4. Operation System: TAC32
 - 5. Travel: 14'-0"
 - 6. Landings: 2 total
 - 7. Openings:
 - a. Front: 1
 - b. Rear: 0

8. Clear Car Inside: 5' - 8" wide x 7' - 9 1/2" deep
9. Cab Height: 8'-0" nominal
10. Hoistway Entrance Size: 4'-0" wide x 7'-0" high
11. Door Type: Two Speed
12. Power Characteristics: 208 volts, 3 Phase, 60 Hz.
13. Seismic Requirements: Zone 1
14. Fixture & Button Style: Signa4 Signal Fixtures
15. Special Operations: None

3.09 SPECIAL CONDITIONS (Note: Add Special Conditions as Needed)

END OF SECTION