TECHNICAL SPECIFICATIONS

BATH HOUSE REPLACEMENT AND GAZEBO IMPROVEMENTS AT ESTELL MANOR PARK

PROJECT LOCATION :

109 NJ-50
MAYS LANDING, NJ 08330

PREPARED FOR:

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TABLE OF CONTENTS

DIVISION 00
FRONT END

DIVISION 01
010000 COVER SHEET
010001 TABLE OF CONTENTS
011000 SUMMARY
012100 ALLOWNACES
012200 UNIT PRICES
012500 SUBSTITUION PROCEDURES
013100 PROJECT MANAGEMENT AND COORDINATION
013200 CONSTRUCTION PROGRESS DOCUMENTATION
013300 SUBMITTAL PROCEDURES
013516 ALTERATION PROJECT PROCEDURES
014000 QUALITY REQUIREMENTS
014200 REFERENCES
015000 TEMPORARY FACILITIES AND CONTROLS
016000 PRODUCT REQUIREMENTS
017300 EXECUTION
017419 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
017700 CLOSEOUT PROCEDURES
017839 PROJECT RECORD DOCUMENTS

DIVISION 02
024119 SELECTIVE DEMOLITION

DIVISION 03
033000 CAST-IN-PLACE CONCRETE

DIVISION 04
042200 CONCRETE MASONRY UNIT
047300 MANUFACTURED STONE VENEER

DIVISION 06
061000 ROUGH CARPENTRY
064100 ARCHITECTURAL WOOD COUNTERTOP
066500 SIMULATED WOOD TRIM

DIVISION 07
072116 BATT INSULATION
072726 FLUID APPLIED MEMBRANE AIR BARRIER
073113 ASPHALT SHINGLES
074600 SIDING
079000 JOINT SEALERS

DIVISION 08
081113 HOLLOW METAL DOORS AND FRAMES

085113 ALUMINUM PROJECT OUT WINDOWS
087100 DOOR HARDWARE
DIVISION 09
095455 LAMINATED FILM PVC SIDING
097060 RESINOUS FLOORING
099100 INTERIOR PAINTING

DIVISION 10
101400 SIGNAGE
102100 TOILET PARTITIONS AND ACCESSORIES
102800 WASHROOM ACCESSORIES

DIVISION 31 – 33
311000 SITE CLEARING
312000 EARTHWORK
312319 DEWATERING
315000 EXCAVATION SUPPORT AND PROTECTION
321313 CONCRETE PAVEMENT
321373 CONCRETE PAVING JOINT SEALANTS
329200 TURFS AND GRASSES
329600 SOIL EROSION AND SEDIMENT CONTROL
334100 STORM UTILITY DRAINAGE PIPING

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes the reinforced cast-in-place concrete slab on grade as indicated on the contract documents, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes. Provide fabrication and complete installation of materials including concrete and reinforcement, formwork, water-stops, sealers and finishes as well as anchor bolts and other embedded items provided by other trades.

B. Related Requirements:

1. Section 04 20 00 - Concrete Masonry Unit, for CMU foundation walls.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. General: All changes and revisions to previously submitted and reviewed submittals must be clearly indicated and clouded. Resubmitted or revised submittals will be rejected unless all changes and revisions are clearly indicated and clouded.

B. Product Data: Submit manufacturer's data with application and installation instruction for materials and products intended for use.

C. Design Mixtures: Submit written reports to the Architect for each concrete mixture, with supporting standard deviation analysis or trial batch data as required, and specific use identified. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other

circumstances warrant adjustments. Do not begin concrete production until mixes have been approved.

1. If a portion of the mixing water is to be withheld and added on-site, indicate the amounts of mixing water to be withheld for later addition at Project Site. Mixing water added at the Project Site shall conform to the requirements of ACI 301.

    a. The total quantity of water added at the batch plant and water withheld to be added at the Project Site shall be considered the total quantity of water used in the mix design. All mix design properties, including water-cement ratio, slump, etc., shall be based on the total quantity of mixing water.

    b. Do not add more mixing water than indicated in the Design Mixture.

D. Steel Reinforcement Shop Drawings: Submit Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. Comply with the ACI 315 "Details and Detailing of Concrete Reinforcement". Include special reinforcement required at openings through concrete structures.

1.5 INFORMATIONAL SUBMITTALS

A. General: All changes and revisions to previously submitted and reviewed submittals must be clearly indicated and clouded. Resubmitted or revised submittals will be rejected unless all changes and revisions are clearly indicated and clouded.

B. Material Certificates: For each of the following, signed by manufacturers certifying compliance with the project requirements:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds and compatibility with floor finishes and slab treatments.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.

11. Vapor retarders.
12. Semirigid joint filler.
13. Joint-filler strips.
14. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with project requirements:

1. Water: Submit test reports indicating water used in concrete mixes meets the requirements of ASTM C1602.

D. Hot-weather concreting procedures: submit detailed outline of the contractor's plans and procedures for batching, placing, and protecting concrete in hot weather. Hot-Weather procedures shall comply with ACI 305.1, ACI 305R, and all additional requirements indicated in this specification.

E. Cold-weather concreting procedures: submit detailed outline of the contractor's plans and procedures for batching, placing, and protecting concrete in cold weather. Cold-Weather procedures shall comply with ACI 306.1, ACI 306R, and all additional requirements indicated in this specification.

F. Field quality-control reports: Testing and inspection reports.

1.6 QUALITY ASSURANCE

A. Codes and Standards:

1. Comply with the provisions of the latest editions of the following codes, specifications and standards, except where more stringent requirements are shown or specified, including but not limited to:

a. ACI 117, "Specification for Tolerances for Concrete Construction and Material."
b. ACI 211.1, "Proportioning Concrete Mixtures."
c. ACI 212.3R, "Chemical Admixtures for Concrete."
d. ACI 212.4R, "Guide for the Use of High-Range Water-Reducing Admixtures (Superplasticizers) in Concrete."
e. ACI 301 "Specification for Structural Concrete."
f. ACI 302 "Guide for Concrete Floor and Slab Construction."
g. ACI 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete."
h. ACI 305 "Hot Weather Concreting."
i. ACI 306 "Cold Weather Concreting."
j. ACI 308 "Standard Practice for Curing Concrete."
k. ACI 309 "Guide for Consolidation of Concrete."
l. ACI 311.4R "Guide for Concrete Inspection."

m. ACI 315 “Details and Detailing of Concrete Reinforcement.”
n. ACI 318 "Building Code Requirements for Reinforced Concrete."
o. ACI 347 "Recommended Practice for Concrete Formwork."
p. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

B. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.8 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1, ACI 306R, and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. Cold weather shall be defined as when the air temperature is below, or is expected to fall below, 40 degrees F at any time during the three days (72 hours) after the concrete is placed.
2. Maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
4. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 305.1, ACI 305R, and as follows:

1. Hot weather shall be defined as when the air temperature is above, or is expected to rise above, 80 degrees F at any time during the three days (72 hours) after the concrete is placed.

2. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 117.
2. ACI 301.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For concrete placed directly on waterproofing membrane, support reinforcement on plastic chairs or rubber-tipped chairs as warranted by the waterproofing manufacturer.

2.4 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials: Use only one brand and source of cementitious material throughout the project, unless otherwise acceptable to the owner.

1. Portland Cement: ASTM C 150, Type I, gray.
2. Supplementary Cementitious Materials

    a. Fly Ash: ASTM C 618, Class F.
    b. Slag Cement: ASTM C 989, Grade 100 or 120
    c. Silica Fume: ASTM C 1240, amorphous silica.
    d. In order for supplementary cementitious material to be utilized, a mix design must be submitted in which the exact type of supplementary cementitious material was successfully used on a previous project. Representative test results shall be submitted with the mix design in conformance with ACI requirements as specified. ASTM conformance must also be provided.

C. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Coarse Aggregate: Clean, uncoated, processed aggregate containing no clay, mud, loam or foreign matter as follows:

    a. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
    b. Crushed stone, processed from natural rock or stone. Use of pit or bankrun gravel is not permitted.

2. Fine Aggregate: Clean, sharp sand free from loam, clay, lumps or other materials with deleterious reactivity to alkali in cement.

D. Lightweight Aggregate: ASTM C 330, 3/4 inch nominal maximum aggregate size.

E. Air-Entraining Admixture: ASTM C 260.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494, Type A.

2. Retarding Admixture: ASTM C 494, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
4. Water-reducing and Accelerating Admixture: ASTM C 494, Type E.
5. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
7. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

G. Water: Provide water meeting the requirements of ASTM C 1602, Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete. Potable water is permitted to be used as mixing water without testing for conformance with the requirements of ASTM C 1602.

2.5 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals - Building Systems; MasterKure ER 50.
b. Bon Tool Co.; 32-301-B7 BonWay Evaporation Retarder.
c. Brickform, a division of Solomon Colors, Inc.; Evaporation Retarder.
d. ChemMasters; SprayFilm.
e. Dayton Superior; AquaFilm J74.
f. Euclid Chemical Company (The), an RPM company; EUCOBAR.
g. Kaufman Products, Inc.; VaporAid.
h. L&M Construction Chemicals, Inc.; E-CON.
i. Lambert Corporation; Lambco Skin.
j. Meadows, W. R., Inc.; EVAPRE.
k. Metalcrete Industries; Waterhold.
l. Nox-Crete Products Group; Monofilm.
m. Sika Corporation.; SikaFilm.
n. Or Approved Equal

2. Contractor to provide the product manufacturer’s written certification that the evaporation retarder is compatible with the scheduled floor finishes**,** sealers and adhesives.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059, Type II, non-re-emulsifiable, acrylic emulsion, polyvinyl-acetate or styrene butadiene.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Dayton Superior Corporation; Acrylic Bonding Agent J40.
    b. Euclid Chemical Company (The), an RPM company; Flex-Con.
    c. L&M Construction Chemicals, Inc.; Everbond.
    d. Or Approved Equal

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Euclid Chemical Company (The), an RPM company; Euco #452 Epoxy System.
    b. L&M Construction Chemicals, Inc.; Epobond.
    c. Sika Corporation; Sikadur 32, Hi-Mod.
    d. Or Approved Equal

D. Reglets: Fabricate reglets of not less than 0.022-inch-thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

E. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

F. Nonmetallic, Shrink-Resistant Grout: ASTM C1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Euclid Chemical Company (The), an RPM company; NS Grout.
b. BASF Construction Chemicals - Building Systems; Masterflow 713 Plus.
c. L&M Construction Chemicals, Inc.; Duragrout.
d. Or Approved Equal

G. Construction Paper Joint Material: Regular or heavy weight.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Meadows, W.R., Inc.; Red Rosin Paper.
b. Fortifiber Building Systems Group; Red Rosin Paper.
c. Trimaco, LLC.; Red Rosin Paper.
d. Or Approved Equal

2.7 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 and ACI 318.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Minimum Compressive Strength: See drawings for required minimum concrete compressive strength at 28 days of all concrete building elements.

C. Cementitious Materials: The total cementitious material content in the concrete mixtures shall be made up of a combination of Portland cement and supplementary cementitious material. The percentage, by weight, of cementitious material other than portland cement in the concrete mixtures shall be one of the following:

1. Fly Ash: 25 percent
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Slag Cement: 40 to 50 percent

4. Combined Fly Ash or Pozzolan and Slag Cement: 50 percent, with fly ash not exceeding 25 percent.

D. All concrete subjected to freeze thaw and/or required to be watertight shall have a maximum water-cement ratio of 0.45.

E. All concrete subjected to de-icers shall have a maximum water-cement ratio of 0.40.

F. Air Content: As indicated below and the following:

1. All concrete exposed to freezing and thawing shall have an air content of 4.5% to 7.5%.
2. Do not allow air content of trowel finished floor to exceed 3%.

G. Slump Limit: 8 inches for concrete with verified slump of 3 to 5 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

H. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

I. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixtures in concrete with water-cement ratio equal to or less than 0.50.
2. Use high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
3. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
4. Use water-reducing admixture in pumped concrete
5. Use air entrainment admixture in concrete subject to freeze/thaw.

2.8 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Slabs-on-Grade: Normal-weight concrete.

1. Maximum W/C Ratio: 0.45.
2. Minimum Cementitious Materials Content: 540 lb/cu. yd.
3. Air Content:

a. 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size for slabs not to receive a trowel finish.
b. Do not allow air content of trowel-finished floors to exceed 3 percent.

4. Steel-Fiber Reinforcement: Add to concrete mixture, according to manufacturer's written instructions, at a rate of 50 lb/cu. yd.

2.9 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
2. Addition of water to the batch resulting in higher water-cement ratio than what is specified above will not be permitted for material with insufficient slump.

B. Project-Site Mixing: Not permitted.

2.11 FORMWORK

A. Circular/tubular fiberboard forms for post foundations, minimum diameter and height per drawings.

B. Manufacturers
1. Basis of Design: Sonoco Products Company – Sonotube® Concrete Forms.
2. Alternate Manufacturers:
   a. Greif, Inc. – EasyPour™ Concrete Forms
   b. Western Container Corporation – Concrete Cardboard Tubes
   c. Or Approved Equal
3. Forms shall remain in place until concrete has sufficiently cured.
4. Verify products are suitable for cast-in-place concrete, meets structural design requirements, and complies with project specifications.

PART 3 - EXECUTION

3.1 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with the specified codes and standards and CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of excessive or loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Place reinforcement to obtain at least the minimum required concrete cover for reinforcement protection.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.2 JOINTS

3.3 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that all required inspections of these items are completed. Notify other trades to permit the installation of their work and cooperate with other trades in setting such work, as required.

B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

C. Prior to the placement of concrete, the contractor shall confirm that all construction and control joint layouts and locations have been installed and coordinated in accordance with the approved shop drawings.

D. Before test sampling and placing concrete, withheld water may be added at Project site, subject to the limitations of ACI 301 and the following:

1. The total quantity of water, including the withheld water added at the Project Site, shall not exceed the amount allowed in the approved mixture proportions. Do not exceed the specified water-cementitious material ratio or slump limit.
2. The addition of water at the Project site shall be in accordance with ASTM C 94.
3. Do not add water to concrete after plasticizing and/or high-range water-reducing admixtures have been added to the mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete as near to its final location as practicable, to avoid segregation due to re-handling or flowing

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to the recommended practices of ACI 301 to suit the type of concrete and project conditions.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations, not farther than the visible effectiveness of the machine, to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
4. Maintain reinforcing in the proper position during concrete placement operations

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.4 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

1. Apply scratch finish to surfaces indicated.

C. Float Finish: After screeding, consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Restraighten, cut down high spots, and fill low spots. Check and level surface plane to a tolerance so that the gap between floor surface and straightedge does not exceed 1/4" under a 10' straightedge. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated.
2. Finish surface to the floor flatness and levelness tolerances indicated below.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Finish surface to the floor flatness and levelness tolerances indicated below.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.5 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place, unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.6 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures for a period of time necessary for hydration of cement and proper hardening. Comply with ACI 301 and ACI 308.1 for curing of the concrete.

1. Comply with ACI 306R and ACI 306.1 for cold-weather protection during the curing period.
2. Comply with ACI 305R and ACI 305.1 for hot-weather protection during the curing period.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

1. Contractor shall monitor and measure the evaporation rate on a regular basis during the during period for concrete slabs placed in hot weather.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete slabs according to ACI 308.1.

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

3.7 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch with suitable repair material defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks that meet the following:

    a. Cracks in excess of 1/16 inch wide
    b. Cracks deemed by the Architect to adversely affect the durability or performance of the concrete, regardless of width.
    c. Cracks that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

    a. When dry, repair topping color shall match surrounding concrete color. Patch a test area at an inconspicuous location first to verify the mixture and color match before proceeding.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.8 FIELD QUALITY CONTROL

A. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

B. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 03 30 00

CONCRETE MASONRY UNIT
SECTION 04 22 00

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Concrete masonry unit (CMU) assemblies for interior and exterior walls.

1.2 RELATED REQUIREMENTS

A. Joint Sealers - Section 07 90 00

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

1. American Concrete Institute (ACI):
315-99 - Details and Detailing of Concrete Reinforcement.
530.1/ASCE 6/TMS 602-13 - Specification for Masonry Structures.
ASTM International (ASTM):
A615/A615M-15ae1 - Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
A951/A951M-14 - Steel Wire for Masonry Joint Reinforcement.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings: Fabrication, bending, and placement of reinforcing bars. Comply with ACI 315. Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies.

C. Special masonry shapes, profiles, and placement.

D. Masonry units for special conditions as affected by existing conditions.

E. Manufacturer's Literature and Data: Description of each product & Installation instructions.

1.5 QUALITY ASSURANCE

A. Welders and Welding Procedures Qualifications: AWS D1.4/D1.4M.

1.6 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, // color, // production run number, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

A. Store products above grade, protected from contamination.

B. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

A. Hot and Cold Weather Requirements: Comply with ACI 530.1/ASCE 6/TMS 602.

1.9 WARRANTY

A. Contractor's one year labor and material warranty.

B. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 PRODUCTS

2.1 GENERAL

A. Basis of Design

B. Provide each product from one manufacturer and from one production run.

2.2 UNIT MASONRY PRODUCTS

A. Concrete Masonry Units (CMU):

1. Hollow and Solid Load-Bearing Concrete Masonry Units: ASTM C90.
   Unit Weight: Normal weight.
2. Sizes: Modular, (8 inches by 16 inches) & (6 inches by 16 inches) nominal face dimension; thickness as indicated on drawings.
3. For molded faces used as a finished surface, use concrete masonry units with uniform fine to medium surface texture unless specified otherwise.

4. Use bullnose concrete masonry units at corners exposed in finished work with 25 mm (1 inch) minimum radius rounded vertical exterior corners (bullnose units).

2.3 LINTELS

A. Solid Concrete Masonry Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength of not less than 3000 psi. Reinforcement shall conform to ASTM A615, Grade 60.

2.4 ANCHORS, TIES, AND REINFORCEMENT

A. Steel Reinforcing Bars: ASTM A615/A615M; Grade 60, deformed bars.

B. Joint Reinforcement:

1. Form from wire complying with ASTM A951/A951M.
2. Hot dipped galvanized after fabrication.
3. Width of joint reinforcement 40 mm (1.6 inches) less than nominal thickness of masonry wall or partition.
4. Cross wires welded to longitudinal wires.
5. Joint reinforcement minimum 3000 mm (10 feet) long, factory cut.
6. Joint reinforcement with crimp formed drip is not acceptable.
7. Maximum spacing of cross wires 400 mm (16 inch) to longitudinal wires.

C. Ladder Design:

1. Longitudinal wires deformed

D. Ridge Wall Anchors:

1. Form from galvanized steel minimum 25 mm (1 inch) wide by 5 mm (3/16 inch) thick by 600 mm (24 inches) long, plus 50 mm (2 inch) bends.

E. Other lengths as indicated on drawings.

2.5 ACCESSORIES

A. Shear Keys: Use preformed gasket control joints in CMU walls.

B. Weeps:

1. Weep Hole: Flexible PVC louvered configuration with rectangular closure strip at top.

C. Preformed Compressible Joint Filler:

1. Thickness and depth to fill joint.
2. Closed Cell Neoprene: ASTM D1056, Type 2, Class A, Grade 1, B2F1.
3. Non-Combustible Type: ASTM C612, Type 5, Max. Temp.1800 degrees F.

D. Masonry Cleaner:

1. Detergent type cleaner selected for each type masonry.
2. Acid cleaners are not acceptable.
3. Use soapless type specially prepared for cleaning brick or concrete masonry as appropriate.

E. Fasteners:

1. Concrete Nails: ASTM F1667, Type I, Style 11, 19 mm (3/4 inch) minimum length.
2. Masonry Nails: ASTM F1667, Type I, Style 17, 19 mm (3/4 inch) minimum length.
3. Screws: FS-FF-S-107, Type A, AB, SF thread forming or cutting.

F. Welding Materials: AWS D1.4/D1.4M, type to suit application.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Install products according to manufacturer's instructions and approved submittal drawings.

1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

B. Keep finish work free from mortar smears or spatters, and leave neat and clean.

C. Wall Openings:

1. Fill hollow metal frames built into masonry walls and partitions solid with mortar as laying of masonry progresses.
2. When items are not available when walls are built, prepare openings for subsequent installation.

D. Tooling Joints:

1. Do not tool until mortar has stiffened enough to retain thumb print when thumb is pressed against mortar.
2. Tool while mortar is soft enough to be compressed into joints and not raked out.
3. Finish joints in exterior face masonry work with jointing tool, and provide smooth, water-tight concave joint unless specified otherwise.
4. Tool Exposed interior joints in finish work concave unless specified otherwise.

E. Lintels:

1. Lintels are not required for openings less than 1000 mm (40 inches) wide that have hollow metal frames.
2. Openings 1025 mm (41 inches) wide to 1600 m (63 inches) wide without structural steel lintel or frames, require lintel formed of concrete masonry lintel or bond beam units filled with grout and reinforced with one No. 16 (No. 5) rod top and bottom for each 100 mm (4 inches) of nominal thickness unless shown otherwise.
3. Use steel lintels, for openings greater than 1600 m (63 inches) wide, brick masonry openings, and elevator openings unless shown otherwise.
4. Lintel Bearing Length: Minimum 100 mm (4 inches) at both ends.

F. Wetting and Wetting Test:

1. Test and wet brick and clay tile according to BIA TN 11B.
2. Do not wet concrete masonry units or glazed structural facing tile before laying.

G. Temporary Formwork: Provide formwork and shores as required for temporary support of reinforced masonry elements.

1. Construct formwork to conform to shape, line and dimensions indicated on drawings. Make sufficiently tight to prevent mortar, grout, or concrete leakage. Brace, tie and support formwork as required to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other reasonable temporary construction loads.
3. Minimum Curing Times Before Removing Shores and Forms:
   Girders and Beams: 10 days.
   Slabs: 7 days.
   Reinforced Masonry Soffits: 7 days.

3.2 INSTALLATION - REINFORCEMENT

A. Joint Reinforcement:

1. Install joint reinforcement in single wythe concrete masonry unit walls or partitions.
2. Locate joint reinforcement in mortar joints at 400 mm (16 inch) maximum vertical intervals.
3. Additional joint reinforcement is required in mortar joints at both 200 mm (8 inches) and 400 (16 inches) above and below windows, doors, louvers and similar openings in masonry.

B. Steel Reinforcing Bars:

1. Install reinforcing bars in cells of hollow masonry units where required for vertical reinforcement and in bond beam units for horizontal reinforcement. Install in wall cavities of reinforced masonry walls where indicated on drawings.

C. Grout openings:

1. Leave cleanout holes in double wythe walls during construction by omitting units at base of one side of wall.
2. Locate 75 mm by 75 mm (3 inches. by 3 inches.) min. cleanout holes at location of vertical reinforcement.
3. Keep grout space clean of mortar accumulation and debris. Clean as work progresses and immediately before grouting.

3.3 INSTALLATION - BRICK EXPANSION AND CMU CONTROL JOINTS

A. Provide brick expansion joint (EJ) and CMU control joints (CJ) where indicated on drawings.

B. Keep joint free of mortar and other debris.

C. Joints Occur In Masonry Walls:

1. Install preformed compressible joint filler in CMU walls.
2. Install cross shaped shear keys in concrete masonry unit wythe with preformed compressible joint filler on both sides of shear key.

D. Use standard notched concrete masonry units (sash blocks) made in full and half-length units where shear keys are used to create a continuous vertical joint.

E. Interrupt joint reinforcement at expansion and control joints.

F. Fill opening in exposed face of expansion and control joints with sealant as specified in Section 07 92 00, JOINT SEALANTS.

3.4 INSTALLATION - BUILDING EXPANSION AND SEISMIC JOINTS

A. Keep expansion and seismic joints open and free of mortar. Remove mortar and other debris.

B. Install non-combustible, compressible type joint filler to fill space completely except where sealant is shown on joints in exposed finish work.

C. Fill opening in exposed face of expansion and seismic joints with sealant as specified in Section 07 92 00, JOINT SEALANTS.

3.5 INSTALLATION - CONCRETE MASONRY UNITS

A. Types and Uses:

1. Provide special concrete masonry shapes as required, // including lintel and bond beam units, sash units, and corner units //. Provide solid concrete masonry units, where full units cannot be installed, or where needed for anchorage of accessories.
2. Provide solid load-bearing concrete masonry units or grout cell of hollow units at jambs of openings in walls, where structural members impose loads directly on concrete masonry, and where shown.
3. Provide rounded corner (bullnose) shapes at opening jambs in exposed work and at exterior corners.
4. Do not install brick jambs in exposed finish work.
5. Where ends of anchors, bolts, and other embedded items, project into voids of units, completely fill voids with mortar or grout.
6. Provide 6 mm (1/4 inch) open joint for sealant between exterior walls.
7. Lay concrete masonry units with full face shell mortar beds and fill head joint beds for depth equivalent to face shell thickness.
8. Lay concrete masonry units so cores of units, that are to be filled with grout, are vertically continuous with joints of cross webs of such cores completely filled with mortar. Unobstructed core openings minimum 50 mm (2 inches) by 75 mm (3 inches).
9. Do not wedge masonry against steel reinforcing. Minimum 13 mm (1/2 inch) clear distance between reinforcing and masonry units.
10. Install deformed reinforcing bars of sizes indicated on drawings.
11. At time of placement, ensure steel reinforcement is free of loose rust, mud, oil, and other contamination capable of affecting bond.
12. Place steel reinforcement at spacing indicated on drawings before grouting.
13. Minimum clear distance between parallel bars: One bar diameter.
14. Hold vertical steel reinforcement in place vertically by centering clips, caging devices, tie wire, or other approved methods.
15. Support vertical bars near each end and at maximum 192 bar diameter on center.

16. Splice reinforcement or attach reinforcement to dowels by placing in contact and securing with wire ties.
17. Stagger splices in adjacent horizontal reinforcing bars. Lap reinforcing bars at splices a minimum of 40 bar diameters.
18. Grout cells of concrete masonry units, containing reinforcing bars, solid as specified.
19. Install cavity and joint reinforcement as masonry work progresses.
20. Rake joints 6 to 10 mm (1/4 to 3/8 inch) deep for pointing with colored mortar when colored mortar is not full depth.

3.6 POINTING

A. Fill joints with pointing mortar using rubber float trowel to apply mortar solidly into raked joints.

B. Wipe off excess mortar from joints of glazed masonry units with dry cloth.

C. Tool exposed joints to smooth concave joint.

D. At joints with existing work, match existing joint.

3.7 GROUTING

A. Preparation:

1. Clean grout space of mortar droppings before placing grout.
2. Close cleanouts.
3. Install vertical solid masonry dams across grout space for full height of wall at intervals of maximum 9000 mm (30 feet). Do not bond dam units into wythes as masonry headers.
4. Verify reinforcing bars are installed as indicated on drawings.

B. Placing:

1. Place grout in grout space in lifts as specified.
2. Consolidate each grout lift after free water has disappeared but before plasticity is lost.
3. Do not slush with mortar or use mortar with grout.

C. Interruptions:

1. When grouting must be stopped for more than an hour, top off grout 40 mm (11/2 inches) below top of last masonry course.
2. Grout from dam to dam on high lift method.

3. Longitudinal run of masonry may be stopped off only by raking back one-half masonry unit length in each course and stopping grout 100 mm (4 inches) back of rake on low lift method.

D. Puddling Method:

1. Consolidate by puddling with grout stick during and immediately after placing.
2. Grout cores of concrete masonry units containing reinforcing bars solid as masonry work progresses.

E. Low Lift Method:

1. Construct masonry to 1.5 m (5 feet) maximum height before grouting.
2. Grout in one continuous operation and consolidate grout by mechanical vibration and reconsolidate after initial water loss and settlement has occurred.

F. High Lift Method:

1. Do not pour grout until masonry wall has cured minimum of 4 hours.
2. Place grout in 1.5 m (5 feet) maximum lifts.
3. Exception:

a. Where following conditions are met, place grout in 3.86 m (12.67 feet) maximum lifts.

1) Masonry has cured minimum of 4 hours.
2) Grout slump is maintained between 250 and 275 mm (10 and 11 inches).
3) No intermediate reinforced bond beams are placed between top and bottom of grout lift.

4. When vibrating succeeding lifts, extend vibrator 300 to 450 mm (12 to 18 inches) into preceding lift.

3.8 PLACING REINFORCEMENT

A. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or approved submittal drawings, or bars with reduced cross-section due to excessive rusting or other causes.

B. Splice reinforcement bars only where indicated on drawings, unless approved by Contracting Officer's Representative. Provide lapped splices. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.

C. Provide minimum lap as indicated on approved submittal drawings, or if not indicated, minimum 48 bar diameters.

3.9 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY

A. Do not wet concrete masonry units (CMU).

B. Lay CMU units with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to distance behind face equal to thickness of longitudinal face shells. Solidly bed cross-webs of starting courses in mortar. Maintain head and bed 9 mm (3/8 inch) joint widths.

C. Where solid CMU units are shown, lay with full mortar head and bed joints.

D. Walls:

1. Pattern Bond: Lay CMU wall units in 1/2-running bond with vertical joints in each course centered on units in courses above and below, unless otherwise indicated. Bond and interlock each course at corners and intersections. Use special-shaped units where shown, and as required for corners, jambs, sash, control joints, lintels, bond beams and other special conditions.
2. Maintain vertical continuity of core or cell cavities, which are to be reinforced and grouted, to provide minimum clear dimension indicated and to provide minimum clearance and grout coverage for vertical reinforcement bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
3. Where horizontally reinforced beams (bond beams) are indicated on drawings, use special units or modify regular units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells of non-reinforced vertical cells, or provide units with solid bottoms.

E. Grouting:

1. Use fine grout for filling spaces less than 100 mm (4 inches) in one or both horizontal directions.
2. Use coarse grout for filling 100 mm (4 inch) spaces or larger in both horizontal directions.
3. Grouting Technique: At Contractor’s option, use either low-lift or high-lift grouting techniques.

F. Low-Lift Grouting:

1. Provide minimum clear dimension of 50 mm (2 inches) and clear area of 5160 sq. mm (8 sq. inches) in vertical cores to be grouted.

2. Place vertical reinforcement before grouting of CMU. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 192 bar diameters nor 3 m (10 feet).
3. Lay CMU to maximum pour height. Do not exceed 1.5 m (5 feet) height, or if bond beam occurs below 1.5 m (5 feet) height, stop pour 38 mm (1-1/2 inches) below top of bond beam.
4. Rod or vibrate grout during placing. Place grout continuously; do not interrupt pouring of grout for more than one hour. Terminate grout pours 38 mm (1-1/2 inches) below top course of pour.
5. Bond Beams: Stop grout in vertical cells 38 mm (1-1/2 inches) below bond beam course. Place horizontal reinforcement in bond beams; lap at corners and intersections as indicated on drawings. Place grout in bond beam course before filling vertical cores above bond beam.

G. High-Lift Grouting:

1. Do not use high-lift grouting technique for grouting of CMU unless minimum cavity dimension and area is 75 mm (3 inches) and 6450 sq. mm (10 sq. inches), respectively.
2. Provide cleanout holes in first course at vertical cells which are to be filled with grout.
3. Use units with one face shell removed and provide temporary supports for units above, or use header units with concrete brick supports, or cut openings in one face shell.
4. Construct masonry to full height of maximum grout pour before placing grout.
5. Limit grout lifts to maximum height of 1.5 m (5 feet) and grout pour to maximum height of 7.3 m (24 feet), for single wythe hollow concrete masonry walls, unless otherwise indicated.
6. Place vertical reinforcement before grouting. Place before or after laying masonry units, to suit application. Tie vertical reinforcement to dowels at base of masonry where shown and thread CMU over or around reinforcement. Support vertical reinforcement at intervals not exceeding 192 bar diameters nor 3 m (10 feet).
7. Where individual bars are placed after laying masonry, place wire loops extending into cells as masonry is laid and loosen before mortar sets. After insertion of reinforcement bar, pull loops and bar to proper position and tie free ends.
8. Where reinforcement is prefabricated into cage units before placing, fabricate units with vertical reinforcement bars and lateral ties of the size and spacing indicated.
9. Preparation of Grout Spaces: Before grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry and other foreign materials from grout spaces. Clean reinforcement and adjust to proper position. Clean top surface of structural members supporting masonry to ensure bond. After final cleaning and inspection, close cleanout holes and brace closures to resist grout pressures.

10. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Install shores and bracing, if required, before starting grouting operations.
11. Limit grout pours to sections which can be completed in one working day with maximum one hour interruption of pouring operation. Place grout in lifts which do not exceed 1.5 m (5 feet). Allow minimum 30 minutes and maximum one hour between lifts. Mechanically consolidate each lift.
12. Place grout in lintels or beams over openings in one continuous pour.
13. Where bond beam occurs more than one course below top of pour, fill bond beam course to within 25 mm (1 inch) of vertically reinforced cavities, during construction of masonry.
14. When more than one pour is required to complete a given section of masonry, extend reinforcement beyond masonry as required for splicing. Pour grout to within 38 mm (1-1/2 inches) of top course of first pour. After grouted masonry is cured, lay masonry units and place reinforcement for second pour section before grouting. Repeat sequence if more pours are required.

3.10 CONSTRUCTION TOLERANCES

A. Lay masonry units plumb, level and true to line within tolerances according to ACI 530.1/ASCE 6/TMS 602 and as follows:
B. Maximum variation from plumb:
In 3000 mm (10 feet) - 6 mm (1/4 inch).
In 6000 mm (20 feet) - 9 mm (3/8 inch).
In 12,000 mm (40 feet) or more - 13 mm (1/2 inch).

C. Maximum variation from level:
In any bay or up to 6000 mm (20 feet) - 6 mm (1/4 inch).
In 12,000 mm (40 feet) or more - 13 mm (1/2 inch).

D. Maximum variation from linear building lines:
In any bay or up to 6000 mm (20 feet) - 13 mm (1/2 inch).
In 12,000 mm (40 feet) or more - 19 mm (3/4 inch).

E. Maximum variation in cross-sectional dimensions of columns and thickness of walls from dimensions shown:
Minus 6 mm (1/4 inch).
Plus 13 mm (1/2 inch).

F. Maximum variation in prepared opening dimensions:
Accurate to minus 0 mm (0 inch).
Plus 6 mm (1/4 inch).

3.11 CLEANING AND REPAIR

A. General:
   1. Clean exposed masonry surfaces on completion.
   2. Protect adjoining construction materials and landscaping during cleaning operations.
   3. Cut out defective exposed new joints to depth of approximately 19 mm (3/4 inch) and repoint.
   4. Remove mortar droppings and other foreign substances from wall surfaces.

B. Brickwork:
   1. First wet surfaces with clean water, then wash down with detergent solution. Do not use muriatic acid.
   2. Brush with stiff fiber brushes while washing, and immediately wash with clean water.
   3. Remove traces of detergent, foreign streaks, or stains of any nature.

C. Concrete Masonry Units:
   1. Immediately following setting, brush exposed surfaces free of mortar or other foreign matter.
   2. Allow mud to dry before brushing.

D. Glazed Structural Facing Tile or Brick Units:
   1. Clean as recommended manufacturer. Protect light colored mortar joints from discoloration during cleaning.
   2. Use on solid masonry walls.
   3. Prepare schedule of test locations.

END OF SECTION 04 22 00

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SECTION 04 73 00
MANUFACTURED STONE VENEER

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Portland cement based manufactured [stone] [and] [brick] veneer and trim.

1.2 REFERENCES

A. American National Standards Institute (ANSI):
   1. ANSI A118.4 Specifications for Latex-Portland Cement Mortar.

B. American Society for Testing and Materials (ASTM):
   1. ASTM C 39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   2. ASTM C 67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
   3. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
   4. ASTM C 177 - Standard Test Method for Steady-State Head Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
   5. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.
   6. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
   7. ASTM C 482 - Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement.
   8. ASTM C 567 - Standard Test Method for Determining Density of Structural Lightweight Concrete.
   9. ASTM C 847 - Standard Specification for Metal Lath.
   10. ASTM C 932 – Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering.
   11. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.
   12. ASTM C 1032 - Standard Specification for Woven Wire Plaster Base.
   13. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.
   14. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
   15. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster

16. ASTM C1329 - Standard specification for Portland cement
17. ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
18. ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
19. ASTM E2556/E2556M – Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment

C. Other Standards:
   1. UBC Standard No. 14-1, Kraft Waterproof Building Paper
   2. ICC AC38 Acceptance Criteria for Water Resistive Barriers
   3. UU-B-790 Building Paper, Vegetable Based, Kraft , waterproofed, water repellent and fireproof

D. International Code Council (ICC):
   1. ESR Report.

E. Underwriter's Laboratory (UL): Building Materials Directory.

1.3 SUBMITTALS

A. Submit following items:
   1. Product Data.
   2. Samples:
      a. Standard sample board consisting of small-scale pieces of veneer units showing full range of textures and colors.
      b. Full range of mortar colors.
   3. Verification Samples: Following initial sample selection submit “laid-up” sample board using the selected stone and mortar materials and showing the full range of colors expected in the finished Work; minimum sample size: 3 by 3 feet (1 by 1 m).
   4. Quality Assurance/Control Submittals:
      a. Qualifications:
         i. Proof of manufacturer qualifications.
         ii. Proof of installer qualifications.
      b. Regulatory Requirements: Evaluation reports.
      c. Veneer manufacturer’s installation instructions.
      d. Installation instructions for other materials.

B. Closeout Submittals: Submit following items:
   1. Maintenance Instructions.
   2. Special Warranties.

1.4 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications: Eldorado Stone, LLC.
   2. Installer Qualifications: Experienced mason familiar with installation procedures and related local, state and federal codes masonry.

B. Certifications:
   1. ICC Evaluation Service Evaluation Report ESR-1215.
   2. ICC ESR-1215, Florida Building Code Supplement
   3. ASTM C1670
   4. UL - Classification listing in Building Materials Directory: UL 546T (F8002).

C. Field Sample:
   1. Prepare 2 by 2 foot sample at a location on the structure as selected by the Architect. Use approved selection sample materials and colors. Include mortar.
   2. Obtain Architect's approval.
   3. Protect and retain sample as a basis for approval of completed manufactured stone work. Approved sample may be incorporated into completed work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Follow manufacturer's instructions.

1.6 PROJECT/SITE CONDITIONS

A. Environmental Requirements: When air temperature is 40 degrees F (4.5 degrees C) or below, consult local building code for Cold-Weather Construction requirements.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard warranty coverage against defects in materials when installed in accordance with manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: Eldorado Stone; www.eldoradostone.com.
B. Alternate Manufacturers:
   1. Cultured Stone; www.culturedstone.com
   2. Coronado Stone Products; www.coronado.com
   3. Or Approved Equal

2.2 MATERIALS

A. Stone Veneer
   1. To Be Selected By Owner.

B. Veneer Unit properties: Precast veneer units consisting of portland cement, lightweight aggregates, and mineral oxide pigments.
    4. Compressive Strength: ASTM C 192 and ASTM C 39, 5 sample average: greater than 1,800 psi (12.4MPa).
    5. Shear Bond: ASTM C 482: 50 psi (345kPa), minimum.
    6. Freeze-Thaw Test: ASTM C 67: Less than 3 percent weight loss and no disintegration.
    7. Thermal Resistance: ASTM C 177: 0.473 at 1.387 inches thick
    8. Weight per square foot: 2012 IBC and 2012 IRC, ASTM C1670, 15 pounds, saturated.

C. Weather Barrier:
    1. Henry Blueskin VP100 (Vapor Permeable Air Barrier Membrane) or equal to be approved by owner

D. Mortar:
    1. Cement: Portland cement complying with ASTM C 1329.
    2. Lime: ASTM C 207.
    3. Sand: ASTM C 144, natural or manufactured sand.
    4. Color Pigment: ASTM C 979, mineral oxide pigments.
    5. Water: Potable.
    6. Pre-Packaged Latex-Portland Cement Mortar: ANSI A118.4.

E. Bonding Agent: Exterior integral bonding agent meeting ASTM C 1059 Type II.

F. Water Repellent: Water based silane or siloxane masonry water repellent

2.3 MORTAR MIXES

A. Standard Installation (Grouted Joints):

    1. Mix mortar in accordance with ASTM C 270,
    2. Polymer modified mortar complying with ANSI A118.4
        a. Add color pigment in grout joint mortar in accordance with pigment manufacturer’s instructions not to exceed 10% by weight of cement.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which work will be installed.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate.

3.2 PREPARATION

A. Protection: Protect adjacent work from contact with mortar.

B. Surface Preparation: Prepare substrate in accordance with manufacturer's installation instructions for the type of substrate being covered.

3.3 INSTALLATION

A. Install and clean stone in accordance with manufacturer's installation instructions for Standard Installation (Grouted Joint) as specified above.

B. Apply repellent in accordance with repellent manufacturer's application instructions.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Manufacturer's Field Service Representative shall make one periodic site visit review of on-going installation process but is not responsible for any errors or omissions that are not observed or are previously completed. One additional site visit will be required at substantial completion.

B. Install non-combustible, compressible type joint filler to fill space completely except where sealant is shown on joints in exposed finish work.

C. Fill opening in exposed face of expansion and seismic joints with sealant as specified in Section 07 92 00, JOINT SEALANTS.

3.5 CLEANING

A. Remove protective coverings from adjacent work.
B. Cleaning Veneer Units:
    1. Wash with soft bristle brush and water/granulated detergent solution
    2. Rinse immediately with clean water
C. Removing Effloresence:
    1. Allow veneer to dry thoroughly
    2. Scrub with soft bristle brush and clean water
    3. Rinse immediately with clean water; allow to dry
    4. If efflorescence is still visible, contact ES Customer Service for assistance

END OF SECTION 04 73 00

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SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 apply to the work specified in this section.

B. Closely related work specified in other sections:

1. Cast-in-Place-Concrete – Section 03 30 00
2. Pressure Treated Wood – Section 06 05 73
3. Gypsum Board – Section 09 29 00

1.02 DESCRIPTION OF WORK:

A. Provide as detailed on the Contract Drawings, new wood roof framing and plywood deck, and posts for roof overhang outside and elsewhere to include:

1. Form work for concrete.
2. New wood blocking
3. Roof posts

1.03 SUBMITTALS:

A. Product Data:

1. Pressure Treatment wood: If material not stamped to indicate treatment, submit certification by treating plant stating conformance with applicable standards.

2. Adhesives: Submit manufacturer's data, including use recommendations and installation instructions. Identify intended areas of use for each product.

1.04 QUALITY ASSURANCE:

A. Factory marks each piece of lumber and plywood with type, grade, mill, and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.

1.05 REFERENCE STANDARDS:

A. Comply with the applicable provisions of all codes, standards and specifications referenced in this section, including, but not limited to the following:

1. PS 1 - "U.S. Product Standard for Construction and Industrial Plywood."

2. PS 20 - "Softwood Lumber Standard."

3. ANSI/AHA A135.4 - "Basic Hardboard."

4. AHA - "Application Instructions for Basic Hardboard Products."

5. ANSI A 208.1 - "Mat-Formed Wood Particle Board."

6. "APA Design/Construction Guide - Residential and Commercial."

7. ASTM - "American Society for Testing and Material."

   a. A153 Hot Dip Zinc Coatings for Fasteners.

   b. D226 Building Paper.

   c. AWPA - "Book of Standards."

8. AWPB - "Standards for Pressure Treating of Wood."

9. Grading Rules of Inspection Agencies referenced in Article 2.02.

10. N.F.P.A. Publications.

11. WWPA Publications.

    a. A-2 - "Lumber Specification Information."

1.06 PRODUCT 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, plywood, and other panels; provide for air circulation within and around stacks and under temporary coverings.

B. For lumber and plywood pressure treated with waterborne chemicals, separate courses to provide air circulation.

PART 2 - PRODUCTS

2.01 LUMBER:

A. Lumber Standards: 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.

   a. Weyerhaeuser
   b. Stimson Lumber
   c. Weaber, Inc.
   d. Or Approved Equal

B. Inspection Agencies: Inspection agencies and the abbreviations used with reference to

lumber grades and species include the following:

1. NLGA - "National Lumber Grades Authority."
2. SPIB - "Southern Pine Inspection Bureau."
3. WCLIB - "West Coast Lumber Inspection Bureau."
4. WWPA - "Western Wood Products Association."

For exposed lumber, apply grade stamps to ends or back of each piece, or omit grade stamps and issue certificate of grade compliance from inspection agency in lieu of grade stamp.

C. Nominal sizes are indicated, except as shown by detailed dimensions. Provide actual sizes as required by PS 20, for moisture content specified.

D. Provide dressed lumber, S4S, unless otherwise indicated.

E. Provide seasoned lumber with 19% maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness.

F. Grade: Standard grade light framing size lumber of any species or board size lumber as required. No. 1 common grade boards per WCLIB or WWPA rules, or equivalent by other grading rules used.

2.02 PLYWOOD:

A. Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood panels and for products not manufactured under PS 1 provisions, with American Plywood Association (APA) "Performance Standard and Policies for Structural Use Panels," Form No. E445.

B. Trademark: Factory mark each construction panel with APA trademark evidencing compliance with grade requirements.

C. Grades: Where plywood will be concealed by other work:

1. Exterior type plywood C-D Plugged Grade, unless otherwise specified or shown.
2. Interior type plywood Graded “C” on one side and “D” on the other for the sub-floor.

2.03 MISCELLANEOUS MATERIALS:

A. Fasteners and Anchorages: Except as otherwise indicated, provide size, type, material, and finish as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers, and anchoring devices. Provide stock metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.

Where rough carpentry work is exposed to weather, in ground contact, or in area of high

relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).

2.04 PRESERVATIVE TREATMENT:

A. Comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards as listed below. Mark each treated item with the AWPB Quality Mark Requirements.

1. Above ground items: Comply with AWPB LP-2.
2. Items in contact with ground or fresh water: Comply with AWBP LP-22.

B. Preservative shall be ACQ (copper with a natural base of alkaline and (Quaternary) as manufactured by Chemical Specialties, Inc. or equal, in accordance with ACQ Preserve Standard ACQ-94.

C. Kiln-dry after treatment to an average moisture contact of 19% or less (plywood – 15% or less).

D. Complete fabricated of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

E. Deliver covered to the site and store in a dry location.

2.05 FIRE RETARDANT TREATMENT:

A. Comply with applicable requirements of AWPA Standards C20 (Lumber) and C27 (Plywood).

B. Treatments using sulfates or ammonium phosphates will not be allowed.

C. Treatment to comply with requirements of ASTM D3201, Test Method for Hydroscopic Properties of Fire-Retardant Wood and Wood-Base Products.

D. All wood designated to be fire retardant treated shall be pressure impregnated as per Dricon fire retardant treated lumber and plywood, as manufactured by Koppers Company, Inc. of Pittsburgh, PA, Hickson Corporation, 3941 Bonsal Road, Conley, GA, or approved equal, to comply with the requirements for a flame spread of 25 or less, with no evidence of significant progressive combustion when tested for thirty (30) minutes duration under the standard test method for surface burning characteristics of building materials (ASTM E-84, NFPA 255 and UL 723). Highly corrosive salt treatments will not be allowed.

E. Each piece of wood shall bear the mark of the Underwriters Laboratories Label FR-S indicating compliance with the flame spread classification.

F. After treatment, all lumber shall be kiln-dried to an average moisture content of 19% or less, and all plywood shall be dried to an average moisture content of 15% or less.

G. All fire-retardant treated wood shall be stored indoors upon delivery to the job site. If it is not possible to store it indoors, it shall be completely covered and elevated above the ground.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL:

A. Provide as detailed on Contract Drawings, new wood blocking at pitch pockets and elsewhere not covered in these Specifications. Blocking shall be pressure treated (size as indicated on the Drawings, or as required) and cut to required size. Use CDX plywood where required to adjust thickness.

B. Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with maximum joints or optimum joint arrangement.

C. Layout work to so locate knots and other defects that quality of work is not impaired.

D. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.

E. Back-kerf all members 2" or larger nominal thickness and 6" or larger nominal width, where indicated, and in all cases where installation will not otherwise restrain cupping.

F. Install carpentry work securely, using the following methods, except as otherwise indicated or specified. Use stainless steel or hot-dip zinc coated fasteners for all work exposed to weather, in ground contact, or in high humidity areas.

1. Wood to Metal: Self drilling, self-tapping and self-counter sinking screws.
2. Wood to Concrete and Masonry: Screw type expansion fasteners and concrete screws through pre-drilled holes, countersunk for attachment of all wood members.
3. Wood to Wood: Common wire nails, except as otherwise indicated or specified.

G. 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 wood, pre-drill as required.

END OF SECTION 06 10 00

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SECTION 06 41 00
ARCHITECTURAL WOOD COUNTERTOP

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thermally fused laminate panels (TFL) used for the following applications:
   1. Commercial Fixtures.
   2. Bathroom Cabinetry.

1.2 REFERENCES

A. American National Standards Institute (ANSI):
   1. ANSI A208.1 - Particleboard, Mat-Formed Wood.
   2. ANSI A208.2 - Medium Density Fiberboard for Interior Use.

B. ASTM International (ASTM):
   1. ASTM D 1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
   2. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. Architectural Woodwork Institute (AWI):
   1. Architectural Woodwork Standards (AWS).

D. Composite Panel Association (CPA):
   1. CPA-4-19- Eco-Certified Composite (ECC) Sustainability Standard.

E. California Air Resources Board (CARB):
   1. CARB ATCM 93120 - California Formaldehyde Regulation (CARB rule).

F. Environmental Protection Agency (EPA):
   1. Toxic Substance Control Act (TSCA) - Title VI Formaldehyde Regulation.

G. Forest Stewardship Certification (FSC):
   1. Scientific Certification System, Chain of Custody Number: SCS-COC-000300, Roseburg Forest Products.

H. International Organization for Standardization (ISO):
   1. ISO 14021 - Environmental Labels and Declarations - Self-Declared Environmental Claims (Type II Environmental Labelling).
   2. ISO 4586 - 2 - High Pressure Decorative Laminate Sheets based on Thermosetting Resins.

I. New York Standard for Fire-Rated Panel (MEA):
   1. MEA 244- Material and Equipment Acceptance by Department of

Buildings, City of New York, NY.

J. National Electrical Manufacturers Association (NEMA):
   1. NEMA LD3 - Laminate Testing.

K. Scientific Certification Systems (SCS):
   1. Certification by independent evaluation of 82-92 percent pre-consumer recycled wood fiber content depending on product standard and contains no added formaldehyde (made without the use of phenol formaldehyde and shown in lab testing to be free of formaldehyde down to a detection limit of 0.05 ppm). Furnished by Scientific Certification Systems, Oakland, CA.

L. Standards Council of Canada (CSA):
   1. Formaldehyde Emission Standards for Composite Wood Products - CAN/CSA 0160-16.

M. UL Environment: A business unit of Underwriters Laboratories.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Manufacturer's printed installation instructions, showing required preparation and installation procedures.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Cleaning and maintenance instructions.

C. Verification Samples: For each finish product specified, two samples, 3-1/8 x 4-1/8 in (89 x 127 mm) representing manufacturer's product.

D. Manufacturer's Certification: Materials comply with specified requirements and suitable for intended application.
   1. Material Certificates: Thermally Fused Laminate - Particleboard or MDF.
      a. CARB Compliance: Phase 2 formaldehyde emissions certificate; CA Executive Order for CARB ULEF or NAF Exemption.
      b. CPA - ECC Certification.
      c. FSC Certification.
      d. TSCA Title VI - Formaldehyde Regulations.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Thermally fused laminate (TFL) particleboard or MDF panels produced by a manufacturer with documented quality management and environmental management practices in place to ensure

compliance with:
1. FSC - Mix Credit certification.
2. CPA - ECC - Eco Certified Composite Panel certification.
3. CARB Air Toxic Control Measure - Third party (TPC-1) certified.
4. TSCA Title VI - Formaldehyde Regulations.
5. ISO 4585-1 / NEMA LD 3.

B. Fabricator and Installer Qualifications: Minimum of two years documented experience in fabricating and installation of TFL panels similar in scope and complexity to this project.

.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged pallets with identification labels intact.

B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions in strict compliance with manufacturer's instructions and industry standards.
1. If unloaded outdoors, move and store under shelter as soon as possible. Avoid unloading in inclement weather.
2. Inspect delivered products to verify products are not damaged, soiled or have been exposed to water.

C. Handling: Protect materials during handling and installation to prevent damage.

1.6 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 recommended limits.
1. Store TFL panels prior to fabrication in same environment for fabrication, 48 hours prior to fabrication.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard limited warranty for defects in manufacturing.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturers:
1. Roseburg, which is located at:
3660 Gateway St.

Springfield, OR 97477
Toll Free Tel: 800-245-1115
Tel: 541-679-3311
Fax: 541-679-2543
Email:request info (MarkN@rfpco.com);Web:http://www.roseburg.com

2. Formica 1-800-FORMICA™ (367-6422)
   10155 Reading Road
   Cincinnati, OH 45241
3. Richelieu
   132 Beaver Road,
   Lincoln Park, NJ 07035
   Tim Kenny (732) 710-7820

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 THERMALLY FUSED LAMINATE PANELS

A. Basis of Design: Duramine or, thermally fused laminate as manufactured and supplied by Roseburg Forest Products Company.
   1. Standard core material laminated with Melamine saturated decorative paper layers thermally fused to both core face surfaces with heat and pressure.
   2. Textured Finishes:
      a. Texture for Face: Suede finish.
      b. Color and Pattern: As selected from Roseburg's full range of available selections.
   3. Location:
      a. Manufacturing Location: (Duramine TFL) Dillard, OR; Missoula, MT; Simsboro, LA.
         1) Wood Fiber Extraction: Within 300-mile radius of each manufacturing location.
   4. Basis of Design: Roseburg Medex - Moisture Resistant (MDF) Medium Density Fiberboard as manufactured and supplied by Roseburg Forest Products Company.
      a. Standards Compliance:
         1) ANSI A208.2 Grade 155. Moisture resistance. MR50.
         2) ASTM D1037. Six cycle accelerated aging test for moisture resistance.
         3) ASTM E-84, Class C or 3. Fire resistance.
      b. Third Party Certification:
         1) CARB NAF Exemption due to synthetic resin system.
         2) CARB ATCM 93120 Phase 2 emission requirements. (LEED credit supported).
         3) CPA 4-19: Eco Certified Composite Sustainability Standard.
      c. Recycled Content: 92 percent. SCS Certified.
      d. Thickness Range: 1/4 to 1-1/4 in (6 to 32 mm).

2.3 DECORATIVE EDGEBAND

A. General Requirements:
   1. Material Composition: ABS/PVC extruded plastic.
   2. Width: Equal to our greater than panel thickness.
   3. Finish: Match TFL Panels.
   4. Color and Pattern: Match TFL Color as selected by owner.
   5. Color and Pattern: Edgeband Supplier _____. Color: as selected by owner.
   6. Color and Pattern: Specified in Finish Schedule.
   7. Color and Pattern: As selected by owner.
   8. Color and Pattern: Selected from manufacturer's full range of colors.

B. Matching Edgebanding Products:
   1. Canplast: : canplast.com.
   2. Dollken Woodtape: woodtape.com.
   3. Olon: olon.com.
   4. Rehau: : rehau.com/us-en/furniture/edgeband.
   5. Teknaform: teknaform.com

2.4 FABRICATION

A. Panels shall be cut, routed and assembled in accordance to manufacture's fabrication guidelines. Panels shall be assembled with glue and assembly dowels or with plated finish screws.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions to ensure that work can be completed with no adverse effects.

3.2 PREPARATION

A. Prepare substrates using methods recommended by the manufacturer to achieve the best results for the panels under proper conditions.

B. Do not proceed with installation until substrates have been fabricated based on recommended methods from the manufacturer. Commencement of installation constitutes acceptance of conditions of substrate.

3.3 INSTALLATION

A. Comply with AWI AWS fabrication and installation standard as applicable to the project.

B. Install fabricated TFL panels according to approved architectural drawings,

shop drawings and manufacturer's published installation instructions, Shim as required for proper installation.

3.4 CLEANING AND PROTECTION

A. Clean panels in accordance to manufacturer's published care and maintenance instructions.

B. Touch up, repair or replace damaged products before completing installation.

END OF SECTION 06 40 00

SECTION 06 65 00
SIMULATED WOOD TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Free-Foam Cellular PVC Trim Boards for:

1. Soffits.
2. Fascia.
3. Battens.
4. Door pilasters.
5. Frieze boards.
6. Rake boards.
7. Chair Rail
8. Architectural millwork.
9. Door trim.
10. Window trim.
11. Wainscoting.
12. Walls.

1.2 RELATED SECTIONS

A. Section 06 05 73 – Composite Decking.

B. Section 06 10 00 - Rough Carpentry*.

C. Section 07 90 00 - Joint Sealants.

D. Section 09 29 00 - Gypsum Board.

E. Section 09 91 23 – Interior Painting

1.3 REFERENCES

A. ASTM D 792 - Density and Specific Gravity of Plastics by Displacement.

B. ASTM D 570 - Water Absorption of Plastics.

C. ASTM D 638 - Tensile Properties of Plastics.

D. ASTM D 790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

E. ASTM D 1761 - Mechanical Fasteners in Wood.

F. ASTM D 256 - Determining the Pendulum Impact Resistance of Plastics.

G. ASTM D 696 - Coefficient of Linear Thermal Expansion of Plastics Between minus 30 degrees C and plus 30 degrees C with a Vitreous Silica Dilatometer.

H. ASTM D 635 - Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

I. ASTM E 84 - Surface Burning Characteristics of Building Materials.

J. ASTM D 648 - Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.

K. ASTM D 3679 - Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding.

L. ASTM D 3345 - Standard Test Method for Laboratory Evaluation of Wood and Other Cellulosic Materials for Resistance to Termites.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

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 methods.

C. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and finish.

D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

E. A 2’ wide x 3’ tall mock-up panel to be done once the building is closed in and weather tight.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with a minimum of 5 years producing PVC trim products.

B. Installer Qualifications: Installer with a minimum of 3 years experience with the installation of PVC trim products.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.

2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.
4. Accepted mock-ups shall be comparison standard for remaining Work

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products on a flat and level surface on a full shipping pallet. Handle materials to prevent damage to product edges and corners.

B. Store materials under a protective covering to prevent jobsite dirt and residue from collecting on the boards.

1.7 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 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.

1.9 WARRANTY

A. Provide manufacturer's 30 year transferable warranty against defects in manufacturing that causes the products to rot, corrode, delaminate, or excessively swell from moisture.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
Versatex
400 Steel St., Aliquippa, PA 15001
Tel: 724-857-1111, Fax: 724-241-3599
Email: request info (sales@versatex.com);
Web:https://versatex.com Bead board profile

B. TruExterior siding & trim by Westlake Royal Building Products. Bead board profile

C. Modern Mill, 1140 Frank Oakes Road; Fernwood, MS 39648; Phone: (601) 869-5050; Edge and center bead board profiles
Email: hello@modern-mill.com; Web Address: www.Modern-Mill.com

D. Fypon siding and trim 1.800.446.3040

E. Or Approved Equal

F. Substitutions: As permitted by Division 1.

G. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MATERIALS

A. PVC: Free Foam Cellular PVC material with a small-cell microstructure and density of .55 grams/cm^3.

1. Performance and physical characteristic requirements:
   a. Physical:
      1) Density: 0.55 g/$cm^3$when tested in accordance with ASTM D 792.
      2) Water Absorption: Less then 0.50 percent when tested in accordance with ASTM D 570
   b. Mechanical:
      1) Tensile Strength: 3582 psi when tested in accordance with ASTM D 638.
      2) Tensile Modulus: 107,000 psi when tested in accordance with ASTM D 638.
      3) Flexural Strength: 5179 psi when tested in accordance with ASTM D 790.
      4) Flexural Modulus: 215,600 psi when tested in accordance with ASTM D 790.
      5) Modulus of Elasticity: 209,500 psi when tested in accordance with ASTM D 638.
      6) Elongation: 9.0 percent when tested in accordance with ASTM D 638.
      7) Nail Hold: 398 lbf/in of penetration when tested in accordance with ASTM D 1761.
      8) Screw Hold: 240 lbf/in of penetration when tested in accordance with ASTM D 1761.
      9) Staple Hold: 69 lbf/in of penetration when tested in accordance with ASTM D 1761.
   c. Thermal:
      1) Coefficient of Linear Expansion: 3.25 x 10-5 in/in/degrees F when tested in accordance with ASTM D 696.
      2) Burning Rate: Failed to Ignite when tested in accordance with ASTM D 635.
      3) Flame Spread Index: 25 when tested in accordance with ASTM E 84.
      4) Heat Deflection Temp (264 psi): 146 degrees F when tested in accordance with ASTM D 648.
      5) Heat Deflection Temp (66 psi): 153 degrees F when tested

in accordance with ASTM D 648.
6) Oil Canning (@ 140 degrees F: Passed when tested in accordance with ASTM D 648.

2. Manufacturing Tolerances:
   a. Variation in component length: Minus 0.00 / plus 1.00.
   b. Variation in component width: plus or minus 1/32 inch.
   c. Variation in component thickness: plus or minus 1/32 inch.
   d. Variation in component edge cut: plus or minus 2 degrees.
   e. Variation in Density plus or minus 0.02 grams per cubic centimeter.
3. Workmanship, Finish, and Appearance:
   a. Free Foam Cellular PVC that is homogeneous and free of voids, holes, cracks, foreign inclusions and other defects. Edges must be square and top and bottom surfaces shall be flat with no convex or concave deviation.
   b. Uniform surface free from cupping, warping, and twisting.

2.3 SIMULATED WOOD TRIM

A. PVC Trimboard: Versatex Trimboard with Sealed Edge, designed with a natural appearance to compliment fiber cement and natural cedar.

1. Size:
   a. Nominal Width:
      1) 6 inches
   b. Nominal Thickness:
      1) 1 inch (3/4 inch actual size).
      2) 3/4 inch (3/4 inch actual size).
   c. Length:
      1) 18 feet Or 16 feet
2. Finish:
   a. Smooth/Smooth finish.
   b. Reversible with Smooth/Timber Ridge finish.

B. PVC Cornerboard: Versatex Corners: Folded 90 degree one piece assembly produced with a smooth or natural appearance to compliment fiber cement and natural cedar.

1. Size:
   a. Nominal Corner Size:
      1) 4 Inches
   b. Nominal Thickness:
      1) 5/4 inch (1 inch actual size).
   c. Length:
      1) 10 feet.
      2) 20 feet.

2. Finish:
   a. Smooth.

C. PVC Bead Board: Versatex Beadboard: T and G and Centerbead sheets.

1. Size
   a. Thickness/Width/Length:
      1) Regular 1 inch by 6 inch (Actual 3/4 inch by 5 1/2 inch). Length 18 feet.
      2) WP4 T & G board 3/4 inch by 5-7/16 inch. Length 18 feet.
2. Finish:
   a. Smooth/Smooth finish.

D. Mouldings: Versatex Mouldings designed to compliment exterior trim.

1. Casings:
   a. Base Cap.
2. Sill:
   a. Double Hung Sill.
3. Specialty:
   a. Beadboard Cap.
4. Length:
   a. 16 feet.
5. Finish:
   a. Smooth finish.

2.4 SIMULATED WOOD TRIM

A. PVC Cornerboard: Versatex Stealth Advantage Stealth Corners. Folded 90 degree one piece corner assembly designed with 3/4 inch or 1 inch pocket to accommodate any siding product including fiber cement, cedar, and vinyl.

1. Size:
   a. Nominal Corner Width:
      1) 4 Inches
   b. Nominal Thickness:
      1) 5/4 inch (1 inch actual size).
   c. Length:
      1) 10 feet.
      2) 20 feet.

B. PVC Window and Door Surround: Versatex Stealth Advantage Stealth Window and Door Surround, pre cut window trims designed with 3/4 inch or 1 inch pocket to accommodate any siding product.

1. Size:
   a. Nominal Width:
      1) 4 Inches

b. Nominal Thickness:
1) 5/4 inch (1 inch actual size).
c. Length:
1) 18 feet.
2. Finish:
a. Smooth finish.

C. PVC Frieze and Fascia: Versatex Soffit Advantage Frieze and Notched Fascia. Trims designed with 3/4 inch pocket to accommodate Vented or Solid Soffit product.

1. Fascia Size:
a. Nominal Width:
1) 1 inch by 8 inches
b. Length:
1) 18 feet.
2) Or Custom lengths to minimize waste.
2. Frieze Size:
a. Nominal Width:
1) 5/4 inch by 6 inches
b. Length:
1) 18 feet.
2) Or Custom lengths to minimize waste.
3. Finish:
a. Smooth finish.

D. PVC Soffit: Versatex Soffit Advantage.

1. Type:
a. Vented or solid as shown on drawings
2. Size:
a. Actual Width:
1) 1/2 inch 12 inches
2) 1/2 inch by 16 inches
b. Length: 18 feet.
3. Finish:
a. Smooth finish.

2.5 ACCESSORIES

A. Fasteners:

1. Use 12 gauge stainless steel fasteners designed for wood trim and siding. Fastener should have sufficient flexural and tensile strength to resist bending.
2. Use fasteners with thin shanks, blunt points, and full round heads that are long enough to penetrate the substrate a minimum of 1-1/2 inches.

3. Do not use staples, small brads and wire nails. Avoid using fine threaded wood screws and ring-shank fasteners.
4. Use standard nail guns with a pressure setting between 70 psi and 100 psi. The recommended pressure depends on the type of gun, type of nail, ambient temperature, and the substrate. Care should be taken not to overdrive the nail into the material.
5. Pre-drilling is not typically required unless large fasteners are used or the product is installed during temperatures below 40 degrees F.
6. Use two fasteners for every framing member for trimboard applications. Sheet and trimboards 8 inches and wider require additional fasteners.
7. Install fasteners no more than 2 inches from the end of each board.
8. Avoid fastening simulated wood trim over hollow or uneven areas. Fasten onto flat, solid substrates.
9. 3/8 inch and 1/2 inch thick Sheet and Beadboard is not designed to be ripped and used for trim applications. These products must be glued and mechanically fastened to the substrate.

B. Adhesives: Finishing System.

1. All bonded surfaces must be smooth, clean, and in complete contact with each other for best results.

2. Adhere simulated wood trim to itself with PVC cement or cellular PVC adhesives to prevent joint separation. Acceptable adhesives are PVC Trim Welder, IPS Weld-On 705 (white), and Zevo PVC Trim adhesive.
3. PVC cements cure quickly (3-5 minutes or less), and have a limited working time.
4. Scarf cut joints are recommended where applicable.
5. Bonded joints should be secured with fasteners and fastened with two rows on each side of the joint.
6. When bonding simulated wood trim to other substrates, consult the adhesive manufacturer to determine suitability.

C. Nail Hole Filler: Cortex plug system by Fasten Master.

D. Sealants:
1. Use urethane, polyurethane, polymer blends or acrylic based sealants that do not contain silicone as specified in Section 07 90 00 - Joint Sealers.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Cutting:

1. Simulated wood trim can be cut using standard woodworking saws. Conventional carbide-tipped blades designed for cutting wood are preferred. Avoid using fine-tooth metal-cutting blades.
2. Rough-cut edges are typically caused by excessive friction, poor board support, or worn or improper tooling.

C. Drilling:

1. Simulated wood trim can be drilled using standard woodworking drill bits. Do not use drill bits made for rigid PVC.
2. Avoid frictional heat build-up.
3. Remove shavings periodically from a drill hole as necessary.

D. Milling and Moulding:

1. Simulated wood trim can be milled or moulded using standard milling or moulding machines found in millwork shops.
2. Rake angle 20 to 30 degrees. 25 degrees is recommended.
3. Cutting speed to be optimized with the number of knives and feed rate.

E. Routing:

1. Simulated wood trim can be routed with virtually any piece of equipment used to rout wood.
2. Carbide tipped router bits are recommended.
3. Machinery that allows for multiple cutting speeds will allow you to optimize the process obtaining a smoother finished part.

F. Edge Finishing:

1. Traditional sanding, grinding or filing tools used for woodworking are preferred.

G. Nail Location:

1. For trimboard applications use two fasteners per framing member.

2. Use additional fasteners are required for trimboard 8 inches and wider.
3. Install fasteners a maximum of 2 inches from the end of each board.

H. Expansion and Contraction:

1. Simulated wood trim expands and contracts with changes in temperature. Properly fastening along the entire length is required to minimize expansion and contraction.
2. Allow 3/16 inch space per 18-foot run of trim for expansion and contraction.
3. Bond joints between pieces of simulated wood trim to eliminate separation.
4. Allow expansion and contraction space at the ends of long runs.

I. Cleaning:

1. Clean simulated wood trim with mild detergent and water.
2. Products with pumice, such as Soft Scrub, may be applied with a nylon brush.
3. For more stubborn stains use a mild household cleaner and degreaser like Clorox Cleanup, Clorox Outdoors, Denatured Alcohol, Bleach, Mr. Clean Magic Eraser or Corte Clean with nylon brush.

J. Painting:

1. Be sure surface to be painted is clean, dry, and free of dirt, loose or peeling paint, mildew, chalk, grease and any other surface contaminants before paint application.
2. Finish nail holes with nail hole filler or a UV resistant acrylic caulk.
3. Paint as specified in Section 09 90 00 – Interior & Exterior Painting.
   a. Use 100 percent acrylic latex or 100 percent acrylic latex with urethane additive paint with a light reflective value (LRV) equal to or greater than 55 units.
   b. Follow the paint manufacturer's application recommendations.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 06 65 00

SECTION 07 21 16
BATT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

B. Thermal insulation installed in attic space above ceiling, laid between and across framing members.

C. Fiberglass or mineral-fiber batt insulation.

D. Coordination of insulation with ceiling gypsum board functioning as the air barrier.

E. Continuity of insulation with exterior wall weather-resistive barrier (WRB).

F. Accessories required for installation, including supports, hangers, and fasteners.

G. Related Sections:

1. Section 06 10 00, Rough Carpentry.

1.2 References

A. Materials shall meet the property requirements of one or more of the following specifications applicable to the specific product or end use:

1. American Society for Testing of Materials (ASTM):
   a. ASTM C423 Test Method for Sound Absorption Coefficient by the Reverberation Room Method.
   b. ASTM C518 Test Method for Steady State Thermal Transmission Properties by Means of the Heat Flow Meter.
   c. ASTM C665 Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
   d. ASTM C1320 Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
   e. ASTM E136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.
   f. ASTM E84 Test Method for Surface Burning Characteristics of Building Materials.
   g. ASTM E119 Test Methods for Fire Tests of Building Construction and Materials.
   h. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.

i. ASTM D 1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
j. ASTM D 2126 - Standard Test Method for Response of Rigid Cellular Plastic to Thermal and Humid Aging.
k. ASTM D 2842 - Standard Test Method for Water Absorption of Rigid Plastics.
l. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics.
m. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
n. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
o. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences
Across the Specimen.

1.3 SUBMITTALS

A. Product Data for batt insulation: Submit data on product characteristics, performance criteria, and limitations, including installation instructions.

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Contractor performing work under this section shall be trained and certified in application of batt insulation.

B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until installation is approved by Architect.
3. Rework mock-up area as required to produce acceptable work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer’s original packaging.

B. Store and protect products in accordance with manufacturer’s instructions. Store in a dry indoors location. Protect insulation materials from moisture and soiling.

C. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

D. Do not install insulation that has been damaged or wet. Remove it from jobsite.

1. An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried out (either before installation or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent in respects to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.

E. Materials shall be delivered in manufacturer's original containers clearly labeled with manufacturer's name, product identification, safety information, net weight of contents and expiration date.

F. Material shall be stored in a safe manner and where the temperatures are in the limits specified by the material manufacturer.

G. Empty containers shall be removed from site on a daily basis.

1.6 WARRANTY

A. Manufacturer's Warranty: Batt insulation.

1. This warranty is in effect throughout the life of the building provided the original purchaser registers with the Warranty Department of the Manufacturer within thirty days of occupancy.
2. Manufacturer's sole responsibility under this Limited Lifetime Warranty shall be to repair or replace any defective Product at the cost of the material only.
3. Manufacturer shall not be responsible for labor cost or any other costs whatsoever related to, or in connection with the removal or installation of either the original or replacement product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Thermal Insulation: EcoTouch® PINK® FIBERGLAS™ Insulation with PureFiber® Technology by Owens-Corning, Toledo, OH 43659; www.owenscorning.com.

B. Dow Chemicals

C. Knauf
Address:

Knauf Drive Shelbyville, IN 46176 Tel: 317-398-4434 Fax: 317-398-3675 Sales: 800-825-4434 ext. 8576

D. ThermoSeal, LLC : ThermoSeal, LLC , which is located at: P. O. Box 32; New Canaan, CT 06840 ; Toll Free Tel: 800-853-1577; Email:request info (info@thermosealusa.com); Web:www.thermosealusa.com

E. Guardian Building Products

F. Or Approved Equal

2.2 BATT INSULATION MATERIALS

A. EcoTouch® Unfaced Batt Insulation: ASTM C 665, Type I, preformed formaldehyde free glass fiber batt type, unfaced. Includes Unfaced SonoBatts and Sound Attenuation Batts.

1. Noncombustible per ASTM E 136.
2. Flame spread less than 25, smoke developed less than 50 per ASTM E84.
3. ICC Building Code Construction Classification: All types.
4. Water vapor sorption, Maximum by weight: not more than 5 percent.

B. EcoTouch® Kraft Faced Batt Insulation: ASTM C 665, Type II, Class C preformed formaldehyde free glass fiber batt type, Kraft paper faced one side. Includes Kraft faced SonoBatts and EcoTouch® ProPink FastBatt Insulation

1. ICC Building Code Construction Classification: III, IV, V.
2. Perm Rating: 1 perm maximum per ASTM E96.

C. EcoTouch® Foil Faced Batt Insulation: ASTM C 665, Type III, Class C preformed formaldehyde free glass fiber batt type, foil faced one side.

1. Flame spread less than 75, smoke developed less than 150 per ASTM E84.
2. ICC Building Code Construction Classification: III, IV, V.
3. Perm Rating: 0.5 perm maximum per ASTM E96.

D. EcoTouch® FS-25 Batt Insulation: ASTM C 665, Type II (PSK facing), Class A and Type III (FSK facing), Class A preformed formaldehyde free glass fiber batt, poly/scrim/Kraft (PSK) or foil/scrim/Kraft (FSK) faced on one side.

1. Flame spread less than 25, smoke developed index less than 50 per ASTM E84.
2. ICC building construction classification: all types.
3. Perm Rating: 0.02 maximum per ASTM E96.

E. Accessories: Provide accessories per insulating system manufacturer’s recommendations, including the following:

1. Tape: Polyethylene self-adhering type for Kraft faced insulation and bright aluminum self-adhering type for foil faced insulation.
2. Insulation Fasteners: Impale clip of galvanized steel; type recommended by insulation manufacturer for particular use intended.
3. Mechanical Insulation Fasteners: FM approved, corrosion resistant, size required to suit application.
4. Wire Mesh: Galvanized steel, hexagonal wire mesh.
5. Spindle Fasteners: Corrosion-resistant wire spindles.
6. Ventilation Baffles: Formed plastic, metal, or cardboard sized to fit full width of rafter spaces.

2.3 PERFORMANCE CRITERIA

A. Wood Frame Construction, R-Value for Batt Insulation: Per ASTM C518.

1. R-13, 3-1/2 inch (89mm) thickness, 16 inch (406mm) or 24 inch (609mm) width, 48 inch (1219mm) or 96 inch (2438mm) length.
2. R-15, 3-1/2 inch (89mm) thickness, 16 inch (406mm) or 24 inch (609mm) width, 96 inch (2438mm) length.
3. R-21, 5-1/2 inch (139mm) thickness, 16 inch (406mm) or 24 inch (609mm) width, 96 inch (2438mm) length.
4. R-30, 8-9 inches (159mm) thickness, 16 inch (406mm) or 24 inch (609mm) width, 48 inch (1219mm) or 96 inch (2438mm) length. Faced and unfaced.
5. R-49, 8-9 inches (159mm) thickness, 16 inch (406mm) or 24 inch (609mm) width, 48 inch (1219mm) or 96 inch (2438mm) length. Faced and unfaced.
6. R-60, 2 rows of R-30 8-9 inches (159mm) thickness, 16 inch (406mm) or 24 inch (609mm) width, 96 inch (2438mm) length.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation. Verify mechanical and electrical services within walls have been tested and inspected.

B. Provide written report listing conditions detrimental to performance of work in this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's installation instructions and ASTM C1320.

B. Friction-fit blanket insulation in place, until the interior finish is applied. Install batts to fill entire stud cavity, with no gaps, voids, or areas of compression. If stud

cavity is less than 8 feet in height, cut lengths to friction fit against floor and ceiling tracks. Walls with penetrations require that insulation be carefully cut to fit around outlets, junction boxes, and other irregularities.

1. Do not install insulation on top of or within 3 inches of recessed light fixtures unless the fixtures are approved for such use.

C. Within exterior wall framing, install insulation between pipes and backside of sheathing. Cut or split insulation material as required to fit around wiring and plumbing.

D. Where showers and bathtubs are located on exterior walls, install insulation and vapor retarder air barrier between units and exterior.

E. Fluff insulation to full thickness for specified R-value before installation. Do not compress insulation in the cavity during installation, creating gaps or voids that could diminish thermal value.

F. Trim insulation neatly to fit spaces. Fill miscellaneous gaps and voids with insulation.

G. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.

H. For unfaced batt insulation, install with friction fit or retain in place with manufacturer's recommended fasteners or mesh.

I. For batt insulation with factory-applied facing, install with vapor retarder membrane facing warm in the winter side of building spaces or as specified by local building code. Lap ends and side flanges of membrane over or between framing members. Tape to seal tears, cuts or misalignments in membrane.

J. Secure insulation in place using one of the following methods: Friction fit; staple or nail facing flanges in place as needed, tape in place, retain in place with spindle fasteners, retain in place with wire mesh secured to framing members.

3.3 PROTECTION

A. Protect installed insulation from damage due to weather and physical abuse until protected by permanent construction.

END OF SECTION 07 21 16

SECTION 07 27 26
FLUID-APPLIED MEMBRANE AIR BARRIERS
(VAPOR PERMEABLE)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fluid-applied vapor-permeable air barrier at exterior above grade wall assemblies.
2. Installation of moisture resistant gypsum board sheathing.
3. Connection to adjacent air barrier components providing a durable, continuous, full building air barrier.

1.2 RELATED WORK

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. Air Barrier Association of America (ABAA):
Quality Assurance Program.

C. ASTM International (ASTM):

C920-18.....Elastomeric Joint Sealants.
C1193-16.....Use of Joint Sealants.
D412-16.....Vulcanized Rubber and Thermoplastic Elastomers-Tension.
E96/E96M-16.....Water Vapor Transmission of Materials.
E162-16.....Surface Flammability of Materials Using a Radiant Heat Energy Source.
E783-02(2018).....Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
E1186-17.....Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.
E2178-13.....Air Permanence of Building Materials.
E2357-18.....Determining Air Leakage of Air Barrier Assemblies.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 30 00, Submittals.

1. Show size, configuration, and fabrication and installation details.

B. Manufacturer's Literature and Data:

1. Description of each product.
2. Installation instructions.

C. Sustainable Construction Submittals:

1. Low Pollutant-Emitting Materials:

a. Identify volatile organic compound types and quantities.

D. Test reports:

1. Submit field inspection and test reports.

E. Certificates: Certify each product complies with specifications.

1. Compatibility: Certify products are compatible with adjacent materials.

F. Qualifications: Substantiate qualifications comply with specifications.

1. Manufacturer with 5 years project experience.
2. Installer 2 years with project experience.

1.5 QUALITY ASSURANCE

A. Coordinate work with adjacent and related work to provide continuous, unbroken, durable air barrier system.

B. Manufacturer Qualifications:

1. Regularly and presently manufactures specified products.
2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
3. Accreditation by ABAA.

C. Installer Qualifications:

1. Regularly and presently installs specified products.
2. Approved by manufacturer.
3. Applicators trained and certified by manufacturer of air barrier system.
4. Full time on-site field supervisor has completed three projects of similar scope within last year.

1.6 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, production run number, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight, conditioned facility.

B. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

A. Environment:

1. Work Area Ambient Temperature Range: 4 to 32 degrees C (40 to 90 degrees F) continuously, beginning 48 hours before installation.
2. Surface Requirements: visibly dry, and complying with manufacturer's instructions.

1.9 WARRANTY

A. Construction Warranty: 2 years.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/square feet of surface area at 1.57 psf differential pressure when tested according to ASTM E2357.

B. Provide full system of compatible materials under conditions of service and application required. Compatibility based on testing by material manufacturer.

C. Perform as continuous vapor permeable air barrier and moisture drainage plane.

D. Transition to adjacent flashings and discharge water to building exterior.

E. Accommodate substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without moisture deterioration and air leakage exceeding performance requirements.

2.2 PRODUCTS - GENERAL

A. Provide air barrier system components from one manufacturer.

a. Carlisle or approved equal

2.3 AIR BARRIER

A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier:

1. Elastomeric, modified bituminous or synthetic polymer membrane.
2. Air Permeance: ASTM E2178: 0.02 .004 cfm/square feet of surface area at 1.57 psf differential pressure.
3. Vapor Permeance: ASTM E96/E96M: Minimum 10 perms.
4. Elongation: Ultimate, ASTM D412, Die C: 200 percent, minimum.
5. Thickness: Minimum 40 mils dry film thickness, applied in single continuous coat.
6. Surface Burning Characteristics: When tested according to ASTM E84.

    a. Flame Spread Rating: 25 maximum.
    b. Smoke Developed Rating: 450 maximum.

2.4 ACCESSORIES

A. Primer: Waterborne primer complying with VOC requirements, recommended air barrier manufacturer to suit application.

B. Counterflashing Sheet: Modified bituminous, minimum 40 mils thick, self-adhering composite sheet consisting of minimum 33 mils of rubberized asphalt laminated to polyethylene film.

C. Substrate Patching Material: Manufacturer's standard trowel-grade filler material.

D. Sprayed Polyurethane Foam Sealant: Foamed-in-place, 1.5 to 2.0 pcf density, with maximum flame-spread index of 25 when tested according to ASTM E84.

2.5 MOISTURE RESISTANT GYPSUM BOARD SHEATHING

A. Moisture Resistant Gypsum Board Sheathing: Over all cold rolled exterior framing provide one-lay ½" thick moisture resistant gypsum board sheathing as per DensGlas Sheathing as manufactured by Georgia Pacific.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.

B. Protect existing construction and completed work from damage.

C. Correct substrate deficiencies:

1. Remove projections and excess materials and fill voids with substrate patching material.
2. Remove contaminants capable of affecting subsequently installed product's performance.

D. Prepare and treat substrate joints and cracks according to ASTM C1193 and membrane air barrier manufacturer's instructions.

3.2 INSTALLATION - AIR BARRIER

A. Install products according to manufacturer's instructions and approved submittal drawings.

1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

B. Apply primer.

C. Install transition strips and accessory materials.

D. Seal air barrier to adjacent components of building air barrier system.

E. Install flexible opening transition at each opening perimeter. Extend transition onto each substrate minimum 75 mm (3 inches).

1. Fill gaps at perimeter of openings with foam sealant.

F. At penetrations, seal transition strips around penetrating objects with termination mastic.

1. Fill gaps at perimeter of penetrations with sprayed polyurethane foam sealant.

G. At top of through-wall flashings, seal with continuous transition strip of manufacturer's recommended material to suit application.

H. Apply air barrier in full contact with substrate to produce continuous seal with transitions.

I. Apply fluid membrane in thickness recommended by manufacturer, and minimum specified thickness.

J. Leave air barrier exposed until tested and inspected and approved by Contracting Officer’s Representative.

3.3 FIELD QUALITY CONTROL

A. Inspections:

1. Compatibility of materials within air barrier system and adjacent materials.
2. Suitability of substrate and support for air barrier.
3. Suitability of conditions under which air barrier is applied.
4. Adequacy of substrate priming.
5. Application and treatment of joints and edges of transition strips, flexible opening transitions, and accessory materials.
6. Continuity and gap-free installation of air barrier, transition strips, and accessory materials.

B. Defective Work:

1. Correct deficiencies, make necessary repairs, and retest as required to demonstrate compliance with specified requirements.

3.4 CLEANING

A. Remove masking materials.

B. Clean spills and overspray using cleaning agents recommended by manufacturers of affected construction.

3.5 PROTECTION

A. Protect air barrier from construction operations.

B. Protect air barrier from exposure to UV light exposure exceeding manufacturer's recommendation.

C. Replace overexposed materials and retest.

END OF SECTION 07 27 26

SECTION 07 31 13
ASPHALT SHINGLES

PART 1 – GENERAL

1.1 SUMMARY

A. Provide laminated asphalt shingles and accessories for sloped roof applications on Cabin #6.

1.2 REFERENCES

A. ASTM D3018 – Standard Specification for Class A Asphalt Shingles

B. ASTM D3161 – Wind Resistance of Asphalt Shingles

C. ASTM D3462 – Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules

D. ASTM D7158 – Wind Resistance of Asphalt Shingles (Class H)

E. UL 790 – Standard Test Methods for Fire Tests of Roof Coverings (Class A)

F. ICC-ES ESR-1475 and ESR-3267

G. Miami-Dade County Product Control Approved

H. Florida Building Code Approved FL10124-R12

I. Texas Department of Insurance Approval

1.3 SUBMITTALS

A. Product data and manufacturer’s technical literature

B. Samples of shingles in selected color

C. Warranty documentation

1.4 QUALITY ASSURANCE

A. Manufacturer shall have a minimum of 20 years' experience in producing asphalt. shingles

B. Installer shall be certified or approved by manufacturer.

1.5 WARRANTY

A. Lifetime Limited Warranty with Smart Choice® Protection for first 10 years

B. 25-year StainGuard Plus™ Algae Protection Limited Warranty

C. Wind warranty up to 130 mph with enhanced installation.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Basis of design GAF, 1 Campus Drive, Parsippany, NJ 07054 (973) 628-3000 Product: Woodland® Designer Asphalt Shingles.

B. CertainTeed Satint-Gobain (800) 233-8990 Web Site: www.certinteed.com Product: Presidential Shake TL Shingles.

C. IKO Armourshake Shingles Website: www.iko.com/na/product/armourshake/ Phone Number: 1(888) 456-7663

2.2 MATERIALS

A. Shingle Type: Laminated fiberglass asphalt

B. Dimensions : Approx. 17" x 40" (432 mm x 1,016 mm)

C. Exposure: 6.5" (165 mm)

D. Bundles/Square: 4

E. Pieces/Square: 56

F. Nails/Square: 280 (or 336 for enhanced wind coverage)

G. Colors: Castlewood Gray, Cedarwood Abbey, Mountain Sage, Tuscan Sunset, Woodberry Brown

H. Finish: Dimensional design with oversized tabs and artisan-crafted shapes

I. Adhesive: Dura Grip™ for wind resistance

J. Algae Protection: StainGuard Plus™ time-release copper capsules

2.3 ACCESSORIES

A. Starter Strip: WeatherBlocker™

B. Hip and Ridge: TimberTex® or TimberCrest® Premium Ridge Cap Shingles

C. Vented nail board by GAF ThermaCal,

1.Hunter Panels Product: Cool-vent
2.Atlas Roofing Corporation Product: ACFoam or Crossvent

D. Underlayment: As recommended by manufacturer for warranty compliance.

E. Ridge Vent by GAF “Cobra” 10”x1/2” wide

F. Roof Sheathing ¾” thick

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify substrate is clean, dry, and properly prepared.

B. Confirm roof slope meets manufacturer’s minimum requirements.

3.2 INSTALLATION

A. Install shingles per GAF's published instructions and local building codes.

B. Use six nails per shingle where required for enhanced wind warranty.

C. Align shingles for consistent exposure and aesthetic appearance.

D. Install accessories as specified for starter, hip, and ridge areas.

3.3 PROTECTION

A. Protect installed shingles from damage during remaining construction.

B. Replace damaged shingles prior to final acceptance.

END OF SECTION 07 31 13

SECTION 07 46 00
SIDING

PART 1 GENERAL

1.1 SUMMARY

A. Fiber-cement board-and-batten siding:
   1. Vertical siding panels installed over CMU walls with fluid-applied air barrier.
   2. Associated trim, battens, flashings, and accessories.

B. Vinyl Soffit (Vented and Unvented):
   1. Panels installed at eaves, overhangs, and soffit areas as indicated on drawings.
   2. Associated trim, vents, and fasteners.

C. Installation Context:
   1. Siding applied over CMU substrate (Section 04 22 00) with fluid-applied air barrier (Section 07 27 26).
   2. Roof system: asphalt shingles (Section 07 31 13).
   3. Exposed block base to receive manufactured stone veneer (Section 04 73 00)

1.2 RELATED SECTIONS

A. Section 04 22 00 – Concrete Unit Masonry

B. Section 04 73 00 – Manufactured Stone Veneer

C. Section 06 10 00 – Rough Carpentry

D. Section 07 27 26 – Fluid-Applied Membrane Air Barriers

E. Section 07 31 13 – Asphalt Shingles

F. Section 07 92 00 – Joint Sealers

G. Section 08 11 13 – Hollow Metal Doors and Frames

H. Section 08 53 13 – Aluminum Project-Out Windows

I. Section 09 91 00 – Painting

1.3 REFERENCES

A. ASTM D3679 – Standard Specification for Rigid Vinyl Siding.

B. ASTM C1186 – Standard Specification for Flat Fiber-Cement Sheets.

C. ASTM E330 – Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls (wind load testing).

D. ASTM E84 – Surface Burning Characteristics of Building Materials (optional, if required for code review).

E. Manufacturer's installation guides and published product data for James Hardie, CertainTeed, or approved alternates

1.4 SUBMITTALS

A. Product Data: Manufacturer's specifications, installation instructions, and maintenance data for fiber-cement siding, vinyl soffit, battens, trim, flashings, and sealants.

B. Shop Drawings: Indicate siding and soffit layout, vertical and horizontal joint locations, trim, flashing, and transitions to adjacent materials.

C. Samples:
   1. 12-inch minimum length of each siding panel and battens.
   2. Full range of exposed finish colors.
   3. Vented and unvented soffit samples for approval.

D. Mock-Up:
   1. 3-foot by 3-foot minimum wall panel illustrating siding, battens, trim, flashing, sealant, and transitions.
   2. Mock-up approval required before proceeding; may remain as part of completed work if undamaged.

E. Warranty Documentation: Manufacturer's standard warranty for fiber-cement siding and vinyl soffit.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Minimum 10 years of experience producing fiber-cement siding and vinyl soffit products.
   2. Products must comply with manufacturer's published specifications and applicable ASTM standards.

B. Installer Qualifications:
    1. Minimum 5 years of experience installing fiber-cement siding and vinyl soffit over CMU substrates.
    2. Installer must be approved or certified by the product manufacturer when required.
    3.
C. Standards Compliance:
    1. Comply with manufacturer's published installation instructions.
    2. Comply with ASTM standards cited in Section 1.3.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packaging labeled with manufacturer's name and product identification.

B. Store fiber-cement siding and vinyl soffit panels flat, off the ground, under cover, and protected from moisture, direct sunlight, and impact.

C. Handle materials carefully to prevent damage, warping, or distortion.

D. Do not install wet, damaged, or defective siding or soffit materials.

E. Protect installed materials from dirt, construction traffic, and other damage until final acceptance.

1.7 WARRANTY

A. Product Warranty:
    1. Provide manufacturer's standard warranty covering defects in materials and finishes for fiber-cement siding and vinyl soffit for the full duration offered by the manufacturer.

B. Installer Warranty:
    1. Provide a minimum 2-year warranty covering workmanship and proper installation of siding, battens, trim, flashings, and soffit.

C. Submit all warranty documents with project closeout submittals.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Fiber -Cement Siding:

1. Basis of Design: James Hardie Building Products, Inc. – 231 S. LaSalle St., Suite 2000, Chicago, IL 60604; (888) 542-7343; https://www.jameshardie.com/
    a. Hardie® Panel Vertical Siding with Hardie® Trim Batten Boards
2. Allura USA – 3960 S. Hulen St., Suite 150, Fort Worth, TX 76109; (844) 442-5872; https://www.allurausa.com
3. Nichiha USA, Inc. – 6465 East Johns Crossing, Suite 250, Johns Creek, GA 30097; (866) 424-4421; https://www.nichiha.com
4. Or Equal

B. Vinyl Soffit (Vented and Unvented):
1. Basis of Design: CertainTeed LLC – 20 Moores Road, Malvern, PA 19355; (800) 233-8990; https://www.certainteed.com
    i. Vinyl Soffit Panels, vented and unvented as required
2. Royal Building Products – 5020 Weston Road, Suite 300, Woodbridge, ON L4L 8Z2; (855) 769-2549; https://www.royalbuildingproducts.com
3. Alside (Associated Materials, LLC) – 3773 State Road, Cuyahoga Falls, OH 44223; (800) 922-6009; https://www.alside.com
4. Or Equal

2.2 MATERIALS

A. Fiber-Cement Siding
1. Siding Panels:
    a. Pre-finished or factory-primed fiber-cement panels suitable for vertical board-and-batten installation.
    b. Minimum thickness: 5/16 inch (typical), unless manufacturer's standard specifies otherwise.
    c. Panel width: as specified by manufacturer for board-and-batten configuration.
    d. Panel edges: square or shiplap as recommended by manufacturer.
2. Trim and Battens:
    a. Fiber-cement trim boards to match siding in thickness and finish.
    b. Batten boards: minimum 1 × 4 inches (nominal) or as recommended by manufacturer.
3. Fasteners:
    a. Corrosion-resistant nails or screws recommended by manufacturer for CMU or masonry substrate.

B. Vinyl Soffit (Vented and Unvented)

1. Soffit Panels: Rigid vinyl panels for vented and unvented applications, color and finish per manufacturer standards.
2. Trim and Battens: Vinyl trim boards, vent inserts, and other accessories compatible with soffit panels.
3. Fasteners: Corrosion-resistant nails or screws recommended by manufacturer.

C. Sealants
1. Exterior-grade, compatible with fiber-cement siding and vinyl soffit.
2. Paintable if required by fiber-cement products.
3. Color to match siding, trim, or soffit as approved.

D. Flashing and Accessories
1. Manufacturer-supplied or approved flashings for windows, doors, roof/wall intersections, and penetrations.
2. Material: corrosion-resistant metal or compatible polymer.
3. Include drip edges, Z-flashings, starter strips, and other necessary accessories for proper water shedding.

2.3 ACCESSORIES / SUBSTRATE INTERFACE

A. Fiber-Cement Siding Accessories
1. Trim and Battens: Match siding type, thickness, and finish; supplied by manufacturer or approved alternate.
2. Flashings:
   a. Include window, door, roof/wall intersections, penetrations, starter strips, Z-flashings, and drip edges.
   b. Material: corrosion-resistant metal or polymer compatible with siding system.
3. Fasteners: Corrosion-resistant nails or screws recommended by manufacturer for CMU or masonry substrate.
4. Sealants: Exterior-grade, compatible with siding and trim materials, paintable if required, color-matched..

PART 3 EXECUTION

3.1 EXAMINATION / SITE CONDITIONS

A. Verify CMU substrate is complete, clean, dry, plumb, and structurally sound.

B. Verify fluid-applied air barrier is fully cured, continuous, and undamaged.

C. Verify manufactured stone veneer, roofing, windows, doors, and other adjacent finishes are installed and protected.

D. Confirm weather and temperature conditions are within manufacturer's recommended limits for siding and soffit installation.

E. Do not proceed with installation until unsatisfactory conditions are corrected and approved by architect.

3.2 COORDINATION & PROTECTION

A. Coordinate fiber-cement siding and vinyl soffit installation with air barrier installer to maintain continuous building enclosure.

B. Coordinate installation of trim, battens, flashings, and sealants with siding and soffit.

C. Protect adjacent manufactured stone veneer, roofing, windows, doors, and other finishes from damage or staining.

D. Protect siding, soffit, and accessories from moisture, dirt, and impact during handling and installation.

3.3 INSTALLATION

A. Fiber-Cement Board-and-Batten Siding
   1. Install panels, battens, trim, and flashings per manufacturer's instructions.
   2. Maintain clearances from grade, roof lines, and horizontal surfaces as recommended.
   3. Allow for expansion and contraction; maintain spacing per manufacturer guidelines.
   4. Fasteners: corrosion-resistant nails or screws; do not overdrive or restrict movement.
   5. Apply sealants at joints, penetrations, and trim interfaces; color-match to siding or trim.
   6. Install flashing at windows, doors, roof intersections, and penetrations per manufacturer instructions.

B. Vinyl Soffit (Vented and Unvented)
   1. Install vented and unvented panels per manufacturer's instructions at eaves and overhangs.
   2. Install trim, fascia, and vent inserts compatible with soffit panels.
   3. Fasteners: corrosion-resistant nails or screws; follow manufacturer spacing and layout guidelines.

3.4 FIELD PAINTING / TOUCH-UP

A. Field-cut edges of fiber-cement siding must be primed or painted per manufacturer's instructions.

B. Touch-up painting shall match factory-applied finish and blend seamlessly.

C. Do not paint or touch-up vinyl soffit unless recommended by manufacturer.

3.5 CLEANING AND PROTECTION

A. Remove all protective films, labels, and packaging from siding, soffit, trim, and battens after installation.

B. Clean completed siding and soffit surfaces of dust, dirt, and debris.

C. Protect siding, soffit, battens, trim, and adjacent surfaces until acceptance by architect.

D. Do not use high-pressure washing on newly installed siding or soffit.

END OF SECTION 07 46 00

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SECTION 07 90 00
JOINT SEALERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Conditions Supplementary Conditions and Division 01 Specification sections apply to this section.

B. Closely Related work specified in other sections:

1. Preformed Metal Edge System – Section 07 41 00.

2. Flexible Sheet Membrane Roofing – Section 07 53 00.

3. Flashing and Sheet Metal – Section 07 60 00.

4. Roof Specialties – Section 07 70 00.

1.02 DESCRIPTION OF WORK:

A. Provide as work of this section, except where specified as work of other sections, joint sealers at the following locations.

1. All joints between dissimilar materials where such joints are exposed to weather in the finished work.

2. Wherever required to make joints weather-tight.

3. Where shown on drawings, whether or not meeting other criteria in this paragraph.

1.03 SUBMITTALS:

A. Product Data: Submit manufacturer's technical data for each joint sealer product required, including instructions for joint preparation and joint sealer application.

1.04 QUALITY ASSURANCE:

A. Installer shall have successfully completed within the last three (3) years at least three (3) joint sealer applications similar in type and size to that of this project and shall assign mechanics from the referenced applications to this project, of whom one will serve as lead mechanic.

1.05 REFERENCED STANDARDS:

A. Comply with the applicable provisions of all codes, standards and specifications referenced in this section, including but not limited to the following.

1. ASTM C 920: Standard Specification for Elastomeric Joint Sealants and ASTM Standards referenced therein.

2. ASTM C 962: Elastomeric Sealant Installation Standard.

3. ASTM C 804: Solvent-Release-Curing Sealant Installation Standard.

4. ASTM C 790: Latex Sealant Installation Standard.

5. ASTM C 919: Acoustical Sealant Application Standard.

6. Federal Specifications, as listed.

1.06 PRODUCT HANDLING:

A. Deliver materials to project site in original unopened containers or bundles with labels identifying manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi-component materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.07 WARRANTY:

A. Provide sealant manufacturer printed 5 year warranty covering all costs associated with the replacement of defective materials.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Manufacturer: Subject to compliance with requirements, provide products by one of the listed manufacturers for each specified product.

2.02 MATERIALS, GENERAL:

A. Compatibility: Provide joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

B. General: Use self-leveling compounds for horizontal joints and non-sag compounds for all other areas.

2.03 SEALANTS:

A. Type 1 Sealant:

1. Two-Part, Non-Sag Polyurethane Sealant: Pecora's Dynatrol II Sonneborn's Sonolastic NP II, or Tremco's Dymeric or equal.

B. Type 1A Sealant:

1. For Horizontal Joints: Two-part, self-leveling polyurethane sealant for traffic bearing construction, Mameco's Vulkem 255, Pecora's Urexpan NR-200, or Bostik's Chem-Calk 550 or equal.

C. Type 1C Sealant:

1. One-Part, Non-Sag Polysulfide Base Sealant: Pecora's Synthacalk GC-9, Products Research and Chemical's PRC Rubber Calk 7000, or Sonneborn's Sonolastic One-Part Polysulfide Sealant or equal.

D. Type 1D Sealant:

1. One-Part Mildew Resistant Silicone Sealant: Dow Corning's 786, General Electric's Sanitary 1700, or Bostik's Silicone Rubber Bathroom Caulk or equal.

E. Type 2 Sealant:

1. One-Part Acrylic Polymer Sealant: Pecora's 60+ Unicrylic, PTI's 738, or Tremco's Mono or equal.

F. Type 2A Sealant:

1. One-Part Clear Acrylic Sealant for Sealing Small Joints: PTI's 200 or Tremco's Small Joint Sealant or equal.

G. Type 4 Sealant:

1. One-Part Silicone Sealant for High Temperatures: Dow Corning's Silastic 736 RTV or General Electric's RTV 106 or equal.

H. Preformed Sealant: Preformed paintable sealant strips of open cell, compressible urethane foam, saturated with non-drying, non-staining and non-migrating butylene compound.

I. Sealant Colors: For exposed materials, provide color as indicated, or if not indicated, as selected by the director from manufacturer's standard colors. For concealed materials, provide the natural color which has the best overall performance characteristics.

2.04 JOINT FILLERS:

A. Cork Joint Filler: Resilient, non-extruding type premolded cork units, ASTM D 1752, Type II.

2.05 MISCELLANEOUS MATERIALS:

A. Joint Primer/Sealer/Conditioner: As recommended by the sealant manufacturer for the particular joint surface materials and conditions.

B. Backer-Rod: Compressible rod stock of expanded, extruded polyethylene.

PART 3 EXECUTION

3.01 INSTALLATION

A. General: All materials shall be applied in strict accordance with manufacturer's current specifications and instructions.

B. Surface Preparation: Apply primer on sides of joints to be caulked where material to be caulked will not absorb bonding agents from the caulking compound.

C. Application: Apply caulking compounds with gun having proper nozzle size, use sufficient pressure to fill all voids and joints solid. Remove all excess caulking and leave surface neat, smooth, clean and watertight with an even smooth wrinkle free finish. Tool caulking where necessary to obtain this finish.

END OF SECTION 07 90 00

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 01 Section "General Conditions".
2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
4. Division 08 Section "Door Hardware".
5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

9. 10. SDI-113 Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door & Frame Assemblies.
10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
11. ASTM C1199 - Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods
12. ASTM E1423 - Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.
13. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
14. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
15. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
16. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
17. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
18. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
19. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40” above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.

    a. Smoke "S" Label: Doors to bear “S” label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Storm Shelter Openings: Provide complete door systems for hurricane or tornado storm shelters, and other areas of refuge, complying and tested according to ICC 500 (2014/2020), ICC/NSSA Standard for the Design and Construction of Storm Shelters.

1. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:

1. CECO Door Products (C).
2. Curries Company (CU).
3. Or approved Equal

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard polystyrene. Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value of 2.8 or better.
3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.
4. Vertical Edges: Vertical edges to have the face sheets spot welded and filled full height with an epoxy filler. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Manufacturers Basis of Design:

1. Curries Company (CU) - Polystyrene Core - 707 Series.

2.4 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
3. Manufacturers Basis of Design:

a. Curries Company (CU) - M Series.

C. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.7 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld joints continuously through full throat width of frames, including rabbets, soffits, and stops; grind, fill, dress, and make smooth, flush, and invisible.

    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
4. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
5. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
6. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
7. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on-center and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
8. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT,

tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.8 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

    a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 08 11 13

SECTION 08 51 13
ALUMINUM PROJECT-OUT WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes Kawneer Architectural Aluminum Windows including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of window units.

1. Types of aluminum windows include:
   a. Kawneer Series AA™4325 Ultra Thermal Windows
   b. Fixed Window
   c. Project-Out Window
   d. 3-1/4" (82.5 mm) frame depth
   e. AW-PG80-FW
   f. AW-PG80-AP

B. Related Sections:

1. 072700 “Air Barriers”
2. 079200 “Joint Sealants”

1.3 DEFINITIONS

A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufactures Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed window system shall withstand the effects of the following performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Window Performance Requirements:

1. Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
   a. Performance Class and Grade: AW-PG80-FW
   b. Performance Class and Grade: AW-PG80-AP
2. Air Infiltration: after the AAMA 910 life cycle test, meet AAMA 101 standard of maximum 0.10 cfm/ft2 when tested per ASTM E 283 at a static air pressure differential of 6.24 psf (300 PA).
3. Water Penetration: after the AAMA 910 life cycle test, no uncontrolled water leakage when tested per ASTM E 547 and ASTM E 331 at a static air pressure differential of 15 psf (720 PA).
4. Uniform Deflection: no more than L/175 when tested per ASTM E 330 at a static air pressure differential of 80 psf (3840 PA).
5. Uniform Structural: window to be operable, and maximum .2% permanent deformation per member when tested per ASTM E 330 at a static air pressure differential of 120 psf (5748 PA).
6. Component Testing: Window components shall be tested in accordance with procedures described in ANSI AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
7. Energy Efficiency:
   a. Thermal Transmittance Test (U-Factor): When tested to AAMA specification 1503, AAMA 507 or NFRC 100 the thermal transmittance (U-Factor) shall not be more than:
      1) 1" insulating glass [High-Thermal]:
         U-Factor not more than .4 BTU/hr/sf/°F per AAMA 507 or NFRC100 when using project specified glass.
8. Condensation Resistance Test (CRF): When tested in accordance with AAMA 1503, the condensation resistance factor (CRF) shall not be less than:
   a. 1" insulating glass made with exterior 3/16" soft coat low E glass, thermoplastic butyl spacer, argon gas, and interior 3/16" clear glass:
      (CRFf) frame not less than 70.
      (CRFg) glass not less than 66.
9. Condensation Resistance (I): When tested to CSA A-440, the condensation index shall not be less than:
   a. 1" insulating glass made with exterior 3/16" soft coat low E glass, thermoplastic butyl spacer, argon gas, and interior 3/16" clear glass:
      Temperature Index (I_f) frame not less than 63.
      Temperature Index (I_g) glass not less than 67.
10. Forced Entry Resistance: All windows shall conform to ASTM F588, Grade 10.

11. Thermal Barrier Tests: Testing shall be in general accordance with AAMA 505 Dry Shrinkage and Composite Thermal Cycling test procedure, AAMA TIR-A8, Structural Performance of Composite Thermal Barrier systems.
12. Environmental Product Declarations (EPD): Shall have a Type III Product-Specific EPD created from a Product Category Rule.

1.5 SUBMITTALS

A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances and installation details.

C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

D. Samples for Verification: For aluminum windows and components required.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An installer which has had successful experiences with installation of the same or similar units required for this project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

C. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

B. Projected Windows: warrant for two years against defects in material or workmanship under normal use.

C. Insulating Glass in fixed windows: Warranted to be free from defects (excluding breakage) for a period of five (10) years.

D. Insulating glass units in projected windows: warrant seal for five years against visual obstruction from film formation or moisture collection between internal glass surfaces, excluding that caused by glass breakage or abuse.

E. Paint finish: PPG… as selected by owner
   1. Permafluor™ organic finish conforming to AAMA 2605: warrant for ten years against chipping, peeling, cracking, chalking, or fading.

PART 2 - PRODUCTS

2.1 MANUFACTURES

A. Basis-of-Design Product:

1. Kawneer Series AA™4325 Ultra Thermal Windows - Project-In and Project-Out Windows
2. 3-1/4" (82.5 mm) frame depth
3. AW-PG80-AP
4. Kawneer Series AA™4325 Ultra Thermal Windows - Fixed
5. 3-1/4" (82.5 mm) frame depth
6. AW-PG80-FW

B. Manufacturer: Efco Corporation Project out windows

1. Series: 321X or 321G

2. Profile dimension: 3 ¼”
3. Performance Grade: Impact and thermal

C. Manufacturer: Wausau window and wall system

1. Series: 3250i
2. Profile dimension: 3 7/8”
3. Performance Grade: Hurricane

D. Substitutions: Refer to Substitutions Section for procedures and submission requirements.

1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
2. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid window installation and construction delays.
3. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
4. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for window system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum windows for a period of not less than ten (10) years. (Company Name)
5. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
6. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.

E. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish.

B. Thermal Barrier: Structural thermal break made with glass-reinforced nylon strips, (closed cell PVC foam strips) installed by the window manufacturer in the frame and vent members.

C. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.

D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

E. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

F. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

2.3 GLAZING

A. Glass and Glazing Materials: Refer to Division 08 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.

B. Glazing System: Glazing method shall be a wet/dry type in accordance with manufacturer’s standards. Exterior glazing shall be silicone back bedding sealant. Interior glazing shall be snap-in type glazing beads with an interior gasket in accordance with AAMA 702 or ASTM C864.

C. Glazing: Exterior extruded silicone gasket with 2-part structural silicone; 1" (25.4) insulating glass Interior aluminum glazing bead; open cell foam encased in black thermoplastic elastomeric (TPE) gasket; glass description in paragraph 2.3; glazed by the window manufacturer.

D. Insulating Glass Units

1. Materials
   a. Spacer: extruded thermoplastic butyl with integrated desiccant.
   b. Spacer color: black.
   c. Secondary seal: silicone.
   d. Air space fill: argon.
2. Performance
   a. Dual-seal durability: conformance to ASTM E 2190; visible, permanent IGCC certification label.
3. Exterior glass lite
   a. Thickness: 1/8".
   b. Tint: gray.
   c. Type: annealed tempered.
   d. Coating: Low E
4. Interior glass lite
   a. Thickness: 1/8".
   b. Tint: clear.
   c. Type: annealed tempered.

2.4 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows, and sized to accommodate sash weight and dimensions.

B. Projected Window Typical Hardware:

C. Typical Hardware:

1. Locking
   a. Cast White Bronze Cam Locks (Standard)
2. Hinging
   a. 4-Bar Hinges (Standard)
   b. Limit Stop
   c. Butt Hinges
   d. Friction Adjusters
3. Other
   a. Pole Ring
   b. Pole

D. Optional Exterior Panning and Interior Trims: Extruded aluminum, 6063-T6 alloy and temper, extruded to profiles and details indicated. Seal exterior joints with manufacturer's standard sealant to assure water-tight joints.

1. Exterior Panning and Trims: All panning profiles shall be a minimum thickness of 0.062" (1.57 mm) to match the profiles as shown the drawings. Any profile variations shall be submitted to the architect and/or owner for approval 10 days prior to bid date. All panning shall be factory fabricated for field assembly. All corner joinery shall be factory cut. Joinery at the sill shall be coped and butt-type construction. All preparations for assembly shall be completed by the window manufacturer. Upon assembly, panning frame joints shall be back-sealed to prevent moisture penetration.
2. Interior Trims: The interior face trim minimum wall thickness shall be 0.062" (1.57 mm). The face trim shall snap-fit onto concealed mounting clip. Exposed fasteners shall not be accepted. The mounting clip shall be extruded aluminum of 6063-T6 alloy and temper. The minimum wall thickness shall be 0.062" (1.57 mm). The trim clips shall be provided in 4" (101.6 mm) lengths and spaced a maximum of 18" (457.2 mm) center to center.

2.5 ACCESSORIES

A. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, non-migrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements.

B. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.

C. Sealants and joint fillers for joints at perimeter of window system as specified in Division 7 Section "Joint Sealants".

D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

E. Glazing: Factory glazing as required and specified in Division 8 Section “Glazing”.

F. Accessories
   1. Material: extruded aluminum; nominal .062" (1.57 mm) wall; with exposed surfaces finished to match window color and finish performance; concealed fasteners; required weather seals; designed for unrestricted expansion and contraction.
   2. Exterior: (wrap around panning;) (preset panning;) (two-piece mullion cover;) (two-piece head and jamb receptor with thermal break;) (subsill with thermal break and end dams sealed by the window manufacturer;) (sill cover;) (slip-on expanders).
   3. Interior: (two-piece snap trim;) (stool cover).
   4. Mullions: with thermal break; (integral: mounted between frame members;) (stack;) (offset stack;) (three-piece).

G. Insect Screens: full; field-mounted on interior with steel spring clips; handle-access black* wickets; 3/4" x 1-1/8" x .050" extruded tubular aluminum frame with finish to match window in color and performance; corners mitered, gusset reinforced, and crimped; 18 x 16 dark fiberglass [aluminum] mesh; PVC spline.

2.6 FABRICATION

A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fit joints; make joints flush, hairline and weatherproof.
   3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
   5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   6. Provisions for field replacement of glazing.
   7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Frame and Vent: All members double tubular; corners mitered, double gusset reinforced, factory-sealed with sealant conforming to AAMA 800, and crimped.

C. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

D. Fabricate aluminum windows that are re-glazable without dismantling sash or framing.

E. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact. Thermal barriers shall be designed in accordance with AAMA TIR A8.
   1. Structural thermal break made with glass-reinforced nylon strips, (closed cell PVC foam strips) installed by the window manufacturer in the frame and vent members.

F. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.

G. Sub frames: Provide sub frames with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093-inch (2.4-mm) thick extruded aluminum. Miter or cope corners and join with concealed mechanical joint fasteners. Finish to match window units. Provide sub frames capable of withstanding design loads of window units.

H. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).

I. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match frame.

2.7 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:

   1. Kawneer Permanodic™ AA-M10C21A44 / AA-M45C22A44, AAMA 611, Architectural Class I Color Anodic Coating (Color as chosen by owner).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight window installation.
   1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
   2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76.2 mm) of opening.
   3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
   4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.

B. Install aluminum-framed window system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.

D. Install aluminum-framed window system and components to drain condensation, water penetrating joints, and moisture migrating within system to the exterior.

E. Separate aluminum from dissimilar materials to prevent corrosion or electrolytic action at points of contact.

F. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
   1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

G. Testing Services: Testing and inspecting of installed windows shall take place as follows:

1. Testing Methodology: Testing Standard shall be per AAMA 502 including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 for Water Penetration Test.
   a. Air Infiltration Test: Conduct test in accordance with ASTM E 783 at a minimum uniform static test pressure of 1.57 psf (75 Pa) for CW or 6.24 psf (300 Pa) for AW. The maximum allowable rates of air leakage for field testing shall not exceed 1.5 times the project specifications.
   b. Water Infiltration Test: Water penetration resistance tests shall be conducted in accordance with ASTM E 1105 at a static test pressure equal to 2/3 the specified water test pressure.
2. Testing Extent: Architect shall select window units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present.
3. Test Reports: Shall be prepared according to AAMA 502.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts.

B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

C. Clean glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

END OF SECTION 08 51 13

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SECTION 08 71 00
DOOR HARDWARE

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 commercial door hardware for the following:

1. Swinging doors.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.

C. Related Sections:

1. Division 06 Section “Rough Carpentry”.
2. Division 06 Section “Finish Carpentry”.
3. Division 08 Section “Hollow Metal Doors and Frames”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hardware shall not have any visible manufacturer names on exposed materials, except cylinders, when the door is in a closed position.

2.2 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

a. Two Hinges: For doors with heights up to 60 inches.
b. Three Hinges: For doors with heights 61 to 90 inches.
c. Four Hinges: For doors with heights 91 to 120 inches.
d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

    a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
    b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

    a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.

5. Basis of Design:

    a. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.3 DOOR OPERATING TRIM

A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
6. Basis of Design:

    a. Rockwood (RO).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Match Facility Standard.

C. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

D. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Three (3).
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

E. Construction Keying: Provide construction master keyed cylinders.

F. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Commercial Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide locksets with functions and features as follows:

a. Heavy duty 12-gauge wrought steel case.
b. Stainless steel 3/4" one-piece latchbolt with a steel 1” projection deadbolt assembly with a hardened steel insert.
c. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.

d. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
e. Latchbolt retraction with only 30 degrees of lever rotation.
f. Five-year limited warranty for mechanical functions.

2. Basis of Design:

a. Sargent Manufacturing (SA) - 7900 Series.

2.6 DEADLOCKS AND LATCHES

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Basis of Design:

a. Sargent Manufacturing (SA) - 4870 Series.LOCK AND LATCH STRIKES

B. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

C. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.7 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.

2. Basis of Design:

a. Sargent Manufacturing (SA) - 351 Series.

2.8 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Basis of Design:

a. Rockwood (RO).

2.9 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where

indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Basis of Design:

1. Pemko (PE).

2.10 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.11 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. SA - SARGENT
3. RO - Rockwood
4. PE - Pemko
5. RE - Reese Enterprises Inc

Hardware Sets

Set: 1.0

Doors: 100, 101

3	Hinge, Full Mortise, Hvy Wt	T4A3386 [NRP]	US32D	MK
1	Public Toilet Deadlock	4878	US32D	SA
1	Push Pull	111x73C/73CL	US32D	RO
1	Surface Closer	351 O	EN	SA
1	Wall Stop	415	US26D	RO
1	Gasketing	297APK		PE
1	Sweep	354A		RE
1	Threshold	171A MSES10SS		PE

Set: 2.0

Doors: 102

3 Hinge, Full Mortise, Hvy Wt	T4A3386 [NRP]	US32D	MK
1 Storeroom/Closet Lock	7904 LNB	US32D	SA
1 Wall Stop	415	US26D	RO
1 Gasketing	297APK		PE
1 Sweep	354A		RE
1 Threshold	171A MSES10SS		PE

END OF SECTION 08 71 00

SECTION 09 54 55
LAMINATED FILM PVC INTERIOR CEILING PANELING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes requirements for supply of rigid, hollow core, polyvinylchloride (PVC) interlocking panels with laminated PVC film on exposed surfaces and their installation on interior ceilings and columns.

1.2 REFERENCES

A. ICC-ES Evaluation Report.

B. American Architectural Manufacturers Association (AAMA):

.1 AAMA 303-19, Voluntary Specification for Rigid Polyvinyl Chloride (PVC) Exterior Profiles.

.2 AAMA 307-16, Voluntary Specification for Laminates Intended for Use on AAMA Certified Profiles.

.3 AAMA 664-21, Voluntary Specification for In-Process Quality Control Requirements for Applicators of Synthetic Interior and Exterior Laminates. C. ASTM D3679-17, Standard Specification for Rigid PVC Siding.

D. ASTM D635-18, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

E. ASTM E119-22, Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 ACTION SUBMITTALS

A. Product data: Submit manufacturer's printed product literature, specifications, and data sheets in accordance with Section 01 33 00 - Submittal Procedures.

B. Samples:

.1 Submit samples [in accordance with Section 01 33 00 - Submittal Procedures. LAMINATED FILM PVC INTERIOR CEILING PANELING 09 54 55-1

.2 Submit color samples for color/pattern selection. Submit duplicate samples of actual paneling material, full profile width x [8”] 1’ long, of specified color/pattern and profile.

.3 Submit samples of all exposed accessories and trims from full range of colors.

C. Installation Instructions: Submit manufacturer's printed installation instructions.

D. Installer Qualifications: Submit proof of installer compliance with installer qualifications specified under Quality Assurance.

1.4 CLOSEOUT SUBMITTALS

A. Submit in accordance with Section 01 78 00 – Closeout Submittals.

B. Maintenance Data: Submit manufacturer's printed instructions for cleaning and repair procedures. Include names and contact information of Product manufacturer and installer.

C. Warranty Documentation: Submit manufacturer’s warranty.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Submit in accordance with Section 01 78 00 – Closeout Submittals.

B. Supply:

.1 One manufacturer’s touch-up pen for each color of paneling material.

.2 [10%] of installed panels in manufacturer’s maximum standard panel length.

.3 [One] of each accessory and trim shape in manufacturer’s maximum standard length.

C. Package materials with protective coverings and label.

1.6 QUALITY ASSURANCE

A. Comply with AAMA 664-21.

B. Certified by National Accreditation and Management Institute for quality assurance program that complies with ISO/IEC 17020 and Guide 53.

C. Test Reports: Submit certified test reports showing Product compliance with specified performance characteristics and physical properties.

D. Installer Qualifications: Minimum [one] [1] year[s] experience installing specified Products or similar products, on projects of similar size to this Project.

E. Pre-Installation Meeting: Conduct pre-installation meeting to verify installation requirements, manufacturer's installation instructions, and manufacturer's warranty requirements.

F. Mock-Up: In accordance with Section [01 40 90 – Quality Requirements.

.1 Construct a 1’ x 3’ mock-up of paneling installation forming part of the Work for Consultant’s review.

.2 Include each accessory and trim type.

.3 Construct a mock-up of beams and columns.

.4 Approved mock-up establishes an acceptable standard for the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer’s instructions.

1.8 WARRANTY

A. Provide the following manufacturer’s limited warranty coverages:

.1 That product will be free from initial manufacturing defects in material or workmanship and against warping, blistering, and peeling for 50 years from date of Substantial Completion, prorated.

.2 Against unreasonable discolouration for 15 years from the date of Substantial Completion, non-prorated.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. ChamClad, 10235 – 184 St., Edmonton, Alberta, Canada, T5S 2J4. chamclad.com Ph. 780454-4430.

B. Substitutions will be considered during bidding period as specified in Section 00 21 13 – Instructions to Bidders . [Substitutions will be considered as specified in Section 01 25 00 – Substitution Procedures.

2.2 PANELING MATERIALS

A. PVC Extrusions: Engineered, rigid, PVC extrusions with 100% pre-consumer recycled content, to AAMA 303-19.

B. Classic Ceiling Panels: Rigid, interlocking, PVC panel with hollow core profile and factory laminated PVC film, to ASTM D3679-17, nominally [4”] [6”] [12”] wide x 3/8” thick.

C. Flexible Ceiling Panels: Single wall, interlocking, PVC panel with factory laminated PVC film, nominally [4”] [6”] wide x 3/8” thick.

D. Shadowline Ceiling Panels: Hollow core, rigid, interlocking, PVC panel with factory laminated PVC film, nominally [6” wide x ½” thick with [6”] [3”] reveal] [12” wide x ½” mm thick with 2” reveal].

E. Panel Lengths: [maximum standard lengths to minimize joints] [custom lengths to minimize joints and minimize waste].

F. Colour/pattern: [Barn Board Grey] [Beach Wood Grey] [Black Sand] [Black Wood] [Barrel
Oak] [Brown Oak] [Brushed Metallic] [Brushed Silver] [Canadian Pine] [Charred Black]
[Cinnamon Walnut] [Smoke Grey] [Spanish Cedar] [Speckled Graphite] [Sun Bleached
Oak] [Teak] [Bamboo] [Toffee] [Black Walnut] [California Redwood] [Chocolate Walnut]
[Atlantic White] [Chai Cedar] [Desert Oak] [Golden Oak] [Brushed Titanium] [Honey]
[Iron Glimmer White] [Modern Walnut] [Monument Oak] [Mountain Oak] [Mountain Pine]
[Natural Oak] [Navy] [Pure White] [Toffee] [Tofino] [Dark Wood] [Harvest Walnut]
[Brushed Metallic] [Brushed Metallic] [Black Leather] [Classic Oak] [Italian Leather] [Ivory Stone] [Terra Cotta] [Vegas Stone] [Tiffany’s] [Sorrento] [Black Pearl] [Crystal White] [Warm Autumn] [Pebble Brook] [Sand Dollar] [Grey Asphalt].

G. Accessories and Trims: [PVC] [Aluminum] starter strip, aluminum/PVC two-piece J-trim,
[aluminum/PVC two-piece outside corner] [aluminum H Mold] [PVC one piece J-trim] [PVC inside corner], matching finish to ceiling panels, pre-punched nailing holes, [maximum standard lengths to minimize joints] [custom lengths to minimize joints and minimize waste].

H. Fasteners: [galvanized] [stainless] steel.

2.3 BEAM AND COLUMN MATERIALS

A. Beam Cladding: Same material as paneling, size and profile to suit beam substrate size(s).
Color/pattern: same as paneling.

B. Faux Beams: Same material as paneling, size as indicated on Drawings.
Color/pattern:
same as paneling.

C. Column Cladding: Same material as paneling, size and profile to suit column size(s), complete with column cap and base trim kit. Cap and base widths as indicated on Drawings. Color/pattern: same as paneling.

2.4 PERFORMANCE CRITERIA

A. Material Characteristics: to ASTM D3679-17.

B. Fire Endurance: to ASTM E119-22.

C. Flammability: Category HB when tested to ASTM D635-18.

D. Surface Burning Characteristics: Class A.

E. PVC Film: to AAMA 307-16.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

A. Verify that substrates are suitable for installation of the Work of this Section. Commencement of Work denotes acceptance of conditions.

3.2 PANELING INSTALLATION

A. Install ceiling panels as indicated on Drawings.

B. Install ceiling panels, accessories, and trim in strict accordance with manufacturer’s printed instructions.

C. Scribe and cut as required to neatly fit abutting walls, ceilings, and adjacent surfaces, and to accommodate other materials penetrating through panels.

D. Secure panels, accessories, and trim in place, rigid, plumb, and square.

3.3 [BEAM] [AND] [COLUMN] INSTALLATION

A. Install beam and column cladding in strict accordance with manufacturer's printed instructions.

3.4 ADJUSTING

A. Where minor surface damage has occurred, touch-up by methods recommended by manufacturer. Remove and replace damaged materials that cannot be satisfactorily repaired with the touch-up pen.

3.5 CLEANING

A. Upon completion of installation, remove surplus materials, rubbish, tools and equipment, and clean as specified in Section 01 74 00 – Cleaning and Waste Management.

B. Where necessary, remove dirt and other contaminants in accordance with manufacturer's cleaning instructions.

END OF SECTION 09 54 55

SECTION 09 70 60
RESINOUS FLOORING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Related work specified elsewhere:

1. Flashing and Sheet Metal - Section 07 60 00

1.02 DESCRIPTION OF WORK:

A. Provide as detailed, all surface preparation and installation of a methyl methacrylate acrylic (MMA) floor coating system as follows:.

1. The flooring system system shall consist of a PU/MMA resin system (color and texture selected by owner), with appropriate Primer and Topcoat.
2. The flooring system shall cure and be available to normal traffic in no more than 60 minutes at 68° F. after application of last coat. The cured material shall have a minimum compressive strength of 7,000 psi in accordance with ASTM C109. It shall have a maximum water absorption value of 0.04 weight percent in accordance with ASTM D570. It shall be chemically resistant to a wide range of acids, alkalis, salts, fats, oils, and other chemicals.
3. The finished floor coating system shall be uniform in color, texture, and appearance. All edges that terminate at walls, floor discontinuities, and other embedded items shall be sharp, uniform, and cosmetically acceptable with no thick or ragged edge. The Contractor shall work out an acceptable masking technique to ensure the acceptable finish of all edges.

1.03 QUALITY ASSURANCE:

A. Manufacturer's Qualifications:

1. The manufacturer shall have actively manufactured the specified systems for a minimum of ten (10) years.

B. Applicator's Qualifications:

1. The applicator shall have been trained by the Manufacturer in all phases of surface preparation and application of the specified flooring system(s).
2. The applicator must have five years experience installing the specified flooring system and submit a list of five projects/references as a prequalification requirement. At least one of the five projects/references must be of equal size, quantity, and magnitude to this project as a prequalification requirement. Owner has the option to personally inspect the projects/references to accept or reject any of the Contractors prior to bid time as a prequalification requirement.

C. Subcontractor Qualifications:

1. The only approved and specified subcontractors for this resurfacing work shall be for shot-blast cleaning of the concrete substrate.

D. Acceptance Sample:

1. A minimum one-foot square representative sample of the specified flooring system shall be prepared by the Manufacturer's representative and submitted to the for acceptance.
2. The installed flooring system shall be similar to the acceptance sample in thicknesses of respective film layers, color, texture, overall appearance and finish.

E. Bond Testing:

1. Surface preparation efforts shall be evaluated by conducting Bond Tests at the site prior to application of the flooring system(s).
2. See paragraph 3.03 - B or consult with Material Manufacturer for specific procedure.

1.04 REFERENCE STANDARDS

A. ACI 308 - Standard Practice for Curing Concrete

B. ACI 302.1R-80 - Guide for Concrete Floor and Slab Construction

C. United States Department of Agriculture (USDA) and Food and Drug Administration (FDA) authorization for incidental contact with foodstuffs.

1.05 SUBMITTALS:

A. Acceptance Sample: One foot square (1 ft. by 1 ft.) sample of the specified acrylic flooring system applied to hardboard or similar backing for rigidity and ease of handling.

B. Manufacturer's Literature: Descriptive data and specific recommendations for surface preparation, mixing, and application of materials.

C. Manufacturer's Material Safety Data Sheets (MSDS) for each respective product to be used.

1.06 DELIVERY, STORAGE, AND HANDLING

A. All material shall be delivered in original Manufacturer's sealed containers with all pertinent labels intact and legible.

B. Store materials in dry protected area between 25° and 80° Fahrenheit. Keep out of direct sunlight. Protect from open flame; keep all containers grounded.

C. Follow all Manufacturer's specific label instructions and prudent safety practices for storage and handling.

1.07 PROJECT/SITE CONDITIONS

A. Material, air, and surface temperatures shall be in the range of 25° to 85° Fahrenheit during application and cure, unless a special formulation is being used and Manufacturer has been consulted.

B. Relative humidity in the specific location of the application shall be less than 85 percent and the surface temperature shall be at least 5 degrees Farenheit above the dew point.

C. Conditions required of existing concrete to be coated with MMA materials:

1. Entire surface of floor to receive coating shall be shot-blast and cleaned.
2. Surface contaminants such as curing agents, membranes, or other bond breakers should not be used.
3. Repair all cracks and surface irregularities as detailed.

D. Foodstuffs are the responsibility of the Owner and shall have been removed from the area of application by the Owner or his representatives.

1.08 WARRANTY

A. The finished installation shall be warranted against material and workmanship defects for a period of two (2) years.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. The basis of design shall be Res-Tek Inc. 110 Riverside Drive Cartersville, Georgia 30120, PH: (770) 427-4034, (888) 737-8351, FAX: (770) 427-4037. Approved equal manufacturers include:

1. Tennant Coatings, Inc., Chicago, IL
2. Portico Systems, Greer, SC

2.02 MATERIALS

A. Prime Coat: Shall be Res-Tek DEK-641 Penetrating Primer mixed with RT-R-Component (DEK-641-R), a transparent, 100% reactive, MMA-based resin.See Res-Tek's DEK-Guard Powder Hardener Dosing Chart for DEK-641 and
R-Component mix ratio. DEK-641-R is mixed with Res-Tek Powder Hardener (BPO)at the job site.

DEK-641-R Penetrating Primer

1. Percentage Reactive Resin	100%
2. Percentage Solids	100%
3. Water Absorption, Wt. % (ASTM D570)	0.007
4. Tensile Strength, psi (ASTM D638)	3550
5. Tensile Modulus, psi (ASTM D638)	210,000
6. Coefficient of Thermal Expansion, in./in./deg. F (ASTM D696)	0.000035
7. Electrical Resistivity (ASTM D257)	
Volume Resistance, ohm-cm	10^{15}
Surface Resistance, ohm	10^{12}
8. Water Vapor Transmission (DIN 53122), g/cm-hr-mm Hg X 10^{-9}	1.4

B. Cracks, Control Joints: Shall be Res-Tek DEK-650 Flexible Membrane. DEK-650 ismixed with Res-Tek Powder Hardener (BPO) at the job site. See Res-Tek's
DEK-Guard Powder Hardener Dosing Chart.

DEK-650 Flexible Membrane

1. Percentage of reactive resin	100%
2. Percentage of solids	100%
3. Water Absorption, Wt. % (ASTM D570)	0.04
4. Tensile Strength, psi (ASTM D638)	210
5. Elongation @ Break	400%

C. Patching, Spall, and Joint Nosing Repair. Shall be Res-Tek RT-05LM Polymer Concrete. See Res-Tek's RT-05LM Polymer Concrete Extension Chart and/or Res-Tek's DEK-Guard Powder Hardener Dosing Chart.

RT-05LM Polymer Concrete

1. Percentage of reactive resin	100%
2. Water Absorption, Wt. % (ASTM D570)	0.02
3. Tensile Strength, psi (ASTM C307)	1,100
4. Tensile Modulus, psi (ASTM D307)	28,000
5. Coefficient of Thermal Expansion, in. /in. /deg. F (ASTM D696)	0.000018
6. Compressive Strength, psi (ASTM C579)	6,500

D. Flexible Membrane: Shall be Res-Tek DEK-650 Flexible Membrane, a transparent, flexible, 100% reactive, MMA based resin to which Res-Tek Powder Hardener (BPO)and Res-Tek White Pigment (RT P-15) are added at the job site. See Res-Tek's DEK Guard Powder Hardener Dosing Chart.

DEK-650 Flexible Membrane

1. Percentage of reactive resin:	100%
2. Percentage of solids:	100%
3. Water Absorption, Wt. % (ASTM D570):	0.04
4. Tensile Strength, psi (ASTM D638):	210
5. Elongation at Break	400%

E. Body Coat: Shall be Res-Tek DEK-675 Body Coat, a transparent, 100% reactive, MMAbased resin to which Res-Tek Powder Hardener (BPO) and pigment are added at the jobsite. See Res-Tek's DEK-Guard Powder Hardener Dosing Chart.Pigment to be chosen by owner from manufacturer's provided selection.

DEK-675 Body Coat

1. Percentage of reactive resin	100%
2. Percentage of solids	100%
3. Water Absorption, Wt. % (ASTM D570)	0.04
4. Tensile Strength, psi (ASTM D638)	644
5. Elongation at Break	350%

F. Wear Coat: Shall be Res-Tek DEK-680 Wear Coat, a transparent, 100% reactive, MMAbased resin to which Res-Tek Powder Hardener (BPO) and pigment are added at the jobsite. See Res-Tek's DEK-Guard Powder Hardener Dosing Chart. DEK-680 Wear Coat shall be pigmented the same color as the Body Coat.

DEK-680 Wear Coat

1. Percentage of reactive resin:	100%
2. Percentage of solids:	100%
3. Water Absorption, Wt. % (ASTM D570):	0.04
4. Tensile Strength, psi (ASTM D638):	1,500
5. Elongation at Break	150%

G. Accessory Materials

1. Pigment: Shall be supplied by manufacturer. Color to be selected byowner/architect, from manufacturer's provided selection.
2. Broadcast Aggregate: Skid resistance, bleached aluminum oxide, or similar material to be broadcast into the primer or membrane to achieve skid/slip resistance determined by owner
3. Shall be clean, dry aggregate supplied by manufacturer.Aggregate to be selected by owner/architect, from manufacturer's provided selection.
4. Res-Tek Powder Hardener (BPO). See Res-Tek's DEK-Guard Powder HardenerDosing Chart for appropriate dosing levels.

PART 3 - EXECUTION

3.01 PREWORK INSPECTION

A. Shot-blast and clean all surfaces.

B. Examine all surfaces to be coated with MMA material systems and report to the A/E any conditions that will adversely affect the appearance or performance of these coating systems and that cannot be put into acceptable condition by the preparatory work specified in Paragraph 3.03.

C. Do not proceed with application until the surface is acceptable or authorization to proceed is given by the A/E

3.02 GENERAL

A. Material storage area must be selected and approved by Applicator and Owner or his representative.

B. 3-Phase electricity and water is available for use by Applicator.

C. If existing ventilation is inadequate, Applicator will provide sufficient ventilation to allow complete air exchange every five (5) minutes.

D. Applicator will protect adjacent surfaces not to be coated with masking and/or covers. Owner's equipment shall be protected from dust, cleaning solutions, and flooring materials.

3.03 PREPARATION

A. Surface Preparation – General

1. Entire concrete floor surface is to be shot-blast.

2. Concrete substrate must be clean and dry. Dislodge dirt, mortar spatter, paint overspray, and other dry surface accumulations and contamination by scraping, brushing, sweeping, vacuuming, and/or compressed air lowdown.

3. Surfaces that are heavily contaminated shall be cleaned with the appropriate degreaser, detergent, or other appropriate cleaner/surfactant followed by thoroughly rinsing with fresh water to remove the accumulation prior to mechanical cleaning efforts. Mechanical cleaning will not remove such deposits, but only drive them deeper.

4. Concrete shall have a moisture emission rate of no more than 5 lbs. per 1000 sq. ft. per 24 hour period as determined by proper Calcium Chloride Testing.

B. Bond Testing

1. The applicator shall evaluate all surface preparation by conducting bond tests atstrategic locations.
2. Mix DEK-641 Penetrating Primer and RT-R Component thoroughly before use.
3. Mix eight (8) ounces of DEK-641 Penetrating Primer and two (2) ounces RT-R-Component. Add Res-Tek dry quartz until an easily trowelable mixture is obtained. For temperatures below 70°F add 1/2 ounce Res-Tek Powder Hardener(BPO) and for temperatures at or above 70°F add 1/4 ounce Res-Tek Powder Hardener (BPO). Mix well. Apply palm-sized patties 1" to 2" thick.
4. After one (1) hour, patties must be cured tack-free and cooled to ambient temperature of concrete. Remove patties with hammer and chisel and examine fracture/delamination plane. Concrete with fractured aggregate must be attached tothe entire underside of the patty.
5. If only laitance or a small amount of concrete is attached or if interface betweenpatty and substrate is tacky, further substrate preparation is required.
6. If further surface preparation is required, bond tests shall be conducted again whenthis has been completed.
7. If no amount or kind of surface preparation produces satisfactory bond tests, theapplicator shall report that to the Owner, Engineer, and Manufacturer.

C. Surface Preparation for cracks, and control joints.

1. All existing joint sealant and sealant residue must be completely removed fromcracks and control joints.

2. All cracks greater than 1/16” in width shall be routed/chased to measure 1/4” x1/4”.

3. All control joints and cracks shall be primed with DEK-641-R Penetrating Primerand filled with DEK-650 Flexible Membrane material.

D. Mechanical Surface Preparation for spalled areas.

1. All spalled concrete must be removed.

2. Mark and saw cut concrete at a point just beyond spalled concrete to outline repairarea. If within 3” of an existing joint, make the cut parallel to the joint.
3. Remove all spalled concrete from the repair area with chipping/jack hammer or byother appropriate mechanical means.
4. If reinforcing steel is exposed and corrosion exists; remove all loose rust with awire brush or other adequate means.
5. Application of the respective specified patching material must be completedbefore any water or other contamination of the surface occurs.

3.04 INSTALLATION

A. Application of Res-Tek DEK-Guard™ Vehicular Deck Coating System consists of:

1. 1 (one) coat of DEK-641-R Penetrating Primer, at a coverage of approximately100 – 110 sq. ft. / gal.
2. Prefill all cracks and control joints with DEK-650 Flexible Membrane.
3. 1 (one) coat of DEK-650 Flexible Membrane, pigmented White RT P-15, at acoverage of approximately 50 to 55 sq. ft./ gal.
4. Ramps may require DEK-650 Flexible Membrane to be applied in two separatethin applications to achieve specified application rate/film thickness.
5. 1 (one) coat of DEK-675 Body Coat, pigmented, at a coverage of approximately60 to 65 sq. ft./ gal. with aggregate broadcast.

6. 1 (one) coat DEK-680 Wear Coat, pigmented, at a coverage of approximately
60 - 70 sq.ft./ gal. (coverage rate will vary depending on broadcast aggregate size)

B. Time for curing (60 - 90 minutes) shall be allowed between each coat.

C. Open only the containers of component materials to be used in each specific applicationas needed. Refer to Manufacturer's data sheets for pot-life/temperature relationship to determine size of batches and mix ratios for each respective coat of the system.

D. Measure, add, and mix Res-Tek Powder Hardener (BPO) into the respective resin components in the proportions recommended by Res-Tek's DEK-Guard Powder Hardener Dosing Chart. Pot life is short, so mix only as much material at a time as canbe easily and efficiently applied.

E. Material, air, and surface temperatures shall be in the range of 32°F to 90°F during application and cure. If surface and ambient temperatures are outside of the specifiedrange, please contact Res-Tek for additional recommendations.

3.05 PRIME COAT

A. Mix DEK-641 Penetrating Primer and RT-R Component thoroughly before use.

B. Measure, add, and mix the DEK-641-R Penetrating Primer components in theproportions recommended by the Material Manufacturer. Refer to Res-Tek's DEK-Guard Powder Hardener Dosing Chart.

C. Pour the mixture batches onto the deck surface and use an 18" wide, 1/2" nap, paintroller to roll out the material at a rate of 100 to 110 sq. ft./ gal. to form a uniform, continuous film, ensuring that all crevices, cracks, and other surface discontinuitieshave been saturated and coated. Use a paint brush to reach areas inaccessible to theroller. Work quickly and deliberately; the pot life is short (10 - 15 minutes). Do notleave any puddles; roll out any such accumulations. Brush out any accumulation of primer from control joints and cracks.

D. If reinforcing steel is exposed, prime thoroughly ensuring complete coverage.

E. Allow the Prime Coat to cure.

F. If any of the concrete has absorbed all of the primer or if the concrete still has a drylook, reprime these areas before proceeding.

G. If concrete requires Double Prime, repeat steps A-E.

3.06 CRACK AND CONTROL JOINT FILLING

A. If required, backer rod can be added to joints.

B. Mix DEK-650 Flexible Membrane thoroughly before use.

C. Measure, add, and mix the DEK-650 Flexible Membrane components in the proportionsrecommended by the Material Manufacturer. Refer to Res-Tek's DEK-Guard Powder Hardener Dosing Chart.

D. Use mixture to fill cracks and/or joints as needed until flush with existing concrete.

E. Allow mixture to cure.

F. If cracks and/or joints still show a depression repeat this process until flush with existingconcrete.

3.07 PATCHING/SPALL AND JOINT REPAIR

A. In some installations it may be appropriate to use a DEK-675 skim coat to patch or slope areas that require less than 1/4" of material. For anything greater than 1/4", it is necessaryto use RT-05LM Polymer Concrete.

B. Mix DEK-675 Body Coat thoroughly before use. Mix RT-05LM Polymer ConcreteLiquid thoroughly before use.

C. Measure, add, and mix the RT-05LM Polymer Concrete components and/or DEK-675 skim coat and necessary aggregate (if required) in the proportions recommended by the Material Manufacturer. Refer to Res-Tek's RT-05LM Polymer Concrete Extension Chartand/or Res-Tek's DEK-Guard Powder Hardener Dosing Chart.

D. Use mixture to fill and repair area as needed. If using RT-05LM Polymer Concrete,lightly tamp to ensure compaction.

E. Allow patch areas and/or joint repairs to cure.

F. If RT-05LM Polymer Concrete is utilized, those areas must be re-primed. Refer to 3.05PRIME COAT.

3.08 FLEXIBLE MEMBRANE COAT

A. Mix DEK-650 Flexible Membrane thoroughly before use.

B. Measure, add, and mix the DEK-650 Flexible Membrane components in the proportions recommended by the Material Manufacturer. Refer to Res-Tek's DEK-Guard Powder Hardener Dosing Chart.

C. Apply mixed components of DEK-650 Flexible Membrane with clean 18" wide, 1/2" nap, paint roller or 18" wide notched squeegee to achieve a coverage rate of 50 - 55 sq.ft./gal. Once correct coverage rate is achieved, use an 18" wide, 1/2" nap, paint roller toback roll for consistency and to remove any imperfections.

D. Allow the DEK-650 Flexible Membrane Coat to cure.

E. Ramps may require DEK-650 Flexible Membrane to be applied in two separate thinapplications to achieve specified application rate/film thickness.

3.09 BODY COAT

A. Mix DEK-675 Body Coat thoroughly before use.

B. Measure, add, and mix the DEK-675 Body Coat components in the proportions recommended by the Material Manufacturer. Refer to Res-Tek's DEK-Guard PowderHardener Dosing Chart.

C. Apply mixed components of DEK-675 Body Coat with clean 18" wide, 1/2" nap, paintroller or 18" notched squeegee to achieve a coverage rate of 60 - 65 sq. ft./gal. Once correct coverage rate is achieved, use an 18" wide 1/2" nap, paint roller to back roll forconsistency and to remove any imperfections.

D. Immediately broadcast sand aggregate into the DEK-675 Body Coat, to the point ofrefusal, while the DEK-675 Body Coat is still wet.

E. Allow the DEK-675 Body Coat to cure.

F. Remove any excess sand from the surface.

3.10 WEAR COAT

A. Mix DEK-680 Wear Coat thoroughly before use.

B. Measure, add, and mix the DEK-680 Wear Coat components in the proportions recommended by the Material Manufacturer. Refer to Res-Tek's DEK-Guard PowderHardener Dosing Chart.

C. Apply mixed components of DEK-680 Wear Coat with clean 18" wide, 1/2" nap, paintroller or 18" flat squeegee to achieve a coverage rate of 60 - 70 sq. ft./ gal. Once correctcoverage rate is achieved, use an 18" wide, 1/2" nap, paint roller to back roll for consistency and to remove any imperfections.

D. Allow DEK-680 Wear Coat to cure.

3.11 CLEAN UP

A. Material left over at the job site shall be removed by the approved applicator or disposedof in accordance with SDS and local laws and ordinances.
B. Clean tools and equipment with MMA Cleaner immediately after use.

END OF SECTION 09 70 60

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SECTION 09 91 00
PAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. The following, together with the Drawings, the General Conditions, and Supplementary Conditions are part of the Contract Documents

B. Closely Related work specified in other sections:

1. Section 08 11 13 – Hollow Metal Doors & Frames
2. Section 06 65 00 – Simulated Wood
3. Section 04 22 00 – Concrete Masonry Unit

1.02 DESCRIPTION OF WORK:

A. Provide as work of this section, preparation of new surfaces, priming, and painting as follows:

1. New interior hollow metal doors and frames.
2. All new interior CMU walls within Men's & Women's Bathrooms.
3. New wood ceiling in both men's and Woman's bathrooms.

B. Contractor shall comply with all applicable safety and health provisions of the New Jersey Department of Environmental Protection Agency and OSHA, as defined in the State Guidelines 9.1 - Paint

1.03 SUBMITTALS:

A. Product Data: Submit manufacturer's technical data for each paint or primer product required, including instructions for surface preparation and paint or primer application

B. Color Samples: Submit color card samples in the quantities specified in Division 01 for Consultant's review and Owner's approval

1.04 QUALITY ASSURANCE:

A. Painting Contractor shall have successfully completed applications similar in type and size to that of this project and shall assign workman from the referenced applications to this project

B. Single Source: Provide primers and other undercoat paints produced by the same manufacturer as finish coats for each application. Use only thinners approved as paint manufacturer and use only within recommended limits.

1.05 REFERENCED STANDARDS:

A. Comply with the applicable provisions of all codes, standards and federal specifications

1.06 PRODUCT HANDLING:

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and the following information:

Name or title of material
Manufacturer's name
Thinning instructions
Application instructions
Color name and number

B. Store materials not in actual use in tightly covered, clean containers. Protect it from freezing where necessary. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to:

1. The Sherwin-Williams Company (S-W): 101 Prospect Ave.; Cleveland, OH 44115; Toll Free Tel: 800-524-5979; Tel: 216-566-2000; Fax: 440-826-1989; Email: request infospecifications@sherwin.com; Web:www.swspecs.com
2. Benjamin Moore and Co. (Moore)
3. PPG Industries, Pittsburg Paints (PPG)
4. Pratt and Lambert (P & L)
5. Con-Lux Coatings, Inc. (CL)
6. Calbar, Inc.
7. Or Approved Equal

2.02 PRIMER:

A. Exposed interior Metal: One (1) coat primer as follows:

1. Pro Industrial ProCryl Universal Primer as provided by the Sherwin-Williams

Company
2. Super Spec HP Alkyd Metal Primer No. P06: as provided by Benjamin Moore and Sons, Inc.
3. 4020 PF Pitt-Tech Plus Waterborne Acrylic Primer/Finish: as provided by PPG Paints
4. Or Approved Equal

B. Masonry Walls: One (1) coat of primer

1. 1st Coat: Sherwin-Williams; PrepRite Interior/Exterior Latex Block Filler B25W00025:
2. PPG Paints; SpeedHide Interior/Exterior Masonry Hi-Fill Block Filler Series 6-15XI:
3. Ben Moore Ultra Spec High Build Masonry Block Filler No. 571:
4. Or Approved Equal

2.03 PAINT:

A. Interior Holow Metal: Two (2) coats over the primer as provided by the manufacturer of the primer. NOTE ALL BATHROOMS ARE TO RECEIVE HIGH GLOSS

1. 2nd & 3rd Coats: Sherwin-Williams; Pro Industrial Waterbased Alkyd Urethane Lowsheen
2. 2nd &3rd Coats: PPG Paints; 90-1310 Pitt-Tech Plus Semi-Gloss DTM Acrylic Enamel

3. 2nd &3rd Coats: Benjamin Moore; Ultra Spec HP DTM Acrylic Semi- Gloss No. HP28
4. Or Approved Equal

B. Interior Masonry Walls: Two (2) coats Alkyd Systems (Water based) paint as provided by manufacture of the primer.

1. 2nd & 3rd Coats: Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Eggshell Wall Paint.
2. 2nd & 3rd Coats: PPG Paints; 6-4310XI Speedhide Zero Interior Latex Paint Eggshell.
3. 2nd & 3rd Coats: Benjamin Moore; Ultra Spec 500 Interior Latex Eggshell No. N538:
4. Or Approved Equal

PART 3 - EXECUTION

3.01 PREPARATION FOR WORK:

A. Examine areas and conditions under which painting work is to be applied and submit written report of any conditions detrimental to proper and timely completion of work, including apparently incompatible primers applied under other sections. Verify that adequate illumination will be available during application. Do not proceed with work until unsatisfactory conditions have been corrected.

1. Starting of painting work will be construed as acceptance of surfaces and conditions within any particular area as suitable for a high quality paint job.
2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
3. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.

B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces or conditions otherwise detrimental to formation of a durable paint film

C. Wood: Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

D. CMU Mortar: Must be allowed to dry thoroughly for at least 10 days before painting, unless the products are designed to be used in high pH environments. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

E. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9, unless the products are designed to be used

in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.

3.02 MATERIALS PREPARATION:

A. Mix and prepare materials in accordance with manufacturer's directions

B. Maintain containers used for mixing and application clean and free of foreign materials

C. Stir materials before and during application to produce a mixture of uniform density. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3.03 APPLICATION:

A. General:

1. Apply paint in accordance with manufacturer's direction and under adequate illumination. Use techniques best suited for each substrate condition, and type of material being applied.

2. Apply paint using brush, roller, spray or other acceptable method. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by paint manufacturer for material and texture required.

a. If spray painting, observe all regulations to protect against fire and health hazards. The number of coats and paint film thickness required is the same regardless of the application method.

3. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

3.04 CLEAN-UP AND PROTECTION:

A. Clean-up: During the progress of work, remove from site discarded paint materials, rubbish, cans and rags at the end of each work day. Upon completion of painting work, remove spattered paint from window glass and other surfaces by washing and scraping, using care not to scratch or otherwise damage finished surfaces.

B. Protection: Protect all adjacent surfaces against damage by painting and finishing work. Correct any damage by cleaning, repairing, replacing or repainting, as acceptable.

1. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings after completion of painting operations.
2. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces

END OF SECTION 09 91 23

SIGNAGE
SECTION 10 14 00

PART 1 GENERAL

1.1 SCOPE

A. Section Includes:

1. Exterior ADA-compliant room identification signage.
2. Exterior freestanding sign display including protective transparent cover for campground map.

B. Related Sections:

1. Section 04 22 00 – Concrete Unit Masonry (sign mounting substrate).
2. Section 09 91 00 – Painting and Coating (touch-up at penetrations).

1.2 SUBMITTALS

A. Product data for each sign type, including materials, finishes, and mounting details.

B. Shop drawings showing layout, text, symbols, Braille, dimensions, and installation methods.

C. One sample of each sign type for approval of color, finish, and layout.

D. Maintenance instructions for exterior map display glazing and sign finishes.

1.3 QUALITY ASSURANCE

A. Sign manufacturer shall have minimum 5 years' experience producing ADA-compliant signage.
B. Installer shall be experienced in ADA-compliant mounting and exterior sign installation.

1.4 WARRANTY

A. Provide manufacturer's standard 1-year warranty covering defects in materials and workmanship.

1.5 PROJECT CONDITIONS

A. Do not install signage on substrates that are wet, dirty, or unstable.
B. Do not install signage when ambient temperature is below 40°F (4°C) if adhesives are used.
C. Coordinate installation with completion of air barrier, stone veneer, and siding finishes to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Green Dot Sign, Inc. - 324 Stonebridge Blvd. Saint Paul, MN 55105, Tel: (651) 447-3046

1 Kroy Sign System LLC, 7575 E. Redfiled Rd. Ste. 113, Scottsdale, AZ 85260, Tel:1-800-950-5769
2 Inpro, S80 W18766 Apollo Drive, Muskego, WI 53150, Tel: 1-800-222-5556
3 Or approved equal

2.2 ADA ROOM IDENTIFICATION SIGNAGE

A. Material: Exterior-rated acrylic, polycarbonate, aluminum, or high-pressure laminate, minimum 1/8" thick.

B. Characters and Braille: Raised 1/32", with Grade 2 Braille.

C. Finish: Non-glare background with high-contrast text and symbols.

D. Pictograms: Standard male/female restroom symbols; text “Men,” “Women,” “Janitor.”

E. Mounting: Tamper-resistant fasteners or adhesive, as appropriate to substrate.

2.3 CAMP MAP DISPLAY SIGNAGE

A. Structure: Contractor-fabricated frame and support posts (refer to Division 05).

B. Map Panel: Weather-resistant printed graphic on aluminum, phenolic resin, or equivalent exterior sign panel.

C. Protective Cover: UV-resistant clear polycarbonate or acrylic glazing, vandal-resistant, minimum 1/8” thick.

D. Mounting: Mechanical fasteners concealed where possible; provide gaskets or sealant to prevent water intrusion.

2.4 ACCESSORIES

A. Provide anchors, adhesives, and hardware as recommended by manufacturer for exterior exposure.

B. Provide gaskets, sealants, or spacers to prevent water penetration behind signs.

PART 3 EXECUTION

3.1 EXAMINATION

A. Install products in an interior climate-controlled environment, unless exterior rated.

3.2 INSTALLATION

A. Install signage level, plumb, and in accordance with approved shop drawings.

B. Install ADA room identification signage in locations complying with ICC A117.1 and ADA Standards.

C. Secure exterior map display watertight, with protective cover properly sealed.

3.3 CLEANING AND PROTECTION

A. Clean surfaces after installation.

B. Protect installed signage from damage until final acceptance.

3.4 MAINTENANCE

A. Provide Owner with manufacturer’s recommended cleaning and maintenance instructions for all signage types.

B. Replace or repair damaged or vandalized signage with materials matching original construction.

C. For map display, provide instructions for cleaning protective cover without scratching or clouding surface.

END OF SECTION – 10 14 00

SECTION 10 21 00
TOILET PARTITIONS & ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Solid plastic toilet compartments including the following:

1. Floor mounted overhead-braced toilet compartments.
2. Privacy screens.
3. Shower and dressing compartments.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

B. Section 10 28 00 – Washroom Accessories

1.3 REFERENCES

A. ASTM A666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

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 methods.

C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.

D. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.

B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.

C. Materials: Doors, panels and pilasters, constructed from high density polyethylene (HDPE) resins. Partitions to be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. Cover all plastic components with a protective plastic masking.

D. Performance Requirements:

1. Material Fire Ratings:

a. National Fire Protection Association (NFPA) 286: Pass.
b. International Code Council (ICC): Class B.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 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.

1.8 WARRANTY

A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. Labor not included in warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Scranton Products, which is located at: 801 E. Corey St.; Scranton, PA 18505; Toll Free Tel: 800-445-5148; Fax: 855-376-6161; Email:request info (info@scrantonproducts.com); Web:http://www.scrantonproducts.com
2. Santana Toilet Partitions.
3. Comtec Toilet Partitions.

4. Capitol Toilet Partitions.
5. Or Approved Equal

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MATERIAL

A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface.

B. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.

C. Stainless Steel Castings: ASTM A167, Type 304.

D. Aluminum: ASTM 6463-T5 alloy.

2.3 SOLID PLASTIC TOILET COMPARTMENTS

A. Basis of Design: Hiny Hiders Toilet Partitions as manufactured by and supplied by Scranton Products.

1. Style: Floor mounted overhead-braced toilet compartments.

B. Doors, Panels, and Pilasters: 1 inch (25 mm) thick with all edges rounded to a radius. Mount doors and dividing panels based on height of specified system.

1. Door and Panel Height: 55 inches (1397 mm).
2. Panel Edge: Shiplap.
3. Pilasters: 82 inches (2083 mm) high and fastened to floor.

C. Panel Color: Traditional series.

1. Black - Orange Peel.
2. Black - Grip Ex.
3. Paisley - Orange Peel.
4. Shale - Orange Peel.
5. Charcoal Grey - Orange Peel.
6. Grey - Orange Peel.
7. Glacier Grey - Orange Peel.
8. White - Orange Peel.

D. Panel Color: Bold series.

1. Fossil - Orange Peel.
2. Hunter Green - Orange Peel.
3. Burgundy - Orange Peel.

4. Blueberry - Orange Peel.
5. French Blue - Orange Peel.
6. Midnight - Orange Peel.

E. Panel Color: Warm series.

1. Mahogany - Orange Peel.
2. Concrete - Orange Peel.
3. Linen - Orange Peel.
4. Sandcastle - Orange Peel.
5. Sandstone - Orange Peel.
6. Desert Beige - Orange Peel.
7. Mocha - Orange Peel.

F. Panel Color: Metallic series.

1. Bronze - Hammered.
2. Bronze - Rotary Brushed.
3. Nickel - Hammered.
4. Nickel - Rotary Brushed.
5. Stainless - Hammered.
6. Stainless - Grip Ex.
7. Stainless - Rotary Brushed.

G. Pilaster Shoes: 3 inches (76 mm), 20 gauge stainless steel. Secured to pilasters with a stainless steel tamper resistant Torx head sex bolt.

H. Headrail: Heavy-duty extruded 6463-T5 alloy aluminum with anti-grip design. Finish to be clear anodized. Fastened to headrail brackets with stainless steel tamper resistant Torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant Torx head screws.

1. Headrail Brackets: 20 gauge stainless steel with satin finish. Secured to the wall with stainless steel tamper resistant Torx head screws.

I. Wall Brackets:

1. Aluminum Brackets: Heavy-duty aluminum 6463-T5 alloy.
2. Brackets are fastened to pilasters with stainless steel tamper resistant Torx head screws and fastened to the panels with stainless steel tamper resistant Torx head sex bolts.
3. Bracket Type: Stirrup double ear aluminum.
4. Bracket Type: Stirrup single ear aluminum.
5. Bracket Type: Stirrup stainless steel double ear.
6. Bracket Type: Stirrup stainless steel single ear.
7. Bracket Type: Continuous 54 inches (1372 mm) stainless steel.
8. Bracket Type: Continuous 54 inches (1372 mm) aluminum.

J. Door Hardware:

1. Continuous Aluminum Hinge:

   a. Length: 54 inches (1372 mm).

2. Continuous Stainless Steel Helix Hinge:

   a. Length: 54 inches (1372 mm).

3. Continuous Stainless Steel Spring Loaded Hinge:

   a. Hinges: 54 inches (1372 mm).

4. Vault Hinge: Heavy-duty 304 stainless steel hinge having gravity-acting cams with a brushed finish and wrap around flanges.
5. Integral Hinges - Stealth: Fabricated in mount on inside of the toilet compartment on the door and pilaster. The door and pilaster is not to have exposed metal parts on the outside of the toilet compartment. Hinges operate with field adjustable nylon cams. Cams can be field adjusted to any degree. The pilaster and doors have to be fabricated to accept the hinge.
6. Wrap-Around Hinges: 8 inches (203 mm) and fabricated from heavy-duty extruded aluminum. Hinges are through-bolted to pilasters and doors with stainless steel tamper resistant Torx head sex bolts. Hinges operate with field adjustable nylon cams. Cams can be field set in 30, 60 or 9 degree increments.
7. Door Strike/Keeper: Heavy-duty extruded aluminum 6436-T5 alloy with a clear anodized finish. Secured to pilasters with stainless steel tamper resistant Torx head sex bolts. Bumper shall be made of extruded black vinyl.

   a. Style: 3 inches (76 mm) stainless steel emergency access.

8. Latch Mechanism: Aluminum Slide Bolt Latch and Housing: Heavy-duty extruded 6463-T5 alloy aluminum. Latch and housing to have a clear anodized finish. Slide bolt and button to have a black anodized finish.
9. Latch Mechanism: Stainless Steel Slide Bolt Latch and Housing: Heavy-duty stainless steel type 304. The latch and housing to have a bright finish. The slide bolt and button to have a black anodized finish.

10. Latch Mechanism: Occupancy Indicator Latch and Housing:

    a. Material: Satin stainless steel.
    b. Occupancy indicators: Green for occupied and red not occupied.
    c. Slide bolt and button.

11. Doors supplied with one coat hook/bumper and door pull, clear anodized aluminum or stainless steel.
12. Equip outswing handicapped doors with second door pull and door stop.

2.4 SOLID PLASTIC PRIVACY SCREENS

A. Provide plastic privacy screens in urinal and entry toilet room applications as indicated on floor plans.

B. Panels, and pilasters, if required, 1 inch (25 mm) thick with edges rounded to a radius. Screens to be mounted at 14 inches (356 mm) above the finished floor. Color as selected by owner from manufacturer's full line of current colors.

C. Screen Type: Wall mounted.

1. Urinal Screens: 24 inches (610 mm) wide by 48 inches (1067 mm) high.

D. Wall Brackets: Extruded PVC plastic. Fastened to the panel/pilaster with stainless steel tamper resistant torx head screws and fastened to wall with stainless steel tamper resistant torx head sex bolts.

1. Length of Wall Brackets: 54 inches (1327 mm).
2. Bracket Color: Mocha.
3. Bracket Color: Black.
4. Bracket Color: Grey.
5. Bracket Color: Linen.
6. Bracket Color: Beige.
7. Bracket Color: Blueberry.

E. Aluminum Slide Bolt Latch and Housing: Heavy-duty extruded 6463-T5 alloy aluminum. Latch and housing to have a clear anodized finish. Slide bolt and button to have a black anodized finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Examine areas to receive toilet partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings.

C. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).

D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.

E. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 10 21 00

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SECTION 10 28 00
WASHROOM ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Washroom accessories as scheduled in this Section and as indicated on the Drawings.

B. Custodial accessories.

1.2 RELATED REQUIREMENTS

A. Related Sections

1. Section 06 10 00 - Rough Carpentry (coordination with blocking).
2. Section 10 21 00 – Toilet Partitions and Accessories (coordination with accessories).

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data sheets for each product specified, including the following:

1. Installation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Cleaning and maintenance instructions.
4. Replacement parts information.

B. Schedule: Submit a toilet accessory schedule, indicating the type and quantity to be installed in each washroom. Use room numbers as indicated on the Drawings..

1.4 QUALITY ASSURANCE

A. Manufacturer: Provide products manufactured by a company with a minimum of 5 years' successful experience manufacturing similar products.

B. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.

C. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to ADA and ICC/ANSI A117.1 requirement as applicable.

D. Hazardous Materials: Comply with EU Directive "Restrictions of Hazardous Substances (RoHS) requirements."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

1.6 WARRANTY

A. Manufacturer's Warranty for Washroom Accessories: Manufacturer's standard 1 year warranty for materials and workmanship.

B. Manufacturer's Warranty for Electric Hand Dryers: Manufacturer's standard 5-year warranty on parts, except 3-year warranty on motor brushes from date of purchase.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Basis of Design Products: Based on the quality and performance requirements of the project, specifications are based solely on the products of Bobrick Washroom Equipment, Inc.. www.bobrick.com. Location of manufacturing shall be the United States.

B. Bradley Corporation, Menomonee Falls, WI 53051, (800) 272-3539, fax: (262) 251-5817; Email info@BradleyCorp.com; Website: www.bradleycorp.com.

C. American Specialties, Inc., 441 Saw Mill River Road, Yonkers, NY 10701-4913;
Phone: (914) 476-9000
Fax: (914) 476-0688;
Website: https://americanspecialties.com/contact-us/

D. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the contractor's submission of

adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual. Documentation shall include a list of five similar projects of equivalent size where products have been installed for a minimum of two years, and manufacturer's certification that products are fabricated in the United States.

2.2 TOILET ACCESSORY SCHEDULE

A. Multiple-Use Washroom, Heavy-Duty:

1. B-6806 Series Concealed Mounting Grab Bar – 1-1/2 inch diameter.
2. B-290 Series Welded-Frame Mirror. Sizes: (9) 36”H x 18”W.
3. B-4288 ConturaSeries Surface-Mounted Multi-Roll Toilet Tissue Dispenser.
4. B-2250 Floor Standing Swing-Top Waste Receptacle.
5. B-7125 InstaDry Surface-Mounted High-Speed Hand Dryer.
6. B-2112 ClassicSeries Wall-Mounted Soap Dispenser.
7. B-354 ClassicSeries Partition-Mounted Sanitary Napkin Waste Receptacle.
8. B-4221 ClassicSeries Surface-Mounted Seat Cover Dispenser satin finish.
9. B-2621 ClassicSeries Surface-Mounted Paper Towel Dispenser, Satin Finish.
10. B2706C ClassicSeries Surface-Mounted Napkin Tampon Dispenser satin finish.

2.3 CUSTODIAL ACCESSORIES

A. Janitor Closets

1. TA-11: B-239 Surface-mounted utility shelf / mop holders / Coat hooks, Satin Finish. One is to be installed in Janitors closets as shown on the toilet room accessories schedule.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in strict compliance with manufacturer’s written instructions and recommendations, including the following:

1. Verify blocking has been installed properly.
2. Verify location does not interfere with door swings or use of fixtures.

3. Comply with manufacturers' recommendations for backing and proper support.
4. Use fasteners and anchors suitable for substrate and project conditions.
5. Install unit's rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
6. Conceal evidence of drilling, cutting, and fitting to room finish.
7. Test for proper operation.

3.2 CLEANING AND PROTECTION

A. Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.

B. Touch-up, repair or replace damaged products until Substantial Completion.

END OF SECTION 10 28 00

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.
7. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: Estell Manor Park, Picnic Area #1, 109 NJ-50, Mays Landing, NJ 08330.

B. Owner: County of Atlantic, Division of Facilities Management, 1227 Drexel Avenue, PO Box 1107 Atlantic City, NJ 08404-1107.

1. Owner's Representative: Christopher Palermo

C. Engineer's Consultant: Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Site Development: French & Parrello Associates, Brian R. Decina, PE, CME, Executive Vice President (brian.decina@fpaengineers.com; 732.312.9759)

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

The Bath House and Gazebo Improvement project at Estell Manor Park includes the demolition and removal of the existing bathroom facility and wooden gazebo structure at Picnic Area #1, and the construction of a new bathroom facility which will connect to the existing potable well service and the existing subsurface sewage disposal system. A new wooden gazebo is proposed adjacent to the existing location and will include a concrete pad and perimeter extensions beyond the roof line for additional sitting area and grill stations. Additional picnic tables are also provided under the pavilion, and electrical service will be extended from the existing gazebo to the new structure for service to two outlets. The existing perimeter vinyl fence and gates around the playground are to be removed and replaced with a new aluminum perimeter fence and gates. Portions of the existing concrete walkways are to be removed and replaced leading from the parking area, new bathroom facility to the new gazebo. The existing stone parking area is to be regraded, and low areas are to be brought to design grade with new stone and minor adjustment to the perimeter are to be made, along with the removal and reconstruction of the ADA accessible concrete parking area. A new wooden post and rail perimeter fence is to be installed around the parking area with a new double swing gate for park maintenance vehicles and concrete wheel stops at each parking stall.

A subsurface storage system is to be constructed within the low-lying grass area adjacent to the playground area to alleviate the existing ponding that occurs during heavy rain events, consisting of perforated HDPE pipes and stone easement with a topsoil and seeded surface. No connection to any existing storm system is proposed.

The work performed under this contract will include all materials, labor, equipment and services necessary to complete the project. Removal of all debris, clean-up and restoration of the work site will be required.

Refer to drawings and specifications dated April 2, 2026, for additional requirements.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

C. The Contractor will be required to submit with their bid a proposed work schedule that shall be finalized to reflect actual project milestones after contract award. Milestones shall include, at minimum, the following: Submittal Approval, Demolition Complete, Construction Complete. Strict adherence to the agreed upon final work schedule will be required for this project. The schedule shall be generated by the Contractor in a Microsoft Project TM format and shall be updated weekly. Progress reports including the updated schedule (Gantt Chart) will be submitted to the Engineer on a biweekly basis.

The required contract time with major milestones is as follows:

Task	Duration	Completion Requirement
1. Submittal Preparation	14 Calendar Days (2 Weeks)	14 Calendar Days from NTP
2. Submittal Review	28 Calendar Days (4 Weeks)	42 Calendar Days from NTP
3. Equipment Lead Time	42 Calendar Days (6 Weeks)	84 Calendar Days from NTP
4. Project Construction	168 Calendar Days (24 Weeks)	252 Calendar Days from NTP
5. Project Closeout	21 Calendar Days (3 Weeks)	298 Calendar Days from NTP

The liquidated damages as outlined in the General Conditions section apply to this project. Phase Two Construction shall not commence until the preceding phase is considered

substantially complete. The project shall be considered substantially complete at the point which, as certified in writing by the County, a project is at the level of completion, in strict compliance with the contract documents, where:

a) Necessary approval by public regulatory authority has been given;
b) The Owner has received al l required warranties and documentation, and;
c) The Owner may enjoy beneficial use or occupancy and may use, operate, and maintain the project in all respects for its intended purpose.

Partial use or occupancy shall not necessarily result in the project being deemed substantially complete and shall not be evidence of substantial completion. The term substantial completion shall be construed to mean the date upon which the Owner first entered upon the occupancy or commenced use thereof.

D. Submittals: The contractor shall provide all submittals in a timely manner. The contractor shall ensure that submittals comply with the contract documents to avoid delays in the project schedule. All submittals shall be provided within 2 weeks of the issue of the NTP.

E. The facility shall be occupied throughout the construction period. Coordinate all major construction activities at least 2 weeks in advance with the Owner. The contractor shall include all associated costs in his bid.

F. A Pre-Construction meeting will be required prior to start of construction at a site chosen by the Owner. All allowances/costs for the pre-construction meeting must be included in the Contractor's proposal pricing and submitted with the bid. No additional payments will be made by the Owner for the pre-construction meeting.

G. Progress Meetings: The Contractor shall attend biweekly progress meetings beginning after the date of the pre-construction meeting. At each progress meeting, the contractor shall provide a 2-week work summary, 2-week look ahead, and updated project schedule. All information shall be typed and presented in a clear and professional manner.

H. A Pre-Construction meeting will be required prior to start of construction at a site chosen by the Owner. All allowances/costs for the pre-construction meeting must be included in the Contractor's proposal pricing and submitted with the bid. No additional payments will be made by the Owner for the pre-construction meeting. **A pre-bid meeting will be held at the project site at the date and time listed on the bid advertisement. It is strongly recommended that the Contractor visit the site prior to completing the bid form.**

1) Project location: Estell Manor Park
109 NJ-50
Mays Landing, NJ 08330

2) Owner: Atlantic County
1227 Drexel Avenue, PO Box 1107
Atlantic City, New Jersey 08404-1107

I. Contract Documents were prepared for the Project by French and Parrello Associates, 1800 Route 34, Suite 101, Wall NJ 07719 and RZ Architecture LLC, 216 Haddon Avenue Suite 325,

Haddon Township, NJ 08108. The contract documents consist of these specifications and the following drawings as prepared by French and Parrello Associates:

T1.0 COVER SHEET
S1.0 EXISTING CONDITIONS PLAN
S2.0 DEMOLITION PLAN
S3.0 SITE PLAN
S4.0 GRADING AND DRAINAGE PLAN
S5.0 SOIL EROSION AND SEDIMENT CONTROL PLAN
S6.0 SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
C1.0 CONSTRUCTION DETAILS 1
C2.0 CONSTRUCTION DETAILS 2
C3.0 CONSTRUCTION DETAILS 3
C4.0 CONSTRUCTION DETAILS 4
C5.0 CONSTRUCTION DETAILS 5
C6.0 CONSTRUCTION DETAILS 6
G1.1 SHEET SPECS, GENERAL NOTES, SYMBOLS, ETC LIFE SAFETY INFO
G1.2 ADA FIGURES
G1.3 ADA FIGURES
G1.4 ADA FIGURES
D1.0 DEMO PLAN
A1.0 FLOOR & FRAMING PLANS
A2.0 BUILDING ELEVATIONS
A3.0 BUILDING SECTIONS & DETAILS
A4.0 BUILDING SECTIONS & ROOF DETAILS
A5.0 RESTROOM ELEVATIONS

J. Closeout Procedures:

Closeout procedures shall take place for the work. The contractor shall obtain all permitting approvals and certifications for each trade. The Owner shall be provided with 8 hours of training for new equipment. The Contractor shall complete all paperwork and forms required by the County for closeout. The Contractor shall complete all punchlist items as identified by the Engineer and submit a completed punchlist form to the Engineer for review and approval.

K. General - The work consists of the following:

The Contractor is responsible and obligated to successfully complete the entire project and to complete each and every necessary detail of every item specified and/or shown on the Contract Drawings and in the Specifications regardless of whether or not a particular detail is specifically mentioned. Any detail of work called out on the Drawings but not called out in the Specifications, or any item of work or detail not called out on the Drawings, but called out in the Specifications, shall be considered the same as if it was called out in both the Specifications and the Drawings. The scope of work shall include the following:

1.) The furnishing and installation of all improvements as shown on the drawings.
2.) The work shall be in accordance with accepted standards. All demolition materials and scrap shall be disposed of in a legal manner and in accordance with all local, State and Federal or other agencies having jurisdiction.

3.) Any quantities shown on the drawings are for the convenience of the Contractor only. The Contractor shall field verify all existing dimensions and quantities prior to construction and/or preparation of shop drawings.

4.) The Contractor shall be responsible for applying for and obtaining any and all permits required to satisfactorily complete this construction project. Any costs related to obtaining permits shall be included in the proposal.

1.5 SCHEDULED MILESTONES

A. Provide all submittals to Engineer for Review: Within 2 weeks of issue of NTP.

B. Project area must be operational within 38 weeks of the issue of NTP.

1.6 WORK SEQUENCE

A. The Contractor is responsible for the demolition of the existing site features and the installation of new site features as required to complete the new work. The work also includes all excavation, modifications to existing equipment, systems, and structures; piping; and systems, as shown on the drawings and as specified herein or as required to complete the new work.

B. The Contractor is responsible for verification of all existing dimensions and conditions in order to include all associated costs in the bid price for a complete installation as detailed in these specifications.

C. The above Scope of Work outlines the general items and distribution of work and shall not be construed as being all-inclusive. The contractor shall be responsible for applying for and obtaining any and all permits required to satisfactorily complete this construction project. Any costs related to obtaining permits shall be included in the proposal.

D. All contractors shall be responsible for coordinating their work with that of all other contractors on the project site. Any costs related to his coordinating shall be included in the proposal.

E. All items will be paid on a lump sum basis and no additional payment will be made if as-built quantities exceed plan quantities.

F. The contractor is responsible and obligated to successfully complete the entire project and to complete each and every necessary detail of each and every item specified and/or shown on the contract drawings regardless of whether or not a particular detail is specifically mentioned. Any detail of work called out on the Drawings but not called out in the Specifications, or any item of work or detail not called out on the Drawings but called out in the Specifications, shall be considered the same as if it was called out in both the Specifications and the Drawings.

G. Only major items of work are given in the Bid Form, but it is the intent of the specifications to secure a completed project, and if any workmanship or materials be required which are obviously necessary to carry out the full intent and meaning of the plans and specifications or to be reasonably inferred therefrom, the cost of such workmanship or materials shall be included in the unit price bid for the major items of work.

H. The Contractor shall provide As-built drawings of the completed work and shall include topographic information with spot grades for all ADA parking, loading and accessible routes. As-builts shall be a reproducible of the original contract drawings including any additional sheets required. All deviations from the original contract drawings shall be on the As-builts. The drawings shall be legible, neat and of a quality acceptable to the Engineer. Actual installation with all items clearly identified shall be indicated. Location of installed items and any deviations from contract documents shall be so shown with boxes around the as-built numbers or labels.

I. The Contractor is responsible to file and receive all permits for the project through the Township Construction Office (electrical, plumbing, etc.) All associated costs shall be included in the lump sum proposal bid price.

J. If and where directed items in the bid form shall only be utilized at the Owner/Engineers discretion.

1.7 CONTRACTOR USE OF PREMISES

K. General: During the construction period the Owner will occupy the site during construction. Contractor is not to interfere with Owner's Operations. Contractor shall provide all necessary protection to secure the area from the public, including temporary fencing, signage, cones, etc.

L. General Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

M. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to spaces within scope of work.
2. Driveways, Walkways and Entrances: Keep driveways, parking, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

N. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.8 OCCUPANCY REQUIREMENTS

A. Owner Occupancy: The Owner will occupy the site during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with the Owner's operations at no additional cost to the Owner. The Contractor shall be required to perform work off hours or on weekends as needed to meet the occupancy requirements of the Owner. Any costs related to this scheduled shall be included in the Contractor's bid.

1. Maintain access along park's interior road network. Coordinate all work with the Park Director to ensure all areas of proposed work are properly identified, delineated and secured from public access.
2. Notify Owner not less than 120 hours in advance of activities that will affect Owner's operations.

1.9 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 4:00 p.m., unless otherwise indicated.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than ten (10) days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than five (5) days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Restricted Substances: Use of tobacco products and other controlled substances within the existing building and on Project site is not permitted.

F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. It is the responsibility of the Contractor or vendor in charge of the proposed work to maintain a current and accurate list of any and all screened and approved personnel with Atlantic County.

2. The County of Atlantic shall not be responsible for any delays and/or damages either directly or indirectly resulting from the failure to comply with these requirements by and Contractor, Subcontractor or vendor in charge.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

H. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

I. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

J. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Quantity allowances.
4. Contingency allowances.
5. Testing and inspecting allowances.

C. Related Requirements:
1. Section 014000 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Engineer of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.

B. At Engineer's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Engineer from the designated supplier.

1.5 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Engineer for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.8 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.

3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Contingency Allowance: Include a contingency allowance amount of $100,000.00 to the Base Bid for use according to Owner's written instructions.

END OF SECTION 012100

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use copy of form provided in Project Manual.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.

b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of Engineer's Consultants and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from 2015 ICC, 2015 IMC, 2015 IFGC, 2014 NEC and ASHRAE standard 90.1-2013.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Consultant's Action: If necessary, Consultant will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Consultant will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Consultant's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Consultant does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Consultant will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Consultant will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    b. Substitution request is fully documented and properly submitted.
    c. Requested substitution will not adversely affect Contractor's construction schedule.
    d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    e. Requested substitution is compatible with other portions of the Work.
    f. Requested substitution has been coordinated with other portions of the Work.
    g. Requested substitution provides specified warranty.
    h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Consultant will consider requests for substitution if received within 15 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Consultant.

1. Conditions: Consultant will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer’s Consultant will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer’s Consultant for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request for Information. Request from Owner, Consultant, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is

required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

    a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    b. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    c. Indicate functional and spatial relationships of components of Owner, structural, mechanical, and electrical systems.
    d. Indicate required installation sequences.

B. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Preparation Format: DWG, Version 2017, operating in Microsoft Windows operating system.
3. File Submittal Format: Submit or post coordination drawing files using DWG and PDF format.

4. Consultant will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.

    a. Consultant makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    b. Digital Data Software Program: Drawings are available in own format version 2017.
    c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Consultant.

1.7 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Owner will return without response those RFIs submitted to Owner by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Consultant.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: AIA Document G716 or Software-generated form with substantially the same content as indicated above, acceptable to Consultant.

1. Attachments shall be electronic files in PDF format.

D. Consultant’s Action: Consultant will review each RFI, determine action required, and respond. Allow seven working days for Owner's response for each RFI. RFIs received by Consultant after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Consultant’s actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Consultant’s action may include a request for additional information, in which case Owner's time for response will date from time of receipt by Consultant of additional information.

3. Consultant's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change.

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Consultant in writing within 5 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Consultant.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Consultant response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

F. On receipt of Consultant’s action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Consultant within days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Owner's Data Files Not Available: Owner will not provide Owner's CAD drawing digital data files for Contractor's use during construction.

B. Use of Owner's Digital Data Files: Digital data files of Consultant’s CAD drawings will be provided by Consultant for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Consultant makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in AutoCAD 2017
4. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Consultant.

C. PDF Document Preparation: Where PDFs are required to be submitted to Consultant, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: Engineer’s Consultant will schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Consultant of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Consultant within three days of the meeting.

B. Preconstruction Conference: Consultant will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Owner, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Responsibilities and personnel assignments.
    b. Tentative construction schedule.
    c. Phasing.
    d. Critical work sequencing and long lead items.
    e. Designation of key personnel and their duties.
    f. Lines of communications.
    g. Procedures for processing field decisions and Change Orders.
    h. Procedures for RFIs.
    i. Procedures for testing and inspecting.
    j. Procedures for processing Applications for Payment.
    k. Distribution of the Contract Documents.
    l. Submittal procedures.
    m. Preparation of Record Documents.
    n. Use of the premises.
    o. Work restrictions.
    p. Working hours.
    q. Owner's occupancy requirements.
    r. Responsibility for temporary facilities and controls.
    s. Procedures for moisture and mold control.
    t. Procedures for disruptions and shutdowns.
    u. Construction waste management and recycling.
    v. Parking availability.
    w. Office, work, and storage areas.
    x. Equipment deliveries and priorities.
    y. First aid.
    z. Security.
    aa. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner and Consultant of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Possible conflicts.
    i. Compatibility requirements.
    j. Time schedules.
    k. Weather limitations.
    l. Manufacturer's written instructions.
    m. Warranty requirements.
    n. Compatibility of materials.
    o. Temporary facilities and controls.
    p. Space and access limitations.
    q. Regulations of authorities having jurisdiction.
    r. Testing and inspecting requirements.
    s. Installation procedures.
    t. Coordination with other work.
    u. Required performance results.
    v. Protection of adjacent work.
    w. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Consultant, but no later than 30 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.

2. Attendees: Authorized representatives of Owner, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

    a. Preparation of Record Documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Procedures for completing and archiving web-based Project software site data files.
    d. Submittal of written warranties.
    e. Requirements for preparing operations and maintenance data.
    f. Requirements for delivery of material samples, attic stock, and spare parts.
    g. Requirements for demonstration and training.
    h. Preparation of Contractor's punch list.
    i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    j. Submittal procedures.
    k. Owner's partial occupancy requirements.
    l. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Engineer’s Consultant will conduct progress meetings on a monthly minimum.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Consultant each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.

3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site use.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of Proposal Requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings at minimum monthly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner and Consultant, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each contractor present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site use.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Status of RFIs.
14) Proposal Requests.
15) Change Orders.
16) Pending changes.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's Construction Schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Unusual event reports.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time belongs to Owner.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF file.

B. Startup construction schedule.

1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
3. Total Float Report: List of activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.

G. Daily Construction Reports: Submit at weekly intervals.

H. Material Location Reports: Submit at weekly intervals.

I. Site Condition Reports: Submit at time of discovery of differing conditions.

J. Unusual Event Reports: Submit at time of unusual event.

K. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Consultant's request.

B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial Owner occupancy.
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

1. Use Microsoft Project, for current Windows operating system.

B. Time Frame: Extend schedule from date established for the Notice of Award to date of completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Consultant.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 10 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Consultant administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
6. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use-of-premises restrictions.
    f. Provisions for future construction.
    g. Seasonal variations.
    h. Environmental control.

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

a. Subcontract awards.
b. Submittals.
c. Purchases.
d. Fabrication.
e. Sample testing.
f. Deliveries.
g. Installation.
h. Tests and inspections.
i. Adjusting.
j. Curing.
k. Startup and placement into final use and operation.

8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

a. Completion of site work.
b. Completion of testing.
c. Substantial Completion.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

F. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.

G. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

H. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

I. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by

which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

J. Distribution: Distribute copies of approved schedule to Consultant, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.8 STARTUP CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice of Award.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.9 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice of Award.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.10 CPM SCHEDULE REQUIREMENTS

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice of Award. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for Notice of Award.

    a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

    a. Preparation and processing of submittals.
    b. Mobilization and demobilization.
    c. Purchase of materials.
    d. Delivery.
    e. Fabrication.
    f. Utility interruptions.
    g. Installation.
    h. Work by Owner that may affect or be affected by Contractor's activities.
    i. Testing and inspection.
    j. Punch list and final completion.
    k. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

    a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
8. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
9. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
10. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
11. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

    a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
    b. Submit value summary printouts one week before each regularly scheduled progress meeting.

1.11 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.

6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Construction Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials: Material stored prior to previous report and remaining in storage.

1. Material stored prior to previous report and since removed from storage and installed.
2. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
4. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
5. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
6. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
7. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Consultant responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Consultant responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Consultant and additional time for handling and reviewing submittals required by those corrections.

1. Information to be submitted with the bid shall include, but not be limited to the following:
    a. Bidder’s proposed subcontractor for piping work. Include subcontractor name, address, telephone, email and website contact information.
2. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
3. If a startup construction schedule is not required, delete “Initial Submittal” Subparagraph below or revise to require initial submittal within 14 days of date established for commencement of the Work.
4. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
5. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
6. Format: Arrange the following information in a tabular format:
    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Consultant final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Consultant.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.

7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Consultant.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Consultant on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. PDF Submittals:

1. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Consultant.
3. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package and transmit to Consultant by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Consultant.

a. Consultant will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Consultant reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Consultant receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Consultant will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Consultant, Owner, or other parties is indicated, allow 15 days for initial review of each submittal.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Consultant action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Consultant action stamp.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.

b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

5. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

6. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

7. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least [8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).

B. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.
d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Consultant will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Samples. Consultant will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

C. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of consultants and owners, and other information specified.

E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

F. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.

2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

G. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.8 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Consultant.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

2. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as original Drawings.

1.9 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Consultant.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Consultant will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 CONSULTANT’S REVIEW

A. Action Submittals: Consultant will review each submittal, indicate corrections or revisions required.

1. PDF Submittals: Consultant will indicate, via markup on each submittal, the appropriate action.

B. Informational Submittals: Consultant will review each submittal and will not return it or will return it if it does not comply with requirements. Consultant will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Consultant.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Consultant will discard submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Consultant without action.

G. Approval Process.

Follow submittal schedule provided to Engineer. Engineer will return submittal within 15 days. Submittals will be returned and marked with one of the following classifications:

Engineer's Review:

NO EXCEPTIONS TAKEN: Requires no corrections, no marks.
Response of the Contractor:
CONFIRM: Contractor is to confirm receipt, resubmission not required.
or
RESUBMIT: Not applicable for NO EXCEPTIONS TAKEN.

NOTE MARKINGS: Requires minor corrections.
Response of the Contractor:
CONFIRM: Contractor is to confirm receipt and integration of comments, resubmission not required.
or
RESUBMIT. Resubmit incorporating comments provided.

REJECTED: Requires major corrections or is otherwise not following Contract Documents. Not items shall be fabricated. Resubmit entire submittal following original submission with corrections noted. Allow 30 days for checking and Engineer's appropriate action.
Response of the Contractor:
CONFIRM: Not applicable for REJECTED.
or
RESUBMIT: Resubmit incorporating comments provided.

COMMENTS ATTACHED: Comments are attached to the submittal.
Response of the Contractor:
CONFIRM: Contractor is to confirm receipt and integration of comments, resubmission not required.
or
RESUBMIT. Resubmit incorporating comments provided.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 013516 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes special procedures for alteration work.

1.3 DEFINITIONS

A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.

B. Consolidate: To strengthen loose or deteriorated materials in place.

C. Design Reference Sample: A sample that represents the Consultant’s prebid selection of work to be matched; it may be existing work or work specially produced for the Project.

D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Consultant.

F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

K. Retain: To keep existing items that are not to be removed or dismantled.

L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.4 COORDINATION

A. Alteration Work Subschedule: A construction schedule coordinating the sequencing and scheduling of alteration work for entire Project, including each activity to be performed, and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for alteration work.

1. Schedule construction operations in sequence required to obtain best Work results.
2. Coordinate sequence of alteration work activities to accommodate the following:

    a. Owner's continuing occupancy of portions of area.
    b. Owner's partial occupancy of completed Work.
    c. Other known work in progress.
    d. Tests and inspections.

3. Detail sequence of alteration work, with start and end dates.
4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
5. Use of elevator and stairs.
6. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use in existing structure. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.

B. Pedestrian and Vehicular Circulation: Coordinate alteration work with circulation patterns within Project building(s) and site. Some work is near circulation patterns and adjacent to restricted areas. Circulation patterns cannot be closed off entirely and in places can be only temporarily redirected around small areas of work. Access to restricted areas may not be obstructed. Plan and execute the Work accordingly.

1.5 PROJECT MEETINGS FOR ALTERATION WORK

A. Preliminary Conference for Alteration Work: Before starting alteration work, conduct conference at Project site.

1. Attendees: In addition to representatives of Owner, Consultant and Contractor testing service representative, and specialists, shall be represented at the meeting.
2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:

    a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
    b. Fire-prevention plan.
    c. Governing regulations.
    d. Areas where existing construction is to remain and the required protection.
    e. Hauling routes.

f. Sequence of alteration work operations.
g. Storage, protection, and accounting for salvaged and specially fabricated items.
h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
i. Qualifications of personnel assigned to alteration work and assigned duties.
j. Requirements for extent and quality of work, tolerances, and required clearances.
k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.

3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at biweekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, Consultant, and Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.
2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.

a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:

1) Interface requirements of alteration work with other Project Work.
2) Status of submittals for alteration work.
3) Access to alteration work locations.
4) Effectiveness of fire-prevention plan.
5) Quality and work standards of alteration work.
6) Change Orders for alteration work.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.

1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to Owner where directed.

1.7 INFORMATIONAL SUBMITTALS

A. Alteration Work Subschedule:

1. Submit alteration work subschedule within seven (7) days of date established for commencement of alteration work.

B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.

C. Alteration Work Program: Submit 30 days before work begins.

D. Fire-Prevention Plan: Submit 30 days before work begins.

1.8 QUALITY ASSURANCE

A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.

1. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.

a. Construct new mockups of required work whenever a supervisor is replaced.

B. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.

C. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

D. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.

E. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.9 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials:

1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Protect items from damage during transport and storage.

B. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Consultant, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.
3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F (3 deg C) or more above the dew point.

E. Storage Space:

1. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

1.10 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of measured drawings and preconstruction photographs.

1. Comply with requirements specified in Section 013233 "Photographic Documentation."

B. Discrepancies: Notify Consultant of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

C. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
5. Contain dust and debris generated by alteration work and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

B. Temporary Protection of Materials to Remain:

1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.

2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Utility and Communications Services:

1. Notify Owner, Consultant, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
3. Maintain existing services unless otherwise indicated; keep in service and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Consultant immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.

1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION FROM FIRE

A. General: Follow fire-prevention plan and the following:

1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties titled "Owner's Responsibility for Fire Protection."
2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.

    a. If combustible material cannot be removed, provide fire blankets to cover such materials.

B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:

1. Obtain Owner's approval for operations involving use of open-flame or welding or other high-heat equipment. Notify Owner at least 72 hours before each occurrence, indicating location of such work.

2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:

    a. Train each fire watch in the proper operation of fire-control equipment and alarms.
    b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
    c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
    d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each area to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
    e. Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.

C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.

1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 GENERAL ALTERATION WORK

A. Have specialty work performed only by qualified specialists.

B. Ensure that supervisory personnel are present when work begins and during its progress.

C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs. Comply with requirements in Section 013233 "Photographic Documentation."

D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.

E. Notify Consultant of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Consultant.

END OF SECTION 013516

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Consultant Owner, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

D. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Consultant.

1.4 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Consultant.

1.5 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Consultant for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Consultant for a decision before proceeding.

1.6 ACTION SUBMITTALS

A. Shop Drawings:

1. Include plans, sections, and elevations, indicating materials and sizes.
2. Indicate manufacturer and model number of individual components.
3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

F. Reports: Prepare and submit certified written reports and documents as specified.

G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award and not less than five days prior to preconstruction conference. Submit in format acceptable to Consultant. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.

B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
3. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Consultant has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.10 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329 and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

c. Provide sizes and configurations of test assemblies, to adequately demonstrate capability of products to comply with performance requirements.
d. Build site-assembled test assemblies using installers who will perform same tasks for Project.
e. When testing is complete, remove test specimens and test assemblies, do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Consultant, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.11 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.

a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 72 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Owner, Consultant and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Owner, Consultant and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-

control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Consultant testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.12 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Consultant and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Consultant with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

B. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Consultant and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Consultant with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Consultant.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Consultant reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Engineer’s Consultant's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer’s Consultant's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Engineer’s Consultant. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if

bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
3. ABMA - American Boiler Manufacturers Association; www.abma.com.
4. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org
5. AGA - American Gas Association; www.aga.org.
6. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
7. AIA - American Institute of Engineer’s Consultants (The); www.aia.org.
8. AISC - American Institute of Steel Construction; www.aisc.org.
9. AISI - American Iron and Steel Institute; www.steel.org.
10. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
11. ANSI - American National Standards Institute; www.ansi.org.
12. APA - Engineer’s Consultant Precast Association; www.archprecast.org.
13. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
14. ARI - American Refrigeration Institute; (See AHRI).
15. ASCE - American Society of Civil Engineers; www.asce.org.
16. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
17. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
18. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
19. ASSE - American Society of Safety Engineers (The); www.asse.org.
20. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
21. ASTM - ASTM International; www.astm.org.
22. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.

23. AWS - American Welding Society; www.aws.org.
24. AWWA - American Water Works Association; www.awwa.org.
25. BICSI - BICSI, Inc.; www.bicsi.org.
26. CDA - Copper Development Association; www.copper.org.
27. CEA - Canadian Electricity Association; www.electricity.ca.
28. CEA - Consumer Electronics Association; www.ce.org.
29. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
30. CGA - Compressed Gas Association; www.cganet.com.
31. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
32. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
33. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
34. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
35. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
36. CSA - CSA Group; www.csa.ca.
37. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
38. CSI - Construction Specifications Institute (The); www.csinet.org.
39. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
40. ECA - Electronic Components Association; (See ECIA).
41. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
42. ECIA - Electronic Components Industry Association; www.eciaonline.org.
43. EIA - Electronic Industries Alliance; (See TIA).
44. EIMA - EIFS Industry Members Association; www.eima.com.
45. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
46. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org .
47. ETL - Intertek (See Intertek); www.intertek.com.
48. EVO - Efficiency Valuation Organization; www.evo-world.org.
49. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
50. FM Approvals - FM Approvals LLC; www.fmglobal.com.
51. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
52. FSA - Fluid Sealing Association; www.fluidsealing.com.
53. GA - Gypsum Association; www.gypsum.org.
54. GS - Green Seal; www.greenseal.org.
55. HI - Hydraulic Institute; www.pumps.org.
56. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
57. IAS - International Accreditation Service; www.iasonline.org.
58. IAS - International Approval Services; (See CSA).
59. ICBO - International Conference of Building Officials; (See ICC).
60. ICC - International Code Council; www.iccsafe.org.
61. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
62. IEC - International Electrotechnical Commission; www.iec.ch.
63. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
64. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
65. IESNA - Illuminating Engineering Society of North America; (See IES).
66. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
67. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
68. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.

69. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
70. ISO - International Organization for Standardization; www.iso.org.
71. ITU - International Telecommunication Union; www.itu.int/home.
72. LPI - Lightning Protection Institute; www.lightning.org.
73. MCA - Metal Construction Association; www.metalconstruction.org.
74. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
75. MHIA - Material Handling Industry of America; www.mhia.org.
76. MPI - Master Painters Institute; www.paintinfo.com.
77. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
78. NAAMM - National Association of Engineer's Consultant Metal Manufacturers; www.naamm.org.
79. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
80. NADCA - National Air Duct Cleaners Association; www.nadca.com.
81. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
82. NCMA - National Concrete Masonry Association; www.ncma.org.
83. NEBB - National Environmental Balancing Bureau; www.nebb.org.
84. NECA - National Electrical Contractors Association; www.necanet.org.
85. NEMA - National Electrical Manufacturers Association; www.nema.org.
86. NETA - International Electrical Testing Association; www.netaworld.org.
87. NFPA - National Fire Protection Association; www.nfpa.org.
88. NFPA - NFPA International; (See NFPA).
89. NFRC - National Fenestration Rating Council; www.nfrc.org.
90. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
91. NRCA - National Roofing Contractors Association; www.nrca.net.
92. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
93. NSPE - National Society of Professional Engineers; www.nspe.org.
94. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
95. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
96. PDI - Plumbing & Drainage Institute; www.pdionline.org.
97. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
98. SAE - SAE International; www.sae.org.
99. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
100. SDI - Steel Deck Institute; www.sdi.org.
101. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
102. SIA - Security Industry Association; www.siaonline.org.
103. SJI - Steel Joist Institute; www.steeljoist.org.
104. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
105. SPRI - Single Ply Roofing Industry; www.spri.org.
106. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
107. SSINA - Specialty Steel Industry of North America; www.ssina.com.
108. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
109. STI - Steel Tank Institute; www.steeltank.com.
110. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
111. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.

112. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
113. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
114. TMS - The Masonry Society; www.masonrysociety.org.
115. TPI - Truss Plate Institute; www.tpinst.org.
116. UL - Underwriters Laboratories Inc.; http://www.ul.com.
117. USGBC - U.S. Green Building Council; www.usgbc.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
2. ICC - International Code Council; www.iccsafe.org.
3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. OSHA - Occupational Safety & Health Administration; www.osha.gov.
11. SD - Department of State; www.state.gov.
12. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
13. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
14. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
15. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.

2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Engineer's Consultant & Transportation Barriers Compliance Board; (See USAB).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

A. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

D. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PARKING

A. Arrange for parking areas to accommodate construction personnel.

B. Locate as approved by Owner.

C. Use of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.

D. Use of existing parking facilities used by construction personnel is permitted as approved by Owner.

E. Do not allow heavy vehicles or construction equipment in parking areas.

1.7 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.

C. Broom and vacuum clean interior areas before starting surface finishing and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from Site periodically and dispose of off-Site.

1.8 FIRE-PREVENTION FACILITIES

A. Prohibit smoking within buildings under construction and demolition. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas. Coordinate with Owner.

B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.

1. Provide one fire extinguisher at each entrance to the building and/or work area(s).
2. Provide minimum of one fire extinguisher on roof during roofing operations using heat- producing equipment.

1.9 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas when necessary. Allow for Owner's use of Site, and to protect existing facilities and adjacent areas from damage from construction operations and demolition.

B. Protect non-owned vehicular traffic, stored materials, and structures from damage.

C. Provide protection of all work areas from public access through installation of temporary chain link fencing, locks, barricades, etc as approved by the Park Director and County.

1.10 DUST CONTROL

A. Execute Work by methods that minimize raising dust from construction operations.

B. Prevent airborne dust from dispersing into equipment and into Owner-occupied areas.

1.11 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by construction operations where applicable.

1.12 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Final Application for Payment inspection.

B. Clean and repair damage caused by installation or use of temporary Work.

C. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner

and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

C. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches (914 by 1524 mm).

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Connect to existing service.

1. Arrange with Owner and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.

2. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

C. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

3.3 SUPPORT FACILITIES INSTALLATION

A. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

B. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are legible at all times.

C. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

E. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

D. Barricades and Warning Signs: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.

2. Supervise welding operations and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Instruct personnel in methods and procedures. Post warnings and information.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate methods to be used to avoid trapping water in finished work.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:
1. Section 012500 "Substitution Procedures" for requests for substitutions.
2. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Engineer’s Consultant through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section,

provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another product that does meet the requirements of the specifications. Submit a comparable product request. Itemizing each individual project requirement design line by line from specifications.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Engineer’s Consultant's Action: If necessary, Engineer’s Consultant will request additional information or documentation for evaluation within 7 days of receipt of a comparable product request. Engineer’s Consultant will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

    a. Form of Engineer’s Consultant's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Engineer’s Consultant does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Engineer’s Consultant will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but

inconspicuous surface. Include information essential for operation, including the following:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

3. See individual identification sections in Divisions 23 and 26 for additional identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on

product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer’s Consultant will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

    a. Submit additional documentation required by Engineer’s Consultant in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Engineer’s Consultant; whose determination is final.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

    a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"

5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.

    a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"

7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics

that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Engineer's Consultant's sample," provide a product that complies with requirements and matches Engineer's Consultant's sample. Engineer's Consultant's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer's Consultant from manufacturer's full range" or similar phrase, select a product that complies with requirements. Engineer's Consultant will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Engineer's Consultant will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer's Consultant may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of Engineer's Consultants and owners, if requested.
4. Samples, if requested.

B. Submittal Requirements: Approval by the Engineer's Consultant of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 013300 "Submittal Procedures" for submitting surveys.
3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting

and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

a. Contractor's superintendent.
b. Trade supervisor responsible for cutting operations.
c. Trade supervisor(s) responsible for patching of each type of substrate.
d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

C. Cutting and Patching Plan: Submit plan describing procedures at least (10) days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.6 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Consultant of locations and details of cutting and await directions from Consultant before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in

increased maintenance or decreased operational life or safety. Operational elements include the following:

a. Primary operational systems and equipment.
b. Fire separation assemblies.
c. Air or smoke barriers.
d. Fire-suppression systems.
e. Plumbing piping systems.
f. Mechanical systems piping and ducts.
g. Control systems.
h. Communication systems.
i. Fire-detection and -alarm systems.
j. Conveying systems.
k. Electrical wiring systems.
l. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

a. Water, moisture, or vapor barriers.
b. Membranes and flashings.
c. Exterior curtain-wall construction.
d. Sprayed fire-resistive material.
e. Equipment supports.
f. Piping, ductwork, vessels, and equipment.
g. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer’s Consultant's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Consultant for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of utilities, mechanical and electrical systems, and other construction affecting the Work.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for site compontents and electrical systems to verify actual locations of connections before equipment installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer's Consultant according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the existing benchmarks. If discrepancies are discovered, notify Consultant promptly.

B. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Consultant.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Consultant. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Consultant before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Consultant.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."

F. Existing Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
5. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 “Temporary Facilities and Controls" and Section 017419 “Construction Waste Management and Disposal”.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 23 sections.

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

B. County of Atlantic Instruction to Bidders Item 57: Recycling for the Atlantic County Recycling Program and Solid Waste Management Plan.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

1.3 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner’s property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 30 days of date established for the Notice of Award.

1.6 INFORMATIONAL SUBMITTALS

A. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

B. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

C. Qualification Data: For waste management coordinator and refrigerant recovery technician.

1.7 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.

B. Refrigerant Recovery Technician Qualifications: Type II and Type III certified by EPA-approved certification program.

C. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

D. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.

5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste. Include estimated quantities and assumptions for estimates.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including, but not limited to the following:

1. Demolition Waste:
   a. Structural and miscellaneous steel.
   b. Rough hardware.
   c. Equipment.
   d. Piping.
   e. Supports and hangers.
   f. Electrical conduit.
   g. Copper wiring.
   h. Pavement
   i. Concrete
   j. Timber

2. Construction Waste:
   a. Piping.
   b. Electrical conduit.
   c. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:

      1) Paper.
      2) Cardboard.
      3) Boxes.
      4) Plastic sheet and film.
      5) Polystyrene packaging.
      6) Wood crates.

7) Wood pallets.
8) Plastic pails.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three (3) days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Comply with requirements in Section 024119 “Selective Demolition” for salvaging demolition waste.

B. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.

5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

C. Salvaged Items for Sale and Donation: Not permitted on Project site.

D. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

3.3 RECYCLING, DEMOLITION, AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials offsite. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

A. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

B. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

C. Conduit: Reduce conduit to straight lengths and store by material and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Constractor is responsible for all testing requirements related to the removal and disposal of material off site.
3. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner’s property.

C. Burning: Do not burn waste materials.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:
1. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten (10**)** days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.

5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten (10**)** days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements, as applicable.
2. Complete startup and testing of systems and equipment.
3. Perform preventive maintenance on equipment used prior to Substantial Completion.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
5. Complete final cleaning requirements.
6. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10**)** days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Consultant will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer’s Consultant will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on

Contractor's list or additional items identified by Consultant, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Consultant's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Consultant. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit final completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Consultant will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer's Consultant will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order starting with lab spaces first.
2. Organize items applying to each space by major element, including categories for ceiling, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Consultant.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. MS Excel electronic file. Consultant will return annotated file.
    b. PDF electronic file. Consultant will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer's Consultant for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit on digital media acceptable to Consultant or by email to Engineer's Consultant.

E. Warranties in Paper Form:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Remove tools, construction equipment, machinery, and surplus material from Project site.
d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
e. Remove debris and surface dust from limited access spaces.
f. Sweep concrete floors broom clean in unoccupied spaces.
g. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean
h. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
i. Remove labels that are not permanent.
j. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
l. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

m. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls" and Section 017419 "Construction Waste Management and Disposal".

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:
1. Section 017300 "Execution" for final property survey.
2. Section 017700 "Closeout Procedures" for general closeout procedures.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:
1) Submit PDF electronic files of scanned record prints and one (1) of file prints.
2) Submit record digital data files and one (1) set of plots.
3) Consultant will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit three (3) paper-copy set(s) of marked-up record prints.
2) Submit record digital data files and three (3) set(s) of record digital data file plots.
3) Plot each drawing file, whether or not changes and additional information were recorded.

B. Record Specifications: Submit one (1) paper copy and annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one (1) paper copy and annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one (1) paper copy and annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report monthly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Change Directive.
k. Changes made following Consultant’s written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Consultant. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
4. Refer instances of uncertainty to Consultant for resolution.
5. Consultant will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

    a. See Section 013100 "Project Management and Coordination" for requirements related to use of Consultant's digital data files.
    b. Consultant will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Consultant.
    e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for

construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Consultant's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected site elements.
2. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.
3. Section 013516 "Alteration Project Procedures" for general protection and work procedures for alteration projects.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse or store.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
4. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Engineering Survey: Submit engineering survey of work area.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

D. Predemolition Photograph: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.

E. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Consultant of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Consultant and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Work Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more.

F. Storage or sale of removed items or materials on-site is not permitted.

G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.10 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Perform an engineering survey of condition work area to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

D. Verify that hazardous materials have been remediated before proceeding with demolition operations.

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
2. Before selective demolition or removal of existing elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

5. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Consultant, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Protecting existing trees and vegetation to remain.
2. Removing trees and other vegetation.
3. Clearing and grubbing.
4. Topsoil stripping.
5. Removing above-grade site improvements.
6. Disconnecting, capping or sealing, and abandoning site utilities in place.
7. Disconnecting, capping or sealing, and removing site utilities.

B. Related Sections include the following:

1. Division 31 Section 312000 “Earthwork” for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of weeds, roots, and other deleterious materials.

1.4 MATERIALS OWNERSHIP

A. Except for materials indicated to remain Owner's property, cleared, excess and waste materials shall become Contractor's property and shall be removed from the site.

1.5 SUBMITTALS

A. The contractor shall be responsible to provide photographs or video, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site

improvements that might be misconstrued as damage caused by site clearing. The photographs or video must be submitted prior to any site clearing activity.

B. Record drawings according to contract requirements.

1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements of the Specifications.

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by the County.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 31 Section 312000 "Earthwork."

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Locate and clearly flag trees and vegetation to remain or to be relocated.

D. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to the Owner.

3.2 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. The Contractor shall coordinate with the Owner and the respective utility companies to arrange for the shutoff of indicated utilities.
2. Divert surface stormwater runoff to the nearest operational downstream inlet during stormwater management system improvements.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner and Engineer not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner’s written permission.

C. Excavate for and remove underground utilities indicated to be removed.

3.3 CLEARING AND GRUBBING

A. The contractor shall be responsible to remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Completely remove stumps, roots, obstructions, and debris below exposed subgrade.
4. Use only hand methods for grubbing within drip line of remaining trees.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding 8-inch (200-mm) loose depth, and compact each layer to a density equal to adjacent original ground.

3.4 TOPSOIL STRIPPING

A. Remove vegetation, sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and provide temporary seeding as per the soil erosion and sediment control standards.

1. Limit height of topsoil stockpiles to 72 inches (1800 mm).
2. Do not stockpile topsoil within drip line of remaining trees.
3. Dispose of excess topsoil as specified for waste material disposal.
4. Stockpile surplus topsoil and allow for respreading deeper topsoil.

3.5 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, aggregate base and all other items as indicated on the plans.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.6 DISPOSAL

A. The Contractor is responsible to remove surplus soil material, unsuitable topsoil, unsuitable soils, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 311000

SECTION 31 20 00 - EARTHWORK

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 the following:

1. Preparing subgrades for slabs-on-grade, walks, pavements, landscaping, lawns and plantings.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for slabs-on-grade.
4. Subbase course for concrete walks and pavements.
5. Subbase and base course for asphalt paving.
6. Subsurface drainage backfill for walls and trenches.
7. Excavating and backfilling for utility trenches.
8. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.

B. Related Sections include the following:

1. Division 31 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
2. Division 31 Section "Dewatering" for lowering and disposing of ground water during construction.

1.3 UNIT PRICES

A. Rock Measurement: No separate payment will be made for the removal of rock and replacement with approved material.

1.4 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations.

This work shall include the removal of the existing rock and fill material as required to construct the proposed improvements, including the building, walls, utilities, foundations, roadways, sidewalk and all other structures that are constructed below existing grade.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. Yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,090 lbf and stick-crowd force of not less than 18,650 lbf; measured according to SAE J-1179.
2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.

I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows / 2 inches.

J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

K. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

L. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Each type of plastic warning tape.
2. Drainage and separation fabric.

B. Samples: For the following:

1. Forty (40) pound bag samples of each material to be used as backfill and bedding shall be submitted to the Soils Engineer two (2) weeks minimum prior to commencing fill operations. This material shall not be used as a compacted fill until approved by the Engineer. By submitting samples of this material, the Contractor agrees and guarantees that the fill material used for construction will conform with the samples (s) supplied. Final acceptance of fill material rests with the Engineer, whose decision shall be final and binding upon the Contractor. However, the acceptance of any material by the Engineer shall not relieve the Contractor of his responsibility to have the fill material used conform to the sample(s) approved by the Engineer.

2. The Contractor shall supply data on the compaction equipment to the Engineer not less than two (2) weeks prior to the intended use of the equipment and the equipment shall be approved by the Engineer prior to commencing compaction operations.

3. 12-by-12-inch sample of drainage fabric.
4. 12-by-12-inch sample of separation fabric

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification and grain size analysis according to ASTM D 2487 and ASTM D 422 of each on-site or borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.

D. Blasting will not be permitted.

1.6 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548 and responsible to provide the necessary testing and approval determinations as the soils engineer.

B. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in specifications.

1.7 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by the owner and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.
3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

C. The contractor shall be responsible to provide the required soils work as recommended in the Geotechnical Report and these specifications. Also, the contractor shall be responsible to import fill and place in a controlled manner as required to perform his work in accordance with the requirements of the Geotechnical Report, plans, specifications and the Project Manual.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils:

1. Fill Classification:

a. Type "S" Fill – shall be structural fill consisting of clean sand and gravel to be used in general, for the support of foundations and new structures. This fill shall be imported from off the site and shall meet the following gradation requirement.

U.S. Standard Sieve Size	Percent Finer By Weight
1 inch	100
3/8 inch	65-100
No. 10	40-85
No. 30	20-65
No. 60	10-45
No. 200	5-12

b. Type "G" Fill – shall be a granular fill consisting of a clean sand and gravel to be used, in general, for backfilling around and between structures and underneath paved areas, pipelines and utilities. This fill shall be imported from off the site and shall meet the gradation requirements as listed below. If suitable Type "G" materials are found on the site and is accepted by the Engineer, it shall be stored for use.

U.S. Standard Sieve Size	Percent Finer By Weight
2 inch	100
1 inch	80-100
3/8 inch	70-100
No. 10	50-100
No. 30	30-85
No. 60	15-65
No. 200	5-15

c. Type "W" Fill – shall be a structural fill consisting of clean stone conforming to New Jersey Department of Transportation coarse aggregate size No. 57, used to facilitate dewatering while providing a firm workmat subgrade onto which foundations may be constructed as well as providing a drainage blanket and pipe bedding. The fill material shall be imported from off-site and shall meet the following gradation requirements.

U.S. Standard Sieve Size	Percent Finer By Weight
1 1/2 inch	100
1 inch	95-100
1/2 inch	25-60
No. 4	0-10
No. 8	0-5

Unsatisfactory soils include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility.

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as per authority having jurisdiction, or as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Soil Erosion and Sediment Control", during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system, specified in Division 2 Section "Dewatering", to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. All excavations shall be in accordance with OSHA requirements.

B. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

C. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

D. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

E. Trench Bottoms: Excavate trenches 6 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.

1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 5 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed, without additional compensation.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Owner.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, damp-proofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings.

D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Backfill voids with satisfactory soil while installing and removing shoring and bracing, and as sheeting is removed.

F. Place and compact final backfill of satisfactory soil to final subgrade elevation.

G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs or as directed by the utility company or authority having jurisdiction.

3.13 FILL

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions and deleterious materials from ground surface before placing fills.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under future building slabs, use engineered fill.
5. Under future footings and foundations, use engineered fill.

3.14 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Compacting of prepared subgrade under Type “S”, Type “G”, and Type “W” Fills – after excavation to the required subgrade, the subgrade shall be compacted by approved equipment and methods to develop to a depth of at least twelve (12) inches below ground surface at least 95% of maximum dry density as determined by the Engineer in conformance with ASTM Standard D1557. Any soft or weak spots detected during the compaction operation or proof-rolling of subgrade must be removed and replaced with controlled fill as directed by the Engineer. The compaction shall be checked by the Engineer and lean concrete or fill shall not be placed until compaction of the existing subgrade is approved by the Engineer

B. Placement of Type “S”, “G”, and “W” Fills – No backfill shall be placed until the excavation and subgrade has been approved by the Engineer and until backfill materials to be used are approved by the Engineer, and no backfill shall be placed on frozen or thawing ground. Fill shall be placed in uniform horizontal layers not more than twelve (12) inches in thickness and shall be compacted with a high energy self-propelled vibratory roller. Lift thickness may be adjusted in the field by the Engineer if required soil density is not being achieved.

C. Compaction of Types “S”, “G”, and “W” Fills – the backfill shall be compacted near optimum moisture content by means of vibratory compactors to not less then 95% of the maximum density determined in accordance with ASTM Standard D1557. The Engineer shall check the obtained in-place density of the compacted fill using the method of ASTM Standards D 1556 or D 2922 for in place density tests. Should the obtained density of the compacted fill be less than specified, the Contractor shall recompact the area until the required maximum density is reached. Only handheld compaction equipment shall be used within four (4) feet of foundation walls and structures.

D. Moisture Control – the moisture-density curve for the fill used shall be used as a guide in controlling moisture to achieve the required degree of compaction. If, in the opinion of the Engineer, fill material becomes too wet for the required compaction, the fill shall be dried by a method approved by the Engineer prior to commencing or continuing compaction operations. Likewise, if the opinion of the Engineer, the fill material

becomes too dry for the required compaction, the fill shall be moistened by a method approved by the Engineer prior to commencing or continuing compaction operations

E. Drainage of the Site – at all times, Contractor shall maintain and operate proper and adequate surface and subsurface drainage in order to keep the construction site dry and in such condition that placement and compaction of fill may proceed unhindered by saturation of the area.

F. Backfill of Excavations – any excavation (e.g., utilities, walls, footings, etc.) made within the compacted fill areas shall be backfilled with the same type of fill as removed and in accordance with Specifications herein. Where compacted fill is placed adjacent to walls, if the difference in elevation of the top of the fill on either side of the wall is more than one (1) foot, the wall is to be adequately braced. Any excavation made in virgin material shall be backfilled with Type "G" fill as herein specified unless otherwise shown on the Contract Drawings or directed by the Engineer.

G. Final Approval – immediately before the Contractor shall place foundations or floor slabs on compacted fills or virgin soil, the Engineer will inspect the foundation and floor slab subgrade. The Contractor shall remove any soft fill and replace with properly compacted material. The pouring of foundations or floor slab shall commence within twenty-four (24) hours of approval. Rain, frost and other factors (which in the opinion of the Engineer are potentially damaging to the fill or virgin material), occurring after the final approval, but before or during pouring, shall require an additional inspection of the compacted fill or virgin material for approval by the Engineer. The Contractor shall correct any deficiencies found at this time, at his own expense.

H. Maintenance of Fills – all vehicles passing over the fill areas shall use diverse routes to insure uniform compaction of the fill.

I. Before shutdown of the work for any cause, and at the conclusion of work for the day, fill shall be bladed to a grade which will insure drainage away from the unfinished surface of the fill.

J. Excess materials shall be stored as directed by the Owner and following completion of the work shall be removed from the site.

3.16 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:

1. Place base course material over subbase course under.
2. Shape subbase and base course to required crown elevations and cross-slope grades.
3. Place subbase and base course 6 inches or less in compacted thickness in a single layer, unless otherwise directed.
4. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
5. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.18 DRAINAGE COURSE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Place drainage course 6 inches or less in compacted thickness in a single layer, unless otherwise noted.
2. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

3. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.19 FIELD QUALITY CONTROL

A. Testing Agency: The Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing and approval determinations as the soils engineer. The contractor is to cooperate with the soils consultant in all respects and shall provide samples of each type of fill material used so that various tests may be performed to ascertain compliance with the specifications.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect/Engineer.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained with no additional compensation from the owner.

3.20 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including excess topsoil unsatisfactory soil, excess materials, trash, and debris, and legally dispose of it off Owner's property.

1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 312000

SECTION 31 23 19 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes construction dewatering.

B. Related Sections include the following:

1. Division 31 Section 312000 “Earthwork” for excavating, backfilling, and site grading.

1.3 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, provide, test, operate, monitor, and maintain a dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations and permit construction to proceed on dry, stable subgrades.

1. Work includes removing dewatering system when no longer needed.
2. Contractor to maintain dewatering operations to ensure erosion is controlled, stability of excavations and constructed slopes is maintained, and flooding of excavation and damage to structures are prevented.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging existing buildings and site improvements adjacent to excavation.

1.4 SUBMITTALS

A. Shop Drawings: For dewatering system, where applicable show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; and means of discharge and disposal of water.

1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

B. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

C. Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.

D. Field Test Reports: Before starting excavation, submit test results and computations demonstrating that dewatering system is capable of meeting performance requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform dewatering who has specialized in installing dewatering systems similar to those required for this Project and with a record of successful in-service performance.

B. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by the Owner and/or Engineer and then only after arranging to provide temporary utility services according to requirements indicated.

B. The contractor shall make test borings and/or conduct other exploratory operations as required to design the dewatering system, if necessary.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.

2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.2 DEWATERING

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

B. Before excavation below ground-water level, place system into operation to lower water to specified levels and then operate it continuously until drains, sewers, and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

1. Maintain piezometric water level a minimum of 24 inches (600 mm) below surface of excavation.

E. Dispose of water removed from excavations in a manner to avoid endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner to avoid inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

F. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on a continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense.

1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches (900 mm) below overlying construction.

G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

END OF SECTION 312319

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes excavation support and protection systems.

B. Related Sections include the following:

1. Division 31 Section 312000 "Earthwork" for excavating and backfilling.

1.3 PERFORMANCE REQUIREMENTS

A. Design, provide, monitor, and maintain an anchored and braced excavation support and protection system capable of resisting soil and hydrostatic pressure and supporting sidewalls of excavations.

1. Work includes removing excavation support and protection systems when no longer needed.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.

1.4 SUBMITTALS

A. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems. System design and calculations must be acceptable to authorities having jurisdiction.

1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

B. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by excavation support and protection systems.

1.5 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by the Owner and/or Engineer and then only after arranging to provide temporary utility services according to requirements indicated.

B. Make test borings and/or conduct other exploratory operations as necessary.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials need not be new but must be in serviceable condition.

B. Structural Steel: ASTM A 36 (ASTM A 36M).

C. Steel Sheet Piling: ASTM A 328 (ASTM A 328M) or ASTM A 572 (ASTM A 572M).

D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of 3 inches (75 mm).

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

C. Locate excavation support and protection systems clear of permanent construction and to permit forming and finishing of concrete surfaces.

D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other

evidence of movement to ensure excavation support and protection systems remain stable.

E. Promptly repair damages to adjacent facilities caused by the use of excavation support and protection systems.

END OF SECTION 315000

SECTION 321313 - CONCRETE PAVING

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 exterior cement concrete pavement for the following:

1. Parking lots.
2. Curbs and gutters.
3. Walkways.

B. Related Sections include the following:

1. Division 31 Section "Earthwork" for subgrade preparation, grading, and subbase course.
2. Division 32 Section "Concrete Pavement Joint Sealants" for joint sealants within concrete pavement and at isolation joints of concrete pavement with adjacent construction.
3. Division 3 Section "Cast-in-Place Concrete" for general building applications of concrete.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, expansive hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Samples: 10-lb (4.5-kg) sample of exposed aggregate.

D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:

1. Cementitious materials and aggregates.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds.
5. Applied finish materials.
6. Bonding agent or adhesive.
7. Joint fillers.

F. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed pavement work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the National Ready Mix Concrete Association's Plant Certification Program.

C. Testing Agency Qualifications: The Owner is responsible for providing an independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.

E. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixes.

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1. Before submitting design mixes, review concrete pavement mix design and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with concrete pavement to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixes.
c. Ready-mix concrete producer.
d. Concrete subcontractor.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves of a radius 100 feet (30.5 m) or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Deformed-Steel Welded Wire Fabric: ASTM A 497, flat sheet.

C. Epoxy-Coated Welded Wire Fabric: ASTM A 884/A 884M, Class A, plain steel.

D. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

E. Epoxy-Coated Reinforcement Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60 (Grade 420), deformed bars.

F. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 (Grade 420), deformed bars; assembled with clips.

G. Plain Steel Wire: ASTM A 82, as drawn.

H. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A coated, plain steel.

I. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

J. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60 (Grade 420), plain steel bars.

K. Tie Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

L. Hook Bolts: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

M. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer coated wire bar supports.

N. Epoxy Repair Coating: Liquid two-part epoxy repair coating, compatible with epoxy coating on reinforcement.

2.3 CONCRETE MATERIALS

A. General: Use the same brand and type of cementitious material from the same manufacturer throughout the Project.

B. Portland Cement: ASTM C 150, Type I or II.

1. Fly Ash: ASTM C 618, Class F or C.
2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Aggregate: ASTM C 33, uniformly graded, from a single source, with coarse aggregate as follows:

1. Class: 4S.
2. Maximum Aggregate Size: 1 inch (25 mm) nominal.
3. Do not use fine or coarse aggregates containing substances that cause spalling.

D. Exposed Aggregate: Selected, hard, and durable; washed; free of material that reacts with cementitious material or causes staining; from a single source, with gap graded coarse aggregate as follows:

1. Aggregate Sizes: 1/2 to 3/4 inch (13 to 19 mm) nominal.

E. Water: ASTM C 94.

2.4 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

E. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

F. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

G. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

H. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

I. Evaporation Retarder:

1. Cimfilm; Axim Concrete Technologies.
2. Finishing Aid Concentrate; Burke Group, LLC (The).
3. Spray-Film; ChemMasters.
4. Aquafilm; Conspec Marketing & Manufacturing Co., Inc.
5. Sure Film; Dayton Superior Corporation.
6. Eucobar; Euclid Chemical Co.
7. Vapor Aid; Kaufman Products, Inc.
8. Lambco Skin; Lambert Corporation.
9. E-Con; L&M Construction Chemicals, Inc.
10. Confilm; Master Builders, Inc.
11. Waterhold; Metalcrete Industries.
12. Rich Film; Richmond Screw Anchor Co.
13. SikaFilm; Sika Corporation.
14. Finishing Aid; Symons Corporation.
15. Certi-Vex EnvioAssist; Vexcon Chemicals, Inc.

J. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound:

1. AH Curing Compound #2 DR; Anti-Hydro International, Inc.
2. Res-X Cure All Resin; Burke Group, LLC (The).
3. RX Cure; Conspec Marketing & Manufacturing Co., Inc.
4. Day-Chem Rez Cure; Dayton Superior Corporation.
5. Kurez DR; Euclid Chemical Co.
6. Nitocure S; Fosroc.
7. #64 Resin Cure; Lambert Corporation.
8. L&M Cure DR; L&M Construction Chemicals, Inc.
9. 3100-Clear; W. R. Meadows, Inc.
10. Seal N Kure FDR; Metalcrete Industries.
11. Rich Cure; Richmond Screw Anchor Co.
12. Resi-Chem C309; Symons Corporation.

13. Horncure 30; Tamms Industries Co., Div. of LaPorte Construction Chemicals North America, Inc.
14. Uni Res 150; Unitex.
15. Certi-Vex RC; Vexcon Chemicals, Inc.

K. Clear Waterborne Membrane-Forming Curing Compound:

1. AH Curing Compound #2 DR WB; Anti-Hydro International, Inc.
2. Aqua Resin Cure; Burke Group, LLC (The).
3. Safe-Cure Clear; ChemMasters.
4. W.B. Resin Cure; Conspec Marketing & Manufacturing Co., Inc.
5. Day Chem Rez Cure (J-11-W); Dayton Superior Corporation.
6. Nitocure S; Fosroc.
7. Aqua Kure-Clear; Lambert Corporation.
8. L&M Cure R; L&M Construction Chemicals, Inc.
9. 1100 Clear; W. R. Meadows, Inc.
10. Resin Cure E; Nox-Crete Products Group, Kinsman Corporation.
11. Rich Cure E; Richmond Screw Anchor Co.
12. Resi-Chem Clear Cure; Symons Corporation.
13. Horncure 100; Tamms Industries Co., Div. of LaPorte Construction Chemicals North America, Inc.
14. Hydro Cure; Unitex.
15. Certi-Vex Enviocure; Vexcon Chemicals, Inc.

L. White Waterborne Membrane-Forming Curing Compound:

1. AH Curing Compound #2 WB WP; Anti-Hydro International, Inc.
2. Aqua Resin Cure; Burke Group, LLC (The).
3. W.B. Resin Cure; Conspec Marketing & Manufacturing Co., Inc.
4. Thinfilm 450; Kaufman Products, Inc.
5. Aqua Kure-White; Lambert Corporation.
6. L&M Cure R-2; L&M Construction Chemicals, Inc.
7. 1200-White; W. R. Meadows, Inc.
8. White Pigmented Resin Cure E; Nox-Crete Products Group, Kinsman Corporation.
9. Rich Cure White E; Richmond Screw Anchor Co.
10. Resi-Chem High Cure; Symons Corporation.
11. Horncure 200-W; Tamms Industries Co., Div. of LaPorte Construction Chemicals North America, Inc.
12. Hydro White 309; Unitex.

2.6 INTEGRALLY COLORED (TINTED) CONCRETE PAVEMENT

A. Where indicated, provide integrally colored pavement, Color to be Brick Red or as approved by the Architect.

1. Colored admixture: Comply with manufacturer's written instructions. Deliver colored admixtures in original unopened packaging.
2. Basis of Design: Mix-Ready Standard Dry Pigment Color by Davis Colors or approved equal
3. Conform to ACI 304 Recommended Practice for Measuring, Mixing, Transporting and Placing of Concrete, ASTM C494 Standards for Chemical Admixtures for Concrete, and ASTM C979 Standard Specification for Pigments for Integrally Colored Concrete.
4. Do not use supplemental admixtures unless approved by the manufacturer of the colorant. Do not add calcium chloride to the concrete mix as mottling and surface discoloration will occur.
5. Do not trowel or burnish the surface, and provide a consistent broom finish as required. Exercise extreme care to prevent any concrete, especially tinted concrete, from contacting exposed faces of adjacent materials and finishes during placement and finishing.
6. The scoring pattern of the integrally colored concrete pavement shall vary from the surrounding concrete pavement as indicated or as directed by the Architect.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Pavement-Marking Paint: Alkyd-resin type; ready mixed; complying with FS TT-P-115, Type I,or AASHTO M 248, Type N.

C. Glass Beads: AASHTO M 247.

D. Wheel Stops: Precast, air-entrained concrete; 2500-psi (17.2-MPa) minimum compressive strength; approximately 6 inches (150 mm) high, 9 inches (225 mm) wide, and 84 inches (2130 mm) long. Provide chamfered corners and drainage slots on underside, and provide holes for dowel-anchoring to substrate.
1. Dowels: Galvanized steel, diameter of 3/4 inch (19 mm), minimum length 10 inches (254 mm).

E. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

F. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

G. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch (9.5-mm) sieve and 85 percent retained on a No. 8 (2.36-mm) sieve.

H. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:

1. Type: Class I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
2. Type: Class IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.8 CONCRETE MIXES

A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method.

1. Do not use Owner's field quality-control testing agency as the independent testing agency.

C. Proportion mixes to provide concrete as indicated on plans with the following properties:

1. Compressive Strength (28 Days): 4500 psi (Class B).
2. Compressive Strength (28 Days): 4000 psi (Class C).
3. Slump Limit at point of placement: 3 inches

D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals.

E. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 2.5 to 4.5 percent.

F. Coloring Agent: Add coloring agent to mix according to manufacturer's written instructions.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94 and ASTM C 1116.

1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Comply with requirements and measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixers of 1 cu. yd. (0.76 cu. m) or smaller capacity, continue mixing at least one and one-half minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixers of capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 PREPARATION

A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.

1. Apply epoxy repair coating to uncoated or damaged surfaces of epoxy-coated reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch (50-mm) overlap to adjacent mats.

3.4 JOINTS

A. General: Construct construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour, unless pavement terminates at isolation joints.

1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
2. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
3. Provide tie bars at sides of pavement strips where indicated.

4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
5. Use epoxy bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 20 feet, unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filer less than 1/2 inch (12 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

E. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to the following radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.

    a. Radius: 1/4 inch (6 mm).
    b. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

F. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

1. Radius: 1/4 inch (6 mm).

3.5 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.

D. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery, or during placement.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.

   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

H. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

   1. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.

I. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surface treatments.

J. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

K. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations

L. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

M. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

N. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcement steel with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, reinforcement steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 CONCRETE FINISHING

A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited. Finish shall be a fine smooth surface.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:
ACI 117 ESTABLISHES FEW PAVEMENT TOLERANCES. BELOW ARE BASED ON ACI 330.1.

1. Elevation: 1/4 inch (6 mm).
2. Thickness: Plus 3/8 inch (9 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/4 inch (6 mm).
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch (25 mm).
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch (6 mm).
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch (13 mm).
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches (6 mm per 300 mm).
8. Joint Spacing: 3 inches (75 mm).
9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: The Owner is responsible to engage a qualified independent testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

1. Testing Services: Testing shall be performed according to the following requirements:
2. Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C 172, except modified for slump to comply with ASTM C 94.
3. Slump: ASTM C 143; one test at point of placement for each compressive-strength test, but not less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
4. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test, but not less than one test for each day's pour of each type of air-entrained concrete.
5. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
6. Compression Test Specimens: ASTM C 31/C 31M; one set of four standard cylinders for each compressive-strength test, unless otherwise indicated. Cylinders shall be molded and stored for laboratory-cured test specimens unless field-cured test specimens are required.

7. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m). One specimen shall be tested at 7 days and two specimens at 28 days; one specimen shall be retained in reserve for later testing if required.
8. When frequency of testing will provide fewer than five compressive-strength tests for a given class of concrete, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
9. When total quantity of a given class of concrete is less than 50 cu. yd. (38 cu. m), Architect may waive compressive-strength testing if adequate evidence of satisfactory strength is provided.
10. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, current operations shall be evaluated and corrective procedures shall be provided for protecting and curing in-place concrete.
11. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive compressive-strength test results equal or exceed specified compressive strength and no individual compressive-strength test result falls below specified compressive strength by more than 500 psi (3.4 MPa).

B. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

C. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as the sole basis for approval or rejection.

D. Additional Tests: Testing agency shall make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.10 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.

B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 32 13 73 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Expansion and contraction joints within portland cement concrete pavement.
2. Joints between portland cement concrete and asphalt pavement.

B. Related Requirements:

1. Division 32 Section "Concrete Paving" for constructing joints in concrete paving.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch- (13-mm-) wide joints formed between two 6-inch-(150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.

D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Compatibility and Adhesion Test Reports: From joint sealant manufacturer indicating the following:

1. Materials forming joint substrates and joint-sealant backer materials have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

F. Product Test Reports: From a qualified testing agency indicating joint sealants comply with requirements, based on comprehensive testing of current product formulations.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency, based on testing current sealant formulations within a 36-month period.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
2. Test joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

D. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturer, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

    a. Perform tests under environmental conditions replicating those that will exist during installation.

2. Submit not fewer than nine pieces of each type of material, including joint substrates, joint-sealant backer materials, secondary seals, and miscellaneous material.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain joint sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

5. Testing will not be required if joint sealant manufacturer submits joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than that allowed by joint sealant manufacturer for application indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: To be approved by Owner.

C. Colors of Exposed Joint Sealants: As indicated by referencing manufacturer's designations.

D. Colors of Exposed Joint Sealants: To be approved by Owner.

2.2 COLD-APPLIED JOINT SEALANTS

A. Multicomponent Jet-Fuel-Resistant Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:

1. Urethane Formulation: Type M; Grade P; Class 12-1/2; Uses T, M, and, as applicable to joint substrates indicated, O.
2. Coal-Tar-Modified Polymer Formulation: Type M; Grade P; Class 25; Uses T and, as applicable to joint substrates indicated, O.
3. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

B. Single-Component Jet-Fuel-Resistant Urethane Sealant for Concrete: Single-component, pourable, coal-tar-modified, urethane formulation complying with ASTM C 920 for Type S; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

C. Type NS Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.

D. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

E. Multicomponent Low-Modulus Sealant for Concrete and Asphalt: Proprietary formulation consisting of reactive petropolymer and activator components producing a pourable, self-leveling sealant.

F. Available Products: Subject to compliance with requirements, cold-applied joint sealants that may be incorporated into the Work include, but are not limited to, the following:

G. Products: Subject to compliance with requirements, provide one of the following:

1. Multicomponent Jet-Fuel-Resistant Sealant for Concrete:

a. Vulkem 202; Mameco International.
b. SEALTIGHT GARDOX; W.R. Meadows, Inc.
c. Urexpan NR-300; Pecora Corporation.
d. Sonomeric 2; Sonneborn Building Products Div., ChemRex, Inc.

2. Single-Component Jet-Fuel-Resistant Urethane Sealant for Concrete:
   a. Vulkem 200; Mameco International.
   b. Sonomeric 1; Sonneborn Building Products Div., ChemRex, Inc.

3. Type NS Silicone Sealant for Concrete:

   a. Roadsaver Silicone-SL; Crafco Inc.
   b. 888; Dow Corning.

4. Type SL Silicone Sealant for Concrete and Asphalt:

   a. 890-SL; Dow Corning.

5. Multicomponent Low-Modulus Sealant for Concrete and Asphalt:

   a. SOF-SEAL; W.R. Meadows, Inc.

2.3 HOT-APPLIED JOINT SEALANTS

A. Jet-Fuel-Resistant Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3569.

B. Jet-Fuel-Resistant Sealant for Concrete and Tar Concrete: Single-component formulation complying with ASTM D 3581.

C. Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3406.

D. Sealant for Concrete and Asphalt: Single-component formulation complying with ASTM D 3405.

E. Available Products: Subject to compliance with requirements, hot-applied joint sealants that may be incorporated into the Work include, but are not limited to, the following:

F. Products: Subject to compliance with requirements, provide one of the following:

1. Jet-Fuel-Resistant Elastomeric Sealant for Concrete:

   a. Superseal 444/777; Crafco, Inc.
   b. POLY-JET 3569; W.R. Meadows, Inc.

2. Jet-Fuel-Resistant Sealant for Concrete and Tar Concrete:

   a. SUPERSEAL 1614A; Crafco Inc.
   b. POLY-JET 1614; W.R. Meadows, Inc.
   c. POLY-JET 3406; W.R. Meadows, Inc.

d. POLY-JET 3569, W.R. Meadows, Inc.

3. Elastomeric Sealant for Concrete:

a. Superseal 444/777; Crafco, Inc.
b. POLY-JET 3406; W.R. Meadows, Inc.

4. Sealant for Concrete and Asphalt:

a. ROADSAVER 221; Crafco Inc.
b. Product #9005; Koch Materials Company.
c. Product #9030; Koch Materials Company.
d. SEALTIGHT HI-SPEC; W.R. Meadows, Inc.

2.4 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rod for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depths and prevent bottom-side adhesion of sealant.

C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depths, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

D. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depths and prevent bottom-side adhesion of sealant.

2.5 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint- sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. Comply with joint-sealant manufacturer's written installation instructions applicable for products and applications indicated unless more stringent requirements apply.

B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.

C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of backer materials.
2. Do not stretch, twist, puncture, or tear backer materials.
3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants by proven techniques to comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Non-sag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:

1. Remove excess joint sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING AND PROTECTION

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

END OF SECTION 32 13 73

SECTION 329200 – TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Ground Covers
   2. Lawns.
   3. Topsoil and soil amendments.
   4. Fertilizers and mulches.

B. Related Sections: The following Sections contain requirements that relate to this Section:

   1. Section "Site Clearing" for protection of existing trees and planting, topsoil stripping and stockpiling, and site clearing.
   2. Section "Earthwork" for excavation, filling, rough grading, and subsurface aggregate drainage and drainage backfill.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract.

B. Product certificates signed by manufacturers certifying that their products comply with specified requirements.

   1. Manufacturer's certified analysis for standard products.
   2. Analysis for other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
   3. Label data substantiating that plants, trees, shrubs, and planting materials comply with specified requirements.

C. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and address of architects and owners, and other information specified.

E. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.

1. Analysis of existing surface soil.
2. Analysis of imported topsoil.

F. Planting schedule indicating anticipated dates and locations for each type of planting.

G. Maintenance instructions recommending procedures to be established by Owner for maintenance of landscaping during an entire year. Submit before expiration of required maintenance periods.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress.

B. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

C. Provide quality, size, genus, species, and variety of trees and shrubs indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock."

D. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant-nutrient content of topsoil.

1. Report suitability of topsoil for growth of applicable planting material. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce a satisfactory topsoil.

E. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree or Shrub for height and spread; do not measure branches or roots tip-to-tip.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements of the Contract for "Project Meetings."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

B. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

C. Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist.

1. Do not remove container-grown stock from containers before time of planting.

D. Water root systems of plants stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.6 PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Landscape Architect before planting.

1.7 COORDINATION AND SCHEDULING

A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

1.8 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Warrant the following living planting materials for a period of one year after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.

1. Ground covers.

C. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.

D. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

E. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

1.9 GROUND COVER AND PLANT MAINTENANCE

A. Maintain ground cover and plants by watering, weeding, fertilizing, and other operations as required to establish healthy, viable plantings for the following period:

1. Maintenance Period: 3 months following Substantial Completion.

1.10 LAWN MAINTENANCE

A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

1. Seeded Lawns: 60 days after date of Substantial Completion.

a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.

2. Sodded Lawns: 30 days after date of Substantial Completion.
3. Plug-Sodded Lawns: 30 days after date of Substantial Completion.

4. Sprigged Lawns: 30 days after date of Substantial Completion.

B. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.

C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawns uniformly moist to a depth of 4 inches.

1. Water lawn at the minimum rate of 2 inch per week.

D. Mow lawns as soon as there is enough top growth to cut with mower set at specified height for principal species planted. Repeat mowing as required to maintain specified height without cutting more than 40 percent of the grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

E. Postfertilization: Apply fertilizer to lawn after first mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb per 1000 sq. ft. of lawn area.

PART 2 - PRODUCTS

2.1 GROUND COVERS AND PLANTS

A. Provide ground covers and plants established and well rooted in removable containers or integral peat pots and with not less than the minimum number and length of runners required by ANSI Z60.1 for the pot size indicated.

B. All plants must have tags clearly visible and must remain on plants after installation until project Landscape Architect has reviewed and approved all plantings.

2.2 GRASS MATERIALS

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances.

1. Seed Mixture: Provide seed of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on the Contract Documents.

2.3 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7.4 percent organic material minimum, free of stones 1 inch or larger in any dimension, and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
2. Topsoil Source: Import topsoil from off-site sources. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches deep; do not obtain from bogs or marshes.

2.4 SOIL AMENDMENTS

A. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 sieve and a minimum 75 percent passing a No. 60 sieve.

1. Provide lime in the form of dolomitic limestone.

B. Aluminum Sulfate: Commercial grade, unadulterated.

C. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Peat Humus: Finely divided or granular texture, with a pH range of 6 to 7.5, composed of partially decomposed moss peat (other than sphagnum), peat humus, or reed-sedge peat.

F. Peat Humus: For acid-tolerant trees and shrubs, provide moss peat, with a pH range of 3.2 to 4.5, coarse fibrous texture, medium-divided sphagnum moss peat or reed-sedge peat.

G. Sawdust or Ground-Bark Humus: Decomposed, nitrogen-treated, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

H. 1. When site treated, mix with at least 0.15 lb of ammonium nitrate or 0.25 lb of ammonium sulfate per cu. ft. of loose sawdust or ground bark.

I. Manure: Well-rotted, unbleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

J. Herbicides: EPA registered and approved, of type recommended by manufacturer.

K. Water: Potable.

2.5 FERTILIZER

A. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the following composition:

1. Composition: 1 lb per 1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

D. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 5 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight.
2. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
3. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.6 MULCHES

A. Organic Mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood.

B. Mineral Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of following type, size range, and color:

1. Type: Rounded riverbed gravel or smooth-faced stone.
2. Type: Crushed stone or gravel.
3. Size Range: 2 inches maximum, 3/4 inch minimum.
4. Color: Uniform tan-beige color range, acceptable to Architect.

2.7 WEED-CONTROL BARRIERS

A. Sheet Polyethylene: Black, 0.006-inch minimum thickness.

B. Nonwoven Fabric: Polypropylene or polyester fabric, 3 oz. per sq. yd. minimum.

C. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz. per sq. yd.

2.8 EROSION-CONTROL MATERIALS

A. Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches (long.

B. Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, 0.92 lb per sq. yd. minimum, with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

2.9 MISCELLANEOUS MATERIALS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Lay areas for multiple plantings. Stake locations, outline areas, and secure Landscape Architect's acceptance before the start of planting work. Make minor adjustments as may be required.

3.3 PLANTING SOIL PREPARATION

A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

B. Mix soil amendments and fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.

1. A "Planting Soil Amendments Schedule" is included at the end of this Section.

C. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

1. Mix lime with dry soil prior to mixing fertilizer. Prevent lime from contacting roots of acid-tolerant plants.
2. Apply phosphoric acid fertilizer, other than that constituting a portion of complete fertilizers, directly to subgrade before applying planting soil and tilling.

3.4 LAWN PLANTING PREPARATION

A. Limit subgrade preparation to areas that will be planted in the immediate future.

B. Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 1-1/2 inches (38 mm) in any dimension and sticks, roots, rubbish, and other extraneous materials.

C. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.

1. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.
2. Allow for sod thickness in areas to be sodded.

D. Preparation of Unchanged Grades: Where lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare soil as follows:

1. Remove and dispose of existing grass, vegetation, and turf. Do not turn over into soil being prepared for lawns.
2. Till surface soil to a depth of at least 6 inches (150 mm). Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches (100

mm) of soil. Trim high areas and fill in depressions. Till soil to a homogenous mixture of fine texture.

3. Clean surface soil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
4. Remove waste material, including grass, vegetation, and turf, and legally dispose of it off the Owner's property.

E. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1-1/2 inches (38 mm) in any dimension, and other objects that may interfere with planting or maintenance operations.

F. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

G. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

3.5 GROUND COVER AND PLANT BED PREPARATION

A. Loosen subgrade of planting bed areas to a minimum depth of 6 inches (150 mm). Remove stones larger than 1-1/2 inches (38 mm) in any dimension and sticks, roots, rubbish, and other extraneous materials.

B. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.

C. Till soil in beds to a minimum depth of 8 inches (200 mm) and mix with specified soil amendments and fertilizers.

D. Remove soil to a minimum depth of 8 inches (200 mm) and replace with prepared planting soil mixture.

3.6 PLANTING GROUND COVER AND PLANTS

A. Space ground cover and plants as indicated.

B. Dig holes large enough to allow spreading of roots, and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

3.7 MULCHING

A. Mulch backfilled surfaces of pits, trenches, planted areas, and other areas indicated.

B. Weed-Control Barriers: Install the following weed-control barriers according to manufacturer's recommendations, before mulching. Completely cover area to be mulched, lapping edges a minimum of 6 inches (150 mm).

1. Material and Seam Treatment: Composite fabric with seams pinned.

C. Organic Mulch: Apply the following average thickness of organic mulch and finish level with adjacent finish grades. Do not place mulch against trunks or stems.

1. Thickness: 4 inches (100 mm).

3.8 RECONDITIONING LAWNS

A. Recondition existing lawn areas damaged by Contractor's operations, including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required.

1. Recondition other existing lawn areas.

B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

C. Where substantial lawn remains, mow, dethatch, core aerate, and rake. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

D. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of it off the Owner's property.

E. Till stripped, bare, and compacted areas thoroughly to a depth of 6 inches (150 mm).

F. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches (100 mm) of soil. Provide new planting soil as required to fill low spots and meet new finish grades.

G. Apply seed and protect with straw mulch as required for new lawns.

H. Apply sod as required for new lawns.

I. I. Water newly planted areas and keep moist until new grass is established.

3.9 INSTALLATION OF MISCELLANEOUS MATERIALS

A. Apply antidesiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage.

3.10 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition.

B. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 329200

SECTION 329600 - SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Soil Erosion and Sediment Control shall include implementation and maintenance of soil erosion and sediment control devices and construction procedures, as shown on the plans or as directed by the Engineer, which will reduce and prevent soil losses and associated damages from sedimentation during construction of this project.

B. All work will be in conformance with the contract documents and Standards for Soil Erosion and Sediment Control in New Jersey revised and adopted April, 1987, and the latest revisions thereof.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hay bales shall consist of timothy, redtop or native grasses bound together with nylon or wire.

B. Stabilize hay bales with two rebar, steel pickets or two 2”x2” wood stake anchors (length = 1.5’ to 2.0’) as may be required or as directed by the Owner. Contractor shall embed anchors a depth of 4” or as applicable with site conditions to stabilize hay bales. Stone aggregate shall be 1½ - 2” in diameter.

C. All other materials shall be as shown and called for on the plans as “Soil Erosion and Sediment Control Notes & Details”.

PART 3 - EXECUTION

3.1 CONSTRUCTION

The work of soil erosion and sediment controls shall include, but not be limited to the following:

A. All soil erosion and sediment control practices on this project shall be constructed in accordance with the "Standards for Soil Erosion and Sediment Control in New Jersey" or as approved for this project.

1. The smallest practicable area of land shall be exposed at any one time during the project and, whenever feasible, natural vegetation shall be retained and protected. Stripping of vegetation, grading or other soil disturbance shall be completed in a manner which will minimize soil erosion.
2. A schedule of construction operations shall be submitted to the Engineer for his approval including staging areas, stockpile areas and disturbance outside the limits of work. All erosion control devices shall be inspected and maintained periodically.
3. Written notification must be provided to the Ocean County Soil Conservation District 72 hours prior to the start of any land disturbing activity.
4. The Applicant must obtain a district issued report of compliance prior to applying for the municipal certificate of occupancy. Please give the district one-week notice to schedule this inspection.
5. All soil erosion and sediment control devices shall be in place prior to any major soil disturbances or installed and removed in their proper sequence to allow for further operations on the site.
6. All sediment control structures shall be checked and maintained on a regular basis and basins shall be cleaned periodically when storage capacity is affected by siltation.
7. During construction, any additional control measures as deemed necessary to prevent erosion or control sediment beyond those measures shown on the approved plans shall be installed or employed at the direction of the Engineer.
8. After completion of construction, soil and sediment controls shall be left in place until all disturbed areas are stabilized.
9. Disturbed areas shall be maintained in a rough graded condition and temporarily seeded and/or mulched until proper weather conditions exist for the establishment or permanent vegetative cover.
10. All areas disturbed by grading on which permanent or semi-permanent seeding or temporary seeding have not been made and all slopes with a grade steeper than 2:1 shall be treated by mulching. The mulch shall be applied at a rate of 2 TO 2 1/2 tons per acre of equivalent measure, according to State standards.
11. All areas disturbed by grading including soil stockpiles which will not be used or constructed upon for a period greater than 30 days shall be temporarily seeded and protected as required.
12. All areas disturbed by grading which will not be constructed upon within six months are to be stabilized with a permanent type seeding and fertilizing.
13. All disturbed areas shall be treated with 6" of topsoiled, limed and fertilized prior to both temporary and permanent seeding as indicated on plans and in conformance with charts and tables as set forth in the "Standards for Soil Erosion and Sediment Control in New Jersey".

14. A crushed stone wheel cleaning "Tracking Pad" is to be installed at all site exits using 2-1/2 inch stone to a length of at least 50 feet. All driveways must exhibit this item in the drive during construction.
15. All paved roadways must be kept clean at all times. Do not use a fire or garden hose to clean roads unless runoff is directed to a proper sediment basin.
16. All Storm drainage inlets are to be protected by temporary filter devices, as indicated on the plans, to prevent the entry of sediment carried by run-off water until vegetation and/or paving is established as planned.
17. Whenever well points, pumps or other dewatering methods are used, care shall be taken to provide for the elimination of erosion and entrapment of sediment at the outfall of said dewatering.
18. All drainage swales shall be parabolic in shape unless otherwise noted and shall conform to SCS design standards.
19. Drainage swales and other structures shall be located in the field so as to retain as much of the original vegetation as possible, especially large trees.
20. The Contractor shall be responsible to contact and obtain approval from the Soil Conservation District for staging/stockpiling areas over 5,000 square feet.
21. The Contractor must confine all phases of construction work within the permanent and temporary construction easements.
22. The Contractor shall be responsible to secure his own ingress and egress to the construction site. If construction driveways are required, they shall be provided in accordance with the detail. They shall be the width of opening shown on the plans or as required by the Soil Conservation District, a minimum of 50 feet in length and a minimum of one foot deep.
23. The Contractor will strictly adhere to all plans, specifications and details approved by the Soil Conservation District.
24. All erosion and sediment control practices shall be in place prior to any grading operations and installation of proposed structure or utilities.
25. To provide suitable conditions for growth and vegetation and to prevent the acidifying of drainage water in those areas underlain with acid formation having a pH below 4.0 the following requirements shall be met:

    a. Grading shall be such that a minimum of acid formation shall be exposed.
    b. All exposed material shall be covered with a minimum of one foot on non-acid (pH minimum 5.0) soil suitable for plant growth plus 6" of topsoil.

26. Seeded Dates: The following seeding dates are recommended to establish permanent vegetative cover:

    Spring: March 15-May 30
    Fall: August 15-October 15

27. Mulch material shall be unrotted salt hay or small grain straw applied at a rate of at least 2.0 Tons per acre, 90 pounds per 1000 square feet. In no case shall more than five days elapse between seeding and mulching, or by hydroseeding as per the manufacturer's specifications.

28. All damage incurred by erosion shall be rectified immediately by the contractor.

29. All plan revisions must be submitted to the district for proper review.

30. Maximum side slopes shall not exceed 2:1 unless approved by the district.

31. All dewatering operations shall discharge into an approved sediment basin.

32. The district must be notified, in writing, for the sale of any portion of the project or for the sale of any building lots. New Owner's name(s), addresses, and phone numbers shall be provided to the district.

B. All soil erosion and sediment control devices shall be installed prior to any major soil disturbance, or in their proper sequence, and maintained until permanent protection is established. During the length of the entire project, the Contractor shall be responsible for maintaining all soil erosion and sediment control devices in an efficient workable condition.

C. Hay bales shall be replaced as they become filled with silt. Stone at the construction entrances shall be respread as existing stone becomes dirty and covered with silt.

END OF SECTION 329600

SECTION 33 41 00 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes storm drainage outside the building.

1.3 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.

1.4 SUBMITTALS

A. Shop Drawings: Include plans, elevations, details, and attachments for the following:
   1. Precast concrete manholes and other structures, including frames, covers, and grates.
   2. Cast-in-place concrete manholes and other structures, including frames, covers, and grates.
   3. Storm drainage piping materials, cleanouts and bedding.
   4. Connections to existing structures.
   5. Bolted frames, covers and grates.

B. Coordination Drawings: Show manholes and other structures, pipe sizes, locations, and elevations. Include details of underground structures and connections. Show other piping in same trench and clearances from sewerage system piping. Indicate interface and spatial relationship between piping and proximate structures.

C. Design Mix Reports and Calculations: For each class of cast-in-place concrete.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect pipe, pipe fittings, and seals from dirt and damage.

B. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

C. Do not store plastic structures, pipe and fittings in direct sunlight.

1.6 PROJECT CONDITIONS

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.

B. Locate existing structures and piping to be closed and abandoned.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

2.2 PIPES AND FITTINGS

A. High Density Polyethylene Perforated Pipe - AASHTO M 294-94, Type S, O-Ring rubber gasket joints meeting ASTM F477 as specified on the plans or approved equal.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earthwork."

3.2 PIPING INSTALLATION

A. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.

3.3 INSTALLATION, GENERAL

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.

C. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

D. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
   1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.

3.4 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to installations indicated and manufacturer’s specifications.

B. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:
   1. Round Pipe and Fittings: ASTM C 443 (ASTM C 443M), rubber gaskets.

C. High density Polyethylene pipe and fittings as follows:
   1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
   2. Install in accordance with ASTM D 2321 and the manufacturers specifications. .

D. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

3.5 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
   1. In large, accessible piping, brushes and brooms may be used for cleaning.
   2. Place plug in end of incomplete piping at end of day and when work stops.
   3. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
   1. Submit separate reports for each system inspection.
   2. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.

e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

END OF SECTION 33 41 00