SPECIFICATIONS

Volume III of IV
17678 Montgomery Hall Park Pool House and Restrooms

City of Staunton
Park Facilities Improvements
Staunton, Virginia

Prepared for
City of Staunton

T&L Project No. 18861
Document Date: February 20, 2026
Issued for Bids: May 1, 2026

THOMPSON & LITTON EST. 1956

PROJECT MANUAL
Volume III
17678 MONTGOMERY HALL PARK POOL HOUSE AND RESTROOMS

City of Staunton
Park Facilities Improvements
Staunton, Virginia

Prepared For
City of Staunton

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THOMPSON & LITTON

726 Auburn Avenue
Radford, Virginia 24141

T&L Project No. 18861

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City of Staunton Park Facilities Improvements
Staunton, Virginia

For
City of Staunton

T&L Project No. 18861

SEALS PAGE

For Architectural & Life Safety Only

For Civil Engineering Only

For Structural Only

For Mechanical Only

For Electrical Only

City of Staunton Park Facilities Improvements
T&L Project No. 18861

TABLE OF CONTENTS
Volume III

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS – VOLUME I

00 0101	Project Title Page
00 0107	Seals Page
00 0110	Table of Contents
00 0115	Drawings Index
00 0515	VPPA
00 1113	Advertisement for Bids
00 2113	Instructions to Bidders
00 2515	Pre-Bid Question Form
00 4100	Bid Form
00 4313	Bid Bond (AIA A310)
00 4513	Contractor's Qualification Statement (AIA A305)
00 4546.13	Workers' Compensation Certificate (DGS 30-076)
00 4546.16	Certification of Bidder Regarding Debarment
00 5213	Standard Form of Agreement Between Owner & Contractor (AIA A101)
00 5433	Request for Electronic Files Form
00 6113	Performance Bond & Payment Bond (AIA A312)*
00 6275	Payment Application Checklist
00 6276	Application & Certificate for Payment (AIA G702)*
00 6276.10	Continuation Sheet (AIA G703)*
00 6277	Escrow Agreement
00 6313	Request for Information (RFI) Form
00 6325	Request for Substitution Form
00 6333	Architect's Supplemental Instructions (AIA G710)*
00 6346	Construction Change Directive (AIA G714)*
00 6353	Proposal Request (AIA G709)*
00 6363	Change Order (AIA G701)*
00 6516	Certificate of Substantial Completion (AIA G704)*
00 6519.13	Contractor's Affidavit of Payment of Debts & Claims (AIA G706)*
00 6519.16	Contractor's Affidavit of Release of Liens (AIA G706A)*
00 6519.19	Consent of Surety Company to Final Payment (AIA G707)*
00 7210	General Conditions of the Contract for Construction (AIA A201)
00 7310	Supplementary General Conditions

** Asterisks indicate references made to AIA (American Institute of Architects) documents - latest edition, which are hereby made a part of the Contract Documents. All provisions and requirements contained in reference, after being duly executed, shall be considered as part of the Contract Documents, as if bound herein. Copies of the referenced documents are available for review at the office of the Architect. Contractors shall purchase copies from the American Institute of Architects. The original document shall be provided by the Contractor and will be required for the execution of the "Contract".*

SPECIFICATIONS

VOLUME I

DIVISION 01 - GENERAL REQUIREMENTS

01 1000	Summary
01 3000	Administrative Requirements
01 4000	Quality Requirements
01 4533	Code-Required Special Inspections and Procedures
01 5000	Temporary Facilities and Controls
01 6000	Product Requirements
01 7000	Execution and Closeout Requirements
01 7800	Closeout Submittals

VOLUME II – 16472 GYPSY HILL PARK RESTROOM IMPROVEMENTS

DIVISION 02 - EXISTING CONDITIONS

02 4119	Selective Structure Demolition

DIVISION 03 - CONCRETE

03 3000	Cast-In-Place Concrete

DIVISION 04 - MASONRY

04 2000	Unit Masonry

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 1000	Rough Carpentry
06 1753	Shop-Fabricated Wood Trusses
06 6100	Cast Polymer Fabrications

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 2500 Weather Barriers

07 4113 Metal Roof Panels

07 9200 Joint Sealants

DIVISION 08 - OPENINGS

08 1113 Hollow Metal Doors and Frames

08 7100 Door Hardware

DIVISION 09 - FINISHES

09 2116 Gypsum Board Assemblies

09 9120 Painting

DIVISION 10 - SPECIALTIES

10 1400 Signage

10 2113.13 Metal Toilet Compartments

10 2800 Toilet, Bath, and Laundry Accessories

DIVISION 31 - EARTHWORK

31 1000 Site Clearing

31 2200 Grading

31 2316 Excavation

31 2316.13 Trenching

31 2323 Fill

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 1123 Aggregate Base Courses

32 1216 Asphalt Paving

32 9219 Seeding

DIVISION 33 - UTILITIES

33 1116 Water Utility Distribution Piping

33 1300 Disinfecting Of Water Utility Distribution

33 3111 Sanitary Utility Sewerage Piping

33 4111 Storm Utility Drainage Piping

VOLUME III – 17678 MONTGOMERY HALL PARK POOL HOUSE AND RESTROOMS

DIVISION 02 - EXISTING CONDITIONS

02 4119 Selective Structure Demolition

DIVISION 03 - CONCRETE

03 3000 Cast-In-Place Concrete

DIVISION 04 - MASONRY

04 2000 Unit Masonry

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 1000 Rough Carpentry

06 1753 Shop-Fabricated Wood Trusses

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 2500 Weather Barriers

07 3113 Asphalt Shingles

07 4646 Fiber-Cement Siding

07 7123 Manufactured Gutters and Downspouts

07 9200 Joint Sealants

DIVISION 08 - OPENINGS

08 1113 Hollow Metal Doors and Frames

08 7100 Door Hardware

DIVISION 09 - FINISHES

09 2116 Gypsum Board Assemblies

DIVISION 10 - SPECIALTIES

10 1400 Signage

10 2113.13 Metal Toilet Compartments

10 2800 Toilet, Bath, and Laundry Accessories

DIVISION 31 - EARTHWORK

31 1000 Site Clearing

31 2200 Grading

31 2316 Excavation

31 2316.13 Trenching

31 2323 Fill

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 1123 Aggregate Base Courses

32 1723.13 Painted Pavement Markings

32 9219 Seeding

DIVISION 33 - UTILITIES

33 1116 Water Utility Distribution Piping

33 1300 Disinfecting Of Water Utility Distribution

33 4111 Storm Utility Drainage Piping

VOLUME IV – 17679 GYPSY HILL PARK PUMP HOUSE RENOVATIONS BID ALTERNATE NO. 1

DIVISION 02 - EXISTING CONDITIONS

02 4119 Selective Structure Demolition

DIVISION 03 - CONCRETE

03 3000 Cast-In-Place Concrete

DIVISION 04 - MASONRY

04 2000 Unit Masonry

DIVISION 05 - METALS

05 4000 Cold-Formed Metal Framing

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 1000 Rough Carpentry

06 1753 Shop-Fabricated Wood Trusses

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 1400 Fluid-Applied Waterproofing

07 2500 Weather Barriers

07 4113 Metal Roof Panels

07 9200 Joint Sealants

DIVISION 08 - OPENINGS

08 1213 Hollow Metal Frames

08 1416 Flush Wood Doors

08 4313 Aluminum-Framed Storefronts

08 7100 Door Hardware

DIVISION 09 - FINISHES

09 2116 Gypsum Board Assemblies

09 9120 Painting

DIVISION 10 - SPECIALTIES

10 1400 Signage

10 2113.13 Metal Toilet Compartments

10 2800 Toilet, Bath, and Laundry Accessories

DIVISION 31 - EARTHWORK

31 1000 Site Clearing

31 2200 Grading

31 2316 Excavation

31 2316.13 Trenching

31 2323 Fill

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 1123 Aggregate Base Courses

32 1216 Asphalt Paving

32 9219 Seeding

DIVISION 33 - UTILITIES

33 1116 Water Utility Distribution Piping

33 1300 Disinfecting Of Water Utility Distribution

33 3111 Sanitary Utility Sewerage Piping

33 4111 Storm Utility Drainage Piping

SECTION 02 4119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of the existing building.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Reinstall: Detach items from existing construction, protect, store and prepare them for reuse, and reinstall them where indicated.

C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes, if any.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5 PROJECT CONDITIONS

A. The building will be occupied in the areas immediately adjacent to the selective demolition areas. Conduct selective demolition so the buildings main tenant operations will not be disrupted.

B. Conditions existing at the time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the Architect and Owner. Owner will remove hazardous materials under a separate contract.

E. Storage or sale of removed items or materials on site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged. See Architectural drawings for process by which items can be removed from the site.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

F. Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated Utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris removal operations to ensure minimum interference with adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Division 01.

3.4 TEMPORARY FACILITIES

A. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent areas of the building and the site.

B. General: Demolish and remove existing construction only to the extent required by new construction and as indicated on the drawings. Use methods required to complete the work within limitations of governing regulations and as follows:

1. 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, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain. All concrete cutting and other cutting shall occur after normal business hours.

2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

3. 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.

4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

5. Dispose of demolished items and materials promptly.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused or reinstalled, remove demolished materials from project site and legally dispose of them in an EPA approved landfill.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean the area effected of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete formwork.

B. Floors and slabs on grade.

C. Concrete reinforcement.

D. Joint devices associated with concrete work.

E. Concrete curing.

1.2 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.3 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Structural Concrete; 2016.

D. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

F. ACI 305R - Guide to Hot Weather Concreting; 2010.

G. ACI 306R - Guide to Cold Weather Concreting; 2016.

H. ACI 308R - Guide to External Curing of Concrete; 2016.

I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2017).

J. ACI 347R - Guide to Formwork for Concrete; 2014.

K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.

L. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.

M. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2017.

N. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

O. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).

P. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2017b.

Q. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2017a.

R. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.

S. ASTM C150/C150M - Standard Specification for Portland Cement; 2017.

T. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.

U. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete; 2025.

V. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

W. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

X. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019.

Y. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2019.

Z. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.

AA. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004, with Editorial Revision (2013).

BB. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011 (Reapproved 2017).

CC. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

C. Mix Design: Submit proposed concrete mix design.

1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.

2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

3. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

a. Indicate amount of mixing water to be withheld for later addition at Project site.

D. Test Reports: Submit report for each test or series of tests specified.

E. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

G. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.5 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

D. 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.

E. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

F. Testing Agency Qualifications: An independent agency,acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field--Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

G. 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.

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

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.

2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 PRODUCTS

2.1 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

1. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.

2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.

2.2 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Type: Deformed billet-steel bars.

2. Finish: Unfinished, unless otherwise indicated.

B. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I or II Portland type.

1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

1. Acquire aggregates for entire project from same source.

C. Fly Ash: ASTM C618, Class F. Fly ash shall not exceed 25 percent by weight of total cementitious material.

D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.4 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

G. Accelerating Admixture: ASTM C494/C494M Type C.

H. Retarding Admixture: ASTM C494/C494M Type B.

I. Water Reducing Admixture: ASTM C494/C494M Type A.

J. Shrinkage Reducing Admixture:

1. ASTM C494/C494M, Type S.

2.5 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.

1. Permeance: 0.010 perms, maximum when test in accordance with ASTM F1249.

2. Thickness: 15 mil.

3. Installation: Comply with ASTM E1643.

4. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.

2.6 BONDING AND JOINTING PRODUCTS

A. Epoxy Bonding System:

1. Complying with ASTM C881/C881M and of Type required for specific application.

B. Slab Isolation Joint Filler: 3/4 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.

1. Material: ASTM D1751, cellulose fiber.

C. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

1. Height: To suit slab thickness.

2.7 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.

B. Resin Curing Compound: Solvent-based liquid, white pigmented, membrane-forming.

1. For use on exterior slabs. When slab will be painted, sealed, topped, or receive other applied finish, completely remove curing compound after curing is complete and before finish coatings are applied.

2. Comply with ASTM C309, Type 2, Classes A and B.

3. VOC Content: Less than 350 g/L.

C. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.

D. Moisture-Retaining Sheet: ASTM C171.

1. Curing paper, regular.

2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

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

F. Water: Potable, not detrimental to concrete.

2.8 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

1. For trial mixtures method, employ independent testing agency acceptable to Architect/Engineer for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Normal Weight Concrete:

1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.

2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.

3. Water-Cement Ratio: Maximum 40 percent by weight.

4. Maximum Aggregate Size: 3/4 inch.

E. Interior Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum Water-Cemntitious Materials Ratio: 0.45.

3. Slump Limit: 4 inches, plus or minus 1 inch.

4. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

F. Exterior Slabs-on-Grade, Concrete Rigid Pavement and : Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 5000 psi at 28 days.

2. Maximum Water-Cemntitious Materials Ratio: 0.45.

3. Slump Limit: 4 inches, plus or minus 1 inch.

4. Air Content: 5 percent plus or minus 1 percent at point of delivery for 1-inch nominal maximum aggregate size, determined in accordance with ASTM C173/C173M.

G. Foundations: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.

2. Maximum Water-Cemntitious Materials Ratio: 0.50.

3. Slump Limit: 4 inches, plus or minus 1 inch.

4. Air Content: Air-entrainment not required.

2.9 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.

1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

E. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.4 PLACING CONCRETE

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect and water has been withheld at ready-mix plant. Amount of water withheld shall be indicated on the mix delivery ticket.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 and Paragraph 3.4.B above.

D. Place concrete in accordance with ACI 304R.

E. Place concrete for floor slabs in accordance with ACI 302.1R.

F. Notify testing agency not less than 24 hours prior to commencement of placement operations.

G. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

H. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

I. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.

   2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

   3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

J. 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 bleed water appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

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

   1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

L. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is included in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

3.5 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

2. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

3. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

D. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints and cut at least 1 inch deep into concrete, when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

2. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

E. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 07 9200 "Joint Sealants," are indicated.

3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

F. Align sidewalk joints.

1. Place 1/2 inch wide expansion joints at 30 foot intervals and to separate sidewalks and curbs from vertical surfaces and other components and in pattern indicated.

a. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.

b. Secure to resist movement by wet concrete.

2. Provide scored joints.

a. At 6 feet intervals.

3.6 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:

1. Exposed Concrete Floors: 1/4 inch in 10 feet.

B. Correct the slab surface if tolerances are less than specified.

C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.7 CONCRETE FINISHING

A. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:

1. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

B. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

3.8 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

1. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

2. 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.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than seven days.

C. Surfaces Not in Contact with Forms:

1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.

a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.

b. Spraying: Spray water over floor slab areas and maintain wet.

c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.

2. Final Curing: Begin after initial curing but before surface is dry.

a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

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.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

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.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a 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. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

5. 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.

3.9 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.10 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Inspections:

1. Steel reinforcement placement.

2. Verification of use of required design mixture.

3. Concrete placement, including conveying and depositing.

4. Curing procedures and maintenance of curing temperature.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

2. Slump: ASTM C143/C143M ; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C31/C31M

a. Cast and laboratory cure three sets of three standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C39/C39M ; test one set of three laboratory-cured specimens at 7 days and one set of three specimens at 28 days. Hold third set of three specimens for testing at 56 days. Testing at 56 days not required if compressive strength at 28 days exceeds required compressive strength.

a. A compressive-strength test shall be the average compressive strength from a set of a minimum of two specimens obtained from same composite sample and tested at age indicated.

7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

8. Test results shall be reported in writing to Architect/Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect/Engineer.

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

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

E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

F. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.

G. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.11 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect/Engineer and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect/Engineer. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

3.12 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

B. Protect installed products until completion of project.

C. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 04 2000 - UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete block.

B. Mortar and grout.

C. Reinforcement and anchorage.

D. Flashings.

E. Lintels.

F. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.

B. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.

C. Section 07 2500 - Weather Barriers: Water-resistive barriers or air barriers applied to the exterior face of the backing sheathing or masonry.

D. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2016.

B. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019 (Reapproved 2025).

C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

D. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.

F. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2018.

G. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.

H. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.

I. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.

J. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2017a.

K. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.

M. ASTM C476 - Standard Specification for Grout for Masonry; 2016.

N. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2017.

O. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2016.

P. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

Q. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.

R. BIA Technical Notes No. 28B - Brick Veneer/Cold-Formed Steel Framed Walls; 2025.

S. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.

T. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:

1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8 inches.

2. Load-Bearing Units: ASTM C90, normal weight.

    a. Hollow block, as indicated.

3. Non-Loadbearing Units: ASTM C129.

a. Hollow block, as indicated.

b. Normal weight.

2.2 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C91/C91M, Type S.

B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.

C. Grout Aggregate: ASTM C404.

D. Water: Clean and potable.

E. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.

1. Type: Type S.

2. Color: Standard gray.

F. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.

1. Type: Fine.

2.3 REINFORCEMENT AND ANCHORAGE

A. Single Wythe Joint Reinforcement: ASTM A951/A951M.

1. Type: Truss.

2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.

3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.

2.4 FLASHINGS

A. Metal Flashing Materials:

1. Stainless Steel Flashing: ASTM A666/A666M, Type 304, soft temper; 26 gage, 0.0187 inch thick; finish 2B to 2D.

B. Copper/Polymer Film or Fabric Flashing - Self-Adhering: 3 oz/sq ft copper sheet bonded on inward facing side to a sheet of polymer or fiberglass fabric that has a clear adhesive with a removable release liner.

C. Stainless Steel/Polymer Fabric Flashing - Self-adhering: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on inward facing side to a sheet of polymer fabric that has a clear adhesive with a removable release liner.

D. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.

E. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.

F. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.5 ACCESSORIES

A. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.

1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.

B. Weeps:

C. Type: Polyester mesh.

D. Color(s): As selected by Architect/Engineer from manufacturer's full range.

E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.6 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.

1. Masonry below grade and in contact with earth: Type S.

2. Exterior, loadbearing masonry: Type N.

B. New Mortar for Old Brick: Proportion by volume only; no more than 20 percent of the total volume of Portland cement and lime combined to be Portland cement.

1. Repointing Mortar: Use proportions from 1 part lime to 2 parts sand with no Portland cement, up to 2 parts Portland cement to 3 parts lime to 6 parts sand.

C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

D. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:

1. Bond: Running.

2. Coursing: One unit and one mortar joint to equal 8 inches.

3. Mortar Joints: Concave.

3.5 PLACING AND BONDING

A. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

B. Remove excess mortar and mortar smears as work progresses.

C. Interlock intersections and external corners, except for units laid in stack bond.

3.6 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

3.7 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions.

D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.8 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.9 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

1. Remove or cover protrusions or sharp edges that could puncture flashings.

2. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Terminate flashing up 8 inches minimum on vertical surface of backing:

1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.

2. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer’s directions.

3. Anchor vertical leg of flashing into backing with a termination bar and sealant.

4. Apply cap bead of sealant on top edge of self-adhered flashing.

C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.

D. Extend metal flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.

E. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.10 GROUTED COMPONENTS

A. Reinforce bond beams with 2, bars, 1 inch from bottom web.

B. Place and consolidate grout fill without displacing reinforcing.

C. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.11 TOLERANCES

A. Install masonry within the site tolerances found in TMS 402/602.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

3.12 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 FIELD QUALITY CONTROL

A. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67/C67M requirements, sampling 5 randomly chosen units for each 50,000 installed.

B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.

C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.14 CLEANING

A. Remove excess mortar and mortar droppings.

B. Clean soiled surfaces with cleaning solution.

3.15 PROTECTION

END OF SECTION

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SECTION 06 1000 - ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sheathing.

B. Underlayment.

C. Roof sheathing with factory applied roofing underlayment.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

B. AWPA U1 - Use Category System: User Specification for Treated Wood; 2017.

C. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.

D. PS 20 - American Softwood Lumber Standard; 2015.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

1.5 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.

2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.2 CONSTRUCTION PANELS

A. Roof Sheathing: Oriented strand board wood structural panel; PS 2.

1. Grade: Structural 1 Sheathing.
2. Bond Classification: Exposure 1.
3. Performance Category: 5/8 PERF CAT.
4. Span Rating: 40/20.
5. Edges: Square.

B. Wall Sheathing: Any PS 2 type.

1. Bond Classification: Exterior.
2. Grade: Structural I Sheathing.
3. Span Rating: 24.
4. Performance Category: 5/16 PERF CAT.
5. Edge Profile: Square edge.

2.3 ACCESSORIES

A. Fasteners and Anchors:

1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

B. Building Paper: Water resistant Kraft paper.

2.4 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:

1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    b. Treat lumber in contact with roofing or flashing.
    c. Treat lumber in contact with masonry or concrete.
2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.

a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.

b. Treat plywood in contact with roofing or flashing.

c. Treat plywood in contact with masonry or concrete.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.2 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. Provide the following specific non-structural framing and blocking:

1. Wall brackets.

2. Wall paneling and trim.

3.3 INSTALLATION OF CONSTRUCTION PANELS

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.

3.4 CLEANING

A. Waste Disposal:

1. Comply with applicable regulations.

2. Do not burn scrap on project site.

3. Do not burn scraps that have been pressure treated.

4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

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SECTION 06 1753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated wood trusses for roof framing.

B. Bridging, bracing, and anchorage.

1.2 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Installation requirements for miscellaneous framing and sheathing.

B. Section 06 1000 - Rough Carpentry: Material requirements for blocking, bridging, plates, and miscellaneous framing.

1.3 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.

B. SPIB (GR) - Grading Rules; 2014.

C. TPI 1 - National Design Standard for Metal-Plate-Connected Wood Truss Construction; 2014.

D. TPI BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses; 2015.

E. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses; 1989.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on plate connectors, bearing plates, and metal bracing components.

C. Shop Drawings: Show truss configurations, sizes, spacing, size and type of plate connectors, cambers, framed openings, bearing and anchor details, and temporary & permanent bridging & bracing.

1. Include identification of engineering software used for design.

2. Submit design calculation sealed by design engineer.

D. Designer's Qualification Statement.

1.5 QUALITY ASSURANCE

A. Designer Qualifications: Perform design by or under direct supervision of a Professional Engineer experienced in design of this Work and licensed in the Commonwealth of Virginia.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and erect trusses in accordance with TPI BCSI 1.

B. Store trusses in vertical position resting on bearing ends.

PART 2 PRODUCTS

2.1 TRUSSES

A. Wood Trusses: Designed and fabricated in accordance with TPI 1 and TPI DSB-89 to achieve structural requirements indicated.

1. Species and Grade: Southern Pine, SPIB (GR) Grade No. 2 or better.

2. Connectors: Steel plate.

3. Structural Design: Comply with 2018 Virginia Building Code for structural loading criteria and loads indicated.

4. Roof Deflection: 1/240, maximum.

2.2 MATERIALS

A. Lumber:

1. Moisture Content: Between 7 and 9 percent.

2. Lumber fabricated from old growth timber is not permitted.

B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G60/Z180 coating; die stamped with integral teeth; thickness as indicated.

C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.3 ACCESSORIES

A. Wood Blocking, Bridging, Plates, and Miscellaneous Framing: Softwood lumber, any species, construction grade, 19 percent maximum and 7 percent minimum moisture content.

B. Fasteners: Plain steel, type to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that supports and openings are ready to receive trusses.

3.2 PREPARATION

A. Coordinate placement of bearing items.

3.3 ERECTION

A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and TPI BCSI 1; maintain a copy of each TPI document on site until installation is complete.

B. Set members level and plumb, in correct position.

C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Do not field cut or alter structural members without approval of Architect/Engineer.

E. Install permanent bridging and bracing.

F. Install headers and supports to frame openings required.

G. Frame openings between trusses with lumber in accordance with Section 06 1000.

H. Coordinate placement of decking with work of this section.

3.4 TOLERANCES

A. Framing Members: 1/2 inch maximum, from true position.

END OF SECTION

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SECTION 07 2500 - WEATHER BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.

1.2 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing building expansion joints.

1.3 REFERENCE STANDARDS

A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2017.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on material characteristics.

PART 2 PRODUCTS

2.1 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

A. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.

1. Air Barrier Coating:

a. Material: Silica-fortified rubber.

b. Dry Film Thickness (DFT): 10 mil, 0.010 inch, minimum.

c. Air Permeance: 0.001 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.

d. Water Vapor Permeance: 18 perms, minimum, when tested in accordance with ASTM E96/E96M, Procedure B.

e. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to six months of weather exposure after application.

f. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.

g. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

h. Complies with NFPA 285 wall assembly requirements.

i. Nail Sealability: Pass, when tested in accordance with ASTM D1970/D1970M.

j. VOC Content: 100 g per L or less.

k. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.

l. Sealants, Tapes and Accessories: As recommended by coating manufacturer.

m. Manufacturers:

1) 3M Company: www.3M.com/construction/#sle.

2) BASF Corporation; MasterSeal AWB 660: www.master-builders-solutions.basf.us/#sle.

3) Dow Chemical Company; DOWSIL DefendAir 200: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.

4) DuPont Building Innovations; Tyvek Fluid Applied WB+ with Tyvek Fluid Applied Flashing and Joint Compound, Sealant for Tyvek Fluid Applied System and StraightFlash: www.dupont.com/#sle.

2.2 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.

B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.

C. Flexible Flashing: Sheathing fabric saturated with air barrier coating and complying with the applicable requirements of ICC-ES AC148.

PART 3 EXECUTION

3.1 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.2 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

3.3 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 3113 - ASPHALT SHINGLES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Asphalt shingle roofing.

B. Flexible sheet membranes for eave protection, underlayment, and valley protection.

C. Associated metal flashings and accessories.

1.2 RELATED REQUIREMENTS

A. Section 07 7123 - Manufactured Gutters and Downspouts.

1.3 REFERENCE STANDARDS

A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2017.

B. ASTM D3161/D3161M - Standard Test Method for Wind Resistance of Steep Slope Roofing Products (Fan-Induced Method); 2020 (Reapproved 2025).

C. ASTM D3462/D3462M - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules; 2023.

D. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007, with Editorial Revision (2012).

E. ASTM D6380/D6380M - Standard Specification for Asphalt Roll Roofing (Organic Felt); 2003, with Editorial Revision (2013).

F. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2017.

G. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2017.

H. ICC-ES AC188 - Acceptance Criteria for Roof Underlayments; 2012, with Editorial Revision (2015).

I. NRCA (RM) - The NRCA Roofing Manual; 2018.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating material characteristics.

C. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 FIELD CONDITIONS

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide lifetime manufacturer's warranty for coverage against black streaks caused by algae.

PART 2 PRODUCTS

2.1 ASPHALT SHINGLES

A. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D3462/D3462M.

1. Fire Resistance: Class A, complying with ASTM E108.

2. Wind Resistance: Class F, when tested in accordance with ASTM D3161/D3161M.

3. Algae Resistant.

4. Self-sealing type.

5. Style: Laminated overlay.

6. Color: As selected by Architect.

2.2 SHEET MATERIALS

A. Smooth Surfaced Roll Roofing: Asphalt-coated organic felt, with smooth asphalt coating both sides, complying with ASTM D6380/D6380M, Class S, Type III, 51.1 lb/100 sq ft.

B. Eave Protection Membrane:

C. Eave Protection Membrane: Self-adhering polymer-modified asphalt sheet complying with ASTM D1970/D1970M; 40 mil total thickness; with strippable treated release paper and polyethylene sheet top surface.

D. Underlayment: Synthetic non-asphaltic sheet, intended by manufacturer for mechanically fastened roofing underlayment without sealed seams.

1. Type: Woven polypropylene with anti-slip polyolefin coating on both sides.

2. Minimum Requirements: Comply with requirements of ICC-ES AC188 for non-self-adhesive sheet.

3. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.

4. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.

5. Fasteners: As recommended by manufacturer or building code qualification report or approval.

2.3 ACCESSORIES

A. Roofing Nails: Standard round wire shingle type, galvanized steel, stainless steel, aluminum roofing nails, or copper roofing nails, minimum 3/8 inch head diameter, 12 gage, 0.109 inch nail shank diameter, 1-1/2 inch long and complying with ASTM F1667.

B. Plastic Cement: ASTM D4586/D4586M, asphalt roof cement.

C. Lap Cement: Fibrated cutback asphalt type, recommended for use in application of underlayment, free of toxic solvents.

D. Plastic Ridge Vents: Extruded plastic with vent openings that do not permit direct water or weather entry; flanged to receive shingles.

2.4 METAL FLASHINGS

A. Metal Flashings: Provide sheet metal eave edge, gable edge, ridge, ridge vents, open valley flashing, and other flashing indicated.

1. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

2. Hem exposed edges of flashings minimum 1/4 inch on underside.

B. Aluminum Sheet Metal: Prefinished aluminum, 26 gage, 0.017 inch minimum thickness; stucco embossed, PVC coating.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

3.2 PREPARATION

A. Seal roof deck joints wider than 1/16 inch as recommended by shingle manufacturer.

B. At areas where eave protection membrane is to be adhered to substrate, fill knot holes and surface cracks with latex filler.

C. Broom clean deck surfaces before installing underlayment or eave protection.

D. Install eave edge flashings tight with fascia boards, weather lap joints 2 inches and seal with plastic cement, and secure flange with nails spaced on center.

3.3 INSTALLATION - EAVE PROTECTION MEMBRANE

A. Install eave protection membrane from eave edge to minimum 4 ft up-slope beyond interior face of exterior wall.

B. Install eave protection membrane in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

3.4 INSTALLATION - UNDERLAYMENT

A. Underlayment At Roof Slopes Up to 4:12: Install two layers of underlayment over area not protected by eave protection, with ends and edges weather lapped minimum 4 inches, stagger end laps of each consecutive layer, and nail in place.

B. Underlayment At Roof Slopes Greater Than 4:12: Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches, stagger end laps of each consecutive layer, nail in place, and weather lap minimum 4 inches over eave protection.

C. Weather lap and seal watertight with plastic cement any items projecting through or mounted on roof.

3.5 INSTALLATION - VALLEY PROTECTION

A. Install flexible flashing in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Weather lap joints minimum 2 inches.

C. Nail in place minimum 18 inches on center, 1 inch from edges.

3.6 INSTALLATION - METAL FLASHING AND ACCESSORIES

A. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.

B. Secure in place with nails at on center, and conceal fastenings.

C. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

3.7 INSTALLATION - SHINGLES

A. Install shingles in accordance with manufacturer's instructions manufacturer's instructions and NRCA (RM) applicable requirements.

1. Fasten individual shingles using two nails per shingle, or as required by manufacturer and local building code, whichever is greater.

2. Fasten strip shingles using four nails per strip, or as required by manufacturer and local building code, whichever is greater.

B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce double thickness over full roof area, and provide double course of shingles at eaves.

C. Project first course of shingles 3/4 inch beyond fascia boards.

D. Extend shingles 1/2 inch beyond face of gable edge fascia boards.

E. Extend shingles on one slope across valley and fasten, trim shingles from other slope 2 inches from valley center line to achieve closed cut valley, and concealing valley protection.

F. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counterflashings.

G. Complete installation to provide weather tight service.

3.8 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION

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SECTION 07 4646 - FIBER-CEMENT SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiber-cement siding.

1.2 RELATED REQUIREMENTS

A. Section 07 2500 - Weather Barriers: Weather barrier under siding.

PART 2 PRODUCTS

2.1 FIBER-CEMENT SIDING

A. Lap Siding: Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying to ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.

1. Style: Standard lap style.
2. Texture: Smooth.
3. Length: 12 ft, nominal.
4. Width (Height): 5-1/4 inches.
5. Thickness: 5/16 inch, nominal.
6. Finish: Factory applied topcoat.
7. Color: As selected by Architect/Engineer from manufacturers full range of available colors.
8. Warranty: 50 year limited; transferable.
9. Manufacturers:
    a. Allura, a division of Plycem USA, Inc: www.allurausa.com.
    b. James Hardie Building Products, Inc: www.jameshardie.com.
    c. Substitutions: See Section 01 6000 - Product Requirements.

2.2 ACCESSORIES

A. Trim: Same material and texture as siding.

B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate minimum 1-1/4 inch.

C. Sealant: Elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Do not begin until unacceptable conditions have been corrected.

C. If substrate preparation is responsibility of another installer, notify Architect/Engineer of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Install Sheet Metal Flashing:

1. Above door and window trim and casings.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations.

1. Read warranty and comply with terms necessary to maintain warranty coverage.

2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.

3. Use trim details indicated on drawings.

4. Touch up field cut edges before installing.

5. Pre-drill nail holes if necessary to prevent breakage.

B. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.

C. Do not install siding less than 6 inches from surface of ground nor closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.

D. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

3.4 PROTECTION

A. Protect installed products until Date of Substantial Completion.

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

END OF SECTION

SECTION 07 7123 - MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pre-finished aluminum gutters and downspouts.

B. Precast concrete splash pads.

1.2 REFERENCE STANDARDS

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on prefabricated components.

C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.

B. Prevent contact with materials that could cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.1 MATERIALS

A. Pre-Finished Aluminum Sheet: ASTM B209 (ASTM B209M); 0.032 inch thick.

1. Finish: Plain, shop pre-coated with modified silicone coating.

2. Color: As selected from manufacturer's standard colors.

2.2 COMPONENTS

A. Gutters: CDA rectangular style profile.

B. Downspouts: CDA Rectangular profile.

C. Connectors: Furnish required connector pieces for PVC (polyvinyl chloride) components.

D. Anchors and Supports: Profiled to suit gutters and downspouts.

1. Anchoring Devices: In accordance with CDA requirements.

2. Gutter Supports: Brackets.

3. Downspout Supports: Brackets.

E. Fasteners: Galvanized steel , with soft neoprene washers.

2.3 ACCESSORIES

A. Splash Pads: Precast concrete type, size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

B. Downspout Boots: Cast iron; ASTM A48.

2.4 FABRICATION

A. Form gutters and downspouts of profiles and size indicated.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.5 FINISHES

A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that surfaces are ready to receive work.

3.2 PREPARATION

A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.3 INSTALLATION

A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.

B. Slope gutters 1/8 inch per foot minimum.

C. Connect downspouts to downspout boots at 6 inches above grade. Grout connection watertight.

D. Connect downspouts to storm sewer system. Where indicated on the drawings. Seal connection watertight.

END OF SECTION

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SECTION 07 9200 - JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.2 RELATED REQUIREMENTS

A. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.

1.3 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

D. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).

E. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.

2. List of backing materials approved for use with the specific product.

3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.

4. Substrates the product should not be used on.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.5 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.

1. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.

2. Pecora Corporation: www.pecora.com/#sle.

3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

4. Sika Corporation: www.usa-sika.com/#sle.

5. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.

2.2 JOINT SEALANT APPLICATIONS

A. Scope:

1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.

a. Wall expansion and control joints.

b. Joints between door, window, and other frames and adjacent construction.

c. Joints between different exposed materials.

d. Openings below ledge angles in masonry.

e. Other joints indicated below.

2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.

a. Joints between door, window, and other frames and adjacent construction.

b. Other joints indicated below.

B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.

C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

1. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.

2. Floor Joints in Wet Areas: Non-sag polyurethane "non-traffic-grade" sealant suitable for continuous liquid immersion.

3. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; clear.

D. Interior Wet Areas: restrooms; fixtures in wet areas include plumbing fixtures and countertops.

2.3 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

2.4 NONSAG JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 50 percent, minimum.

2. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.

1. Color: Clear.

C. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.

D. Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.

1. Movement Capability: Plus and minus 25 percent, minimum.

2. Hardness Range: 40 to 50, Shore A, when tested in accordance with ASTM C661.

3. Color: Match adjacent finished surfaces.

2.5 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.

2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.

3. Open Cell: 40 to 50 percent larger in diameter than joint width.

4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.2 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.3 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install bond breaker backing tape where backer rod cannot be used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION

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SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Thermally insulated hollow metal doors with frames.

1.2 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware.

B. Section 09 9113 - Exterior Painting: Field painting.

1.3 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2017.

H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

L. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:

1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.

2. Accessibility: Comply with ICC A117.1 and ADA Standards.

3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.

4. Door Edge Profile: Manufacturers standard for application indicated.

5. Typical Door Face Sheets: 2-panel embossed doors. Refer to drawings for elevation. .

6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.

    a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the

requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.2 HOLLOW METAL DOORS

A. Door Finish: Factory primed and field finished.

B. Exterior Doors: Thermally insulated.

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).

a. Level 1 - Standard-duty.

b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.

c. Model 2-panel embossed.

d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.

e. Zinc Coating: A-40 galvannealed coating; ASTM A653/A653M.

2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.

a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.

3. Door Thickness: 1-3/4 inch, nominal.

2.3 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. Exterior Door Frames: Knock-down type.

1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.

2. Frame Metal Thickness: 18 gage, 0.042 inch, minimum.

3. Weatherstripping: Separate, see Section 08 7100.

D. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.

2.4 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

B. Field Finish: Color to be selected by Owner.

C. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

2.5 ACCESSORIES

A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.

1. Style: Standard straight slat blade.

2. Louver Size: As indicated on the drawings.

B. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.

C. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Coordinate frame anchor placement with wall construction.

C. Install door hardware as specified in Section 08 7100.

3.4 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.5 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.6 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 7100 - DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hardware for hollow metal doors.

B. Thresholds.

C. Weatherstripping and gasketing.

1.2 RELATED REQUIREMENTS

A. Section 06 2000 - Finish Carpentry: Wood door frames.

B. Section 07 9200 - Joint Sealants: Sealants for setting exterior door thresholds.

C. Section 08 1113 - Hollow Metal Doors and Frames.

1.3 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. BHMA A156.1 - American National Standard for Butts and Hinges; 2016.

C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2017.

D. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.

E. BHMA A156.6 - American National Standard for Architectural Door Trim; 2015.

F. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2015.

G. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2013.

H. BHMA A156.18 - American National Standard for Materials and Finishes; 2016.

I. BHMA A156.21 - American National Standard for Thresholds; 2014.

J. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2017.

K. BHMA A156.26 - American National Standard for Continuous Hinges; 2012.

L. BHMA A156.36 - Auxiliary Locks; 2020.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.

1. Provide complete description for each door listed.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.

1. Closers: Five years, minimum.

2. Locksets and Cylinders: Three years, minimum.

3. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.1 DESIGN AND PERFORMANCE CRITERIA

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Provide door hardware products that comply with the following requirements:

1. Applicable provisions of federal, state, and local codes.

2.2 HINGES

A. Hinges: Comply with BHMA A156.1, Grade 1.

1. Continuous Hinges: Comply with BHMA A156.26.

2. Provide hinges on every swinging door.

2.3 LOCK CYLINDERS

A. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.

1. Provide cylinders from same manufacturer as locking device.

2. Provide cams and/or tailpieces as required for locking devices.

2.4 CYLINDRICAL LOCKS

A. Manufacturers:

1. Corbin Russwin, Sargent, or Yale; an Assa Abloy Group company: www.assaabloydss.com/#sle.

2. Best, dormakaba Group: www.bestaccess.com/#sle.

3. Schlage, an Allegion brand: www.allegion.com/us/#sle.

B. Cylindrical Locks (Bored): Comply with BHMA A156.2, Grade 1, 4000 Series.

1. Bored Hole: 2-1/8 inch diameter.

2. Latchbolt Throw: 1/2 inch, minimum.

3. Backset: 2-3/4 inch unless otherwise indicated.

4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.

a. Finish: To match lock or latch.

2.5 AUXILIARY LOCKS (DEADLOCKS)

A. Auxiliary Locks (Deadlocks): Comply with BHMA A156.36, Grade 1.

1. Type: Bored (cylindrical).

2. Application: Bored.

3. Backset: 2-3/4 inch, unless otherwise indicated.

4. Bolt Throw: 1/2 inch, with latch made of hardened steel.

2.6 DOOR PULLS AND PUSH PLATES

A. Door Pulls and Push Plates: Comply with BHMA A156.6.

1. Pull Type: Straight, unless otherwise indicated.

2. Push Plate Type: Flat, with square corners, unless otherwise indicated.

a. Edges: Beveled, unless otherwise indicated.

3. Material: Aluminum, unless otherwise indicated.

2.7 CLOSERS

A. Manufacturers; Surface Mounted:

1. Corbin Russwin, Norton, Rixson, Sargent, or Yale; an Assa Abloy Group company: www.assaabloydss.com/#sle.

2. DORMA USA, Inc; 7400 Series, 8600 Series, 8900 Series, and TS93: www.dorma.com/#sle.

B. Closers: Comply with BHMA A156.4, Grade 1.

1. Type: Surface mounted to door.

2. Provide door closer on each exterior door.

3. At outswinging exterior doors, mount closer on interior side of door.

2.8 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders (Door Checks): Comply with BHMA A156.8, Grade 1.

1. Provide stop for every swinging door, unless otherwise indicated.

2.9 KICK PLATES

A. Kick Plates: Provide along bottom edge of push side of every door with closer.

1. Size: 8 inch high by 2 inch less door width (LDW) on push side of door.

2.10 WALL STOPS

A. Manufacturers:

1. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.

B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.

1. Type: Bumper, concave, wall stop.

2. Material: Aluminum housing with rubber insert.

2.11 THRESHOLDS

A. Manufacturers:

1. Pemko; an Assa Abloy Group company: www.assaabloydss.com/#sle.

2. Hager Companies: www.hagerco.com/#sle.

3. National Guard Products, Inc: www.ngpinc.com/#sle.

B. Thresholds: Comply with BHMA A156.21.

1. Provide threshold at each exterior door, unless otherwise indicated.

2. Type: Flat surface.

3. Material: Aluminum.

4. Threshold Surface: Fluted horizontal grooves across full width.

5. Field cut threshold to profile of frame and width of door sill for tight fit.

6. Provide non-corroding fasteners at exterior locations.

2.12 WEATHERSTRIPPING AND GASKETING

A. Manufacturers:

1. Pemko; an Assa Abloy Group company: www.assaabloydss.com/#sle.

2. Hager Companies: www.hagerco.com/#sle.

3. National Guard Products, Inc: www.ngpinc.com/#sle.

B. Weatherstripping and Gasketing: Comply with BHMA A156.22.

1. Head and Jamb Type: Adjustable.

2. Door Sweep Type: Encased in retainer.

3. Material: Aluminum, with brush weatherstripping.

2.13 SILENCERS

A. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.

1. Single Door: Provide three on strike jamb of frame.

2. Pair of Doors: Provide two on head of frame, one for each door at latch side.

3. Material: Rubber, gray color.

2.14 FINISHES

A. Finishes: Provide door hardware of same finish, unless otherwise indicated.

1. Primary Finish: 625; bright chromium plated over nickel, with brass or bronze base material (former US equivalent US26); BHMA A156.18.

2. Finish: 626; satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D); BHMA A156.18.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

3.2 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.

1. For Steel Doors and Frames: Refer to Section 08 1113.

2. Mounting heights in compliance with ADA Standards:

a. Locksets: 40-5/16 inch.

b. Push Plates/Pull Bars: 42 inch.

c. Deadlocks (Deadbolts): 48 inch.

D. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.3 ADJUSTING

A. Adjust work under provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Adjust hardware for smooth operation.

C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.4 CLEANING

A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.5 PROTECTION

A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

3.6 HARDWARE SETS

A. As noted on the drawings.

END OF SECTION

SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal stud wall framing.

B. Metal channel ceiling framing.

C. Gypsum wallboard.

D. Joint treatment and accessories.

1.2 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

B. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.3 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

B. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2017.

C. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2017a.

D. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.

E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

F. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.

G. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.2 METAL FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.

1. Studs: "C" shaped with flat or formed webs with knurled faces.

2. Runners: U shaped, sized to match studs.

3. Ceiling Channels: C-shaped.

B. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

C. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

2.3 BOARD MATERIALS

A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Use for ceilings, unless otherwise indicated.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

a. Mold resistant board is required at all locations.

3. Thickness:

a. Ceilings: 1/2 inch.

4. Mold Resistant Paper Faced Products:

a. American Gypsum Company; M-Bloc.

b. CertainTeed Corporation; M2Tech 1/2" Moisture & Mold Resistant Drywall.

c. Continental Building Products; Mold Defense.

d. Georgia-Pacific Gypsum; ToughRock Mold-Guard.

e. National Gypsum Company; Gold Bond XP Gypsum Board.

B. Exterior Sheathing Board: As specified in Section 06 1000.

2.4 GYPSUM WALLBOARD ACCESSORIES

A. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.

B. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.

2. Joint Compound: Setting type, field-mixed.

C. Screws for Fastening of Gypsum Panel Products to Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.2 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.

C. Studs: Space studs at 16 inches on center.

1. Extend partition framing to structure where indicated and to ceiling in other locations.

2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.

3.3 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

3.4 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

B. Corner Beads: Install at external corners, using longest practical lengths.

3.5 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.6 TOLERANCES

END OF SECTION

SECTION 10 1400 - SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Room and door signs.

1.2 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.

1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.

2. When content of signs is indicated to be determined later, request such information from Owner through Architect/Engineer at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.

3. Submit for approval by Owner through Architect/Engineer prior to fabrication.

PART 2 PRODUCTS

2.1 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.

1. Sign Type: Flat signs with engraved panel media as specified.

2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.

3. Character Height: 1 inch.

4. Sign Height: 2 inches, unless otherwise indicated.

5. Service Rooms: Identify with Owner.

6. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", and braille.

2.2 SIGN TYPES

A. Flat Signs: Signage media without frame.

1. Edges: Square.

2. Corners: Square.

3. Wall Mounting of One-Sided Signs: Concealed screws.

B. Color and Font: Unless otherwise indicated:

1. Character Font: Helvetica, Arial, or other sans serif font.

2. Character Case: Upper case only.

3. Background Color: TBD.

4. Character Color: Contrasting color: TBD

2.3 TACTILE SIGNAGE MEDIA

A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:

1. Total Thickness: 1/16 inch.

2.4 ACCESSORIES

A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

D. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION

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SECTION 10 2113.13 - METAL TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal toilet compartments.

B. Urinal and Vestibule screens.

C. Metal entrance screens.

1.2 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: Concealed steel support members.

B. Section 05 5000 - Metal Fabrications: Concealed steel support members.

C. Section 06 1000 - Rough Carpentry: Blocking and supports.

D. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.3 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2025a.

C. ASTM A743/A743M - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application; 2021.

D. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2023.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

G. ASTM D1735 - Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus; 2021.

H. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity; 2025.

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

K. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.

L. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on panel construction, hardware, and accessories.

C. Shop Drawings:

1. Indicate plans, elevations, dimensions. Include door swings on plans.

2. Indicate details of wall and floor supports and attachments.

3. Indicate reflected ceiling plan view of and, ceiling grid, ceiling-mounted items at overhead support locations.

4. Indicate cutouts for through-partition toilet accessories.

5. Indicate reinforcements in toilet partition panels for grab bar attachment.

D. Samples:

1. For Initial Selection: Submit color charts.

E. Sustainable Design Documentation:

1. Product Data: For recycled content, indicate postconsumer and preconsumer recycled content and cost.

F. Manufacturer's qualification statement.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver, store, and handle materials and products in accordance with manufacturer's instructions and recommendations and industry standards.

C. Do not deliver materials or begin installation until building is enclosed, with complete protection from outside weather, and building temperature maintained at minimum of 60 degrees F (15.6 C).

D. Store products indoors in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer. Protect from damage.

E. Lay cartons flat, with adequate support to ensure flatness and prevent damage to prefinished surfaces.

F. Do not store where ambient temperature exceeds 120 degrees F (49 C).

1.8 WARRANTY

A. Stainless Steel Finish Warranty: Provide 5-year manufacturer warranty against corrosion or discoloration of stainless steel material properly maintained in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturer: ASI Global Partitions: www.asi-globalpartitions.com/#sle.

B. Metal Toilet Compartments:

1. Substitutions: Section 01 6000 - Product Requirements.

2. Toilet Compartments with Integrated Privacy: Stainless steel, sightline blocking molding affixed to hinge and latch sides of door during fabrication. Field-applied, no-sight strips not permitted.

    a. Standard Privacy-58; floor-anchored, overhead-braced mounting.

3. Urinal Screens: Stainless steel, wall hung.

4. Entrance Screens: Stainless steel, floor-mounted post.

5. Fabrication:

    a. Fabricate toilet compartment components to sizes indicated.

    b. Coordinate requirements and provide cutouts for through-partition toilet accessories and reinforcement within panel where required for attachment of grab bars.

    c. Provide shoes at pilasters and posts to conceal anchors, supports, and leveling mechanisms.

    d. Provide Easy-Stall shoes at floor anchored, overhead braced toilet compartments.

    e. Provide manufacturer's standard corrosion-resistant supports, leveling mechanisms, anchors, and anchoring assemblies for pilasters and posts.

f. Entrance Screen Posts: Provide anchoring assemblies with leveling adjustment at bottoms of posts.

2.2 MATERIALS

A. Stainless Steel Sheet: ASTM A666/A666M, Type 304.

B. Aluminum Extrusions: ASTM B221 (ASTM B221M).

C. ASTM A653/A653MA/Z rating = galvannnealed coating thickness, in English and metric units.

D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666/A666M, Type 304, stretcher-leveled standard of flatness.

E. Stainless Steel Castings: ASTM A743/A743M.

F. Zamac: ASTM B86, commercial zinc-alloy die castings, chrome plated.

2.3 COMPONENTS

A. Toilet Compartments: Stainless steel, floor-mounted headrail-braced.

B. Doors, Panels, and Pilasters: Sheet steel faces, pressure bonded to sound deadening core, formed and closed edges; corners made with corner clips or mitered, welded, and ground smooth.

C. Doors, Panels, and Pilasters: Seamless sheet steel faces, pressure bonded to sound- deadening cellular honeycomb core. Provide doors with integral no-sightline system including integrated privacy component on latch and hinge sides that overlaps adjacent pilasters.

1. Stainless Steel: **Diamond finish.**

2. Panel Faces: **22 gauge, 0.0299 inch (0.76 mm).**

3. Door Faces: **22 gauge, 0.0299 inch (0.76 mm).**

4. Edge Moldings for Stainless Steel Doors: Integrated sightline continuous roll form **22 gauge, 0.0299 inch (0.76 mm).**

5. Pilaster Faces, Braced at Both Ends: 22 gauge, 0.0299 inch (0.76 mm).

6. Side Seams: Interlocking continuous molding strip.

7. Internal Reinforcement: Provide reinforcement of size and material adequate for panel to withstand applied downward load on grab bar of at least **250 lbf (1112 N)** without deformation of panel.

D. Door and Panel Dimensions:

1. Thickness: 1 inch (25 mm).

2. Door Width: [24 inches (610 mm).

3. Door Width for Handicapped Use: [36 inches (915 mm), out-swinging.

4. Standard Privacy-58:

   a.

   b. Door Height Above Floor: 12 inches (305 mm).

5. Urinal/Entrance Screen Panel Height: 48 inches (1219 mm).

6. Urinal/Entrance Screen Panel Height Above Floor: 12 inches (305 mm).

E. Pilasters: 1-1/4 inch (32 mm) thick, of sizes required to suit compartment width and spacing.

1. Pilaster Height: 84 inches (2134 mm).

2. Easy-Stall Pilaster Shoes: Formed 20 gauge, 0.0359 inch (0.91 mm) ASTM A666 Type 304 stainless steel with No.4 finish, 3 inches (76 mm) high, concealing floor fastenings and leveling bolts; secured to pilaster with stainless steel tamper-resistant screws; secured to floor with concrete anchors.

   a. Provide height and leveling adjustment with machine thread leveling bolts and bottom of pilaster threaded inserts.

   b. Provide Easy-Stall shoes at floor anchored, overhead braced toilet compartments.

F. Entrance Screen Post: Manufacturer's standard post design of **square aluminum tube with satin finish 1-3/4-inch by 1-3/4-inch (44 mm by 44 mm)**, with shoe matching that on pilaster.

G. Head Rails: Hollow anodized aluminum tube, 1-inch by 1-5/8-inch (25 mm by 41 mm) size, with anti-grip surface and aluminum wall brackets.

2.4 ACCESSORIES

A. Brackets: Polished chrome-plated non-ferrous cast metal.

1. Stirrup Type: Brushed stainless steel, two per panel connection.

B. Door Hardware: Polished chrome plated non-ferrous cast metal:

1. Hinges: Wrap-around pivot hinges, gravity type, adjustable for door close positioning; two per door.

2. Latch and Keeper: Surface-mounted ASI integrated privacy slide latch with occupancy indicator and emergency access.

3. Coat Hook: Manufacturer's standard coat hook with rubber bumper; one per compartment, mounted on door.

4. Door Pull: Provide door pull for outswinging doors. Provide on both sides of doors designated as accessible.

5. Door Bumper: Provide rubber-tipped door bumpers at out-swinging doors.

C. Attachments, Screws, and Bolts: Stainless steel, tamper-resistant type.

1. For Attaching Panels and Pilasters to Brackets: Sex-type through-bolts and nuts, tamper-resistant.

D. Toilet Partition Suspension Members: See Section **055000**.

2.5 SOURCE QUALITY CONTROL

A. See Section **014000 - Quality Requirements** for additional requirements.

B. Confirm that exposed surfaces are free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.

C. Test water resistance of coatings in accordance with and [ASTM D2247] [ASTM D1735]

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that field measurements are as indicated.

C. Verify correct spacing of and between plumbing fixtures.

D. Verify correct location of built-in framing, anchorage, and bracing.

3.2 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Attach Easy Stall shoe system to floor with 1/4 by 2 inch (6 by 52 mm) screws. Insert pilaster into Easy Stall shoe and secure after height adjustment.

C. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.

D. Attach panel brackets securely to walls using anchor devices.

E. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

F. Do not permit field touch-up of scratches or damaged finish. Replace damaged or scratched materials with new materials.

G. Attach Easy Stall shoe system to floor with 1/4 by 2 inch (6 by 52 mm) screws. Insert pilaster into Easy Stall shoe and secure after height adjustment.

3.3 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.4 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

3.5 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.

END OF SECTION

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SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Commercial toilet accessories.

B. Diaper changing stations.

1.2 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a.

C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

D. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2022.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:

1. AJW Architectural Products: www.ajw.com/#sle.
2. American Specialties, Inc: www.americanspecialties.com/#sle.
3. Bradley Corporation: www.bradleycorp.com/#sle.
4. Substitutions: Section 01 6000 - Product Requirements.

B. Diaper Changing Stations:

1. American Specialties, Inc: www.americanspecialties.com/#sle.
2. Bradley Corporation: www.bradleycorp.com/#sle.
3. Diaper Deck & Company: www.diaperdeck.com/#sle.
4. Koala Kare Products: www.koalabear.com/#sle.

2.2 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

B. Stainless Steel Sheet: ASTM A666/A666M, Type 304.

C. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

2.3 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

2.4 COMMERCIAL TOILET ACCESSORIES

A. Grab Bars: Stainless steel, peened surface.

1. Heavy Duty Grab Bars: Floor supports are acceptable if necessary to achieve load rating.

a. Push/Pull Point Load: Minimum 1000 pound-force, minimum.

b. Dimensions: 1-1/2 inch outside diameter, minimum 0.125 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.

c. Length and Configuration: As indicated on drawings.

2.5 DIAPER CHANGING STATIONS

A. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.

1. Material: Polyethylene.

2. Mounting: Surface.

3. Color: As selected.

4. Minimum Rated Load: 250 pounds.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

1. Grab Bars: As indicated on drawings.

END OF SECTION

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SECTION 31 1000 - SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of debris.

1.2 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Sequencing and staging requirements.

B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.

D. Section 31 2200 - Grading: Topsoil removal.

E. Section 31 2323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.3 QUALITY ASSURANCE

A. Conform to applicable code for environmental requirements, disposal of debris, burning debris on site, and use of herbicides.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fill Material: As specified in Section 31 2200 - Grading.

PART 3 EXECUTION

3.1 PREPARATION

A. Call Local Utility Line Information service at number shown on Drawings not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

3.2 SITE CLEARING

A. Comply with other requirements specified in Section 01 7000.

B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.3 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate Work with utility companies; notify before starting Work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Protect improvements on adjoining properties as well as those on the Owner's property.

E. Restore any improvements damaged by this Work to their original condition, as acceptable to the Owner, other parties, or authorities having jurisdiction.

3.4 VEGETATION

A. Scope: Remove trees, shrubs, brush, and stumps within rights-of-way or easements or within limits of disturbance as indicated on the Drawings.

B. Do not begin clearing until vegetation to be relocated has been removed.

C. Do not remove or damage vegetation beyond the limits of disturbance indicated on the Drawings.

1. Trees and shrubs that are to remain within limits of disturbance will be indicated on Drawings or conspicuously marked on site.

2. Unless otherwise noted, trees within the limits of disturbance shall become the property of the Contractor and shall be removed from the site.

D. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.

E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.

1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.

2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.

3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.

4. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.

5. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.

F. Remove above-grade improvements such as posts, poles, fences, and other Work as specifically indicated or necessary to permit new construction.

G. Masonry or other construction material that will result in dust shall be wet down during demolition and removal.

H. Remove promptly all salvage that become property of the Contractor and is not to be reused in construction. Sale of material on the site is prohibited.

I. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.

J. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.5 DEBRIS

A. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.

B. Remove debris, rock, extracted plant life, junk, and trash from site.

C. Remove paving, curbs, and slabs.

D. Where indicated on Drawings, partially remove paving, curbs, and slabs. Neatly saw cut edges at right angle to surface.

E. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.

F. Do not burn or bury materials on site unless authorized in writing by authority having jurisdiction.

G. Leave site in clean condition, ready for subsequent work.

H. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

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SECTION 31 2200 - GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal and storage of topsoil.

B. Rough grading the sitefor site structures.

C. Topsoil and finish grading .

1.2 RELATED REQUIREMENTS

A. Section 31 1000 - Site Clearing.

B. Section 31 2316 - Excavation.

C. Section 31 2316.13 - Trenching: Trenching and backfilling for utilities.

D. Section 31 2323 - Fill: Filling and compaction.

E. Section 32 9219 - Seeding: Finish ground cover.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: See Section 31 2323.

B. Other Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Notify utility company to remove and relocate utilities.

E. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

F. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.

G. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

3.3 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. See Section 31 2323 for filling procedures.

G. Benching Slopes: Horizontally bench existing slopes greater than 3:1 to key fill material to slope for firm bearing.

H. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.4 SOIL REMOVAL AND STOCKPILING

A. Stockpile topsoil to be re-used on site; remove remainder from site.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.5 FINISH GRADING

A. Before Finish Grading:

1. Verify building and trench backfilling have been inspected.

2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1 inch in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 6 inches.

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 6 inches.

E. Place topsoil in areas where seeding, sodding, and planting are required.

F. Place topsoil to the following compacted thicknesses:

1. Areas to be Seeded with Grass: 6 inches.

G. Place topsoil during dry weather.

H. Remove roots, weeds, rocks, and foreign material while spreading.

I. Near plants, buildings, and pavement, spread topsoil manually to prevent damage.

J. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

K. Lightly compact placed topsoil.

3.6 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.7 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect/Engineer as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.8 FIELD QUALITY CONTROL

A. See Section 31 2323 for compaction density testing.

3.9 CLEANING

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

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SECTION 31 2316 - EXCAVATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavating for building volume below grade, footings, pile caps, slabs-on-grade, paving, site structures, utilities within the building, utilities, and site development.

1.2 RELATED REQUIREMENTS

A. Section 01 7000 - Execution and Closeout Requirements: General requirements for dewatering of excavations and water control.

B. Section 31 1000 - Site Clearing.

C. Section 31 2200 - Grading

D. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

E. Section 31 2323 - Fill: Fill materials, filling, and compacting.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

C. Dewatering Plan: Describe dewatering methods to be used to keep excavations dry, if required.

1.4 QUALIFICATIONS

A. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Virginia.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.2 PREPARATION

A. Call Local Utility Line Information service at number shown on Drawings not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum locations.

C. See Section 31 2200 for additional requirements.

D. Locate, identify, and protect utilities that remain from damage.

E. Notify utility company to remove and relocate utilities.

F. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, curbs, and lawns from excavating equipment and vehicular traffic.

G. Protect plants, lawns, rock outcroppings, and other features to remain.

3.3 EXCAVATING

A. All excavation shall be unclassified regardless of material encountered.

B. Underpin adjacent structures that could be damaged by excavating work.

C. Excavate to accommodate building foundations, slabs-on-grade, paving, site structures, and construction operations.

D. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

E. Preparation for Piling Work: Excavate to working elevations. Coordinate special requirements for piling.

F. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

G. Do not interfere with 45 degree bearing splay of foundations.

H. Cut utility trenches wide enough to allow inspection of installed utilities.

I. Hand trim excavations. Remove loose matter.

J. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

K. Grade top perimeter of excavation to prevent surface water from draining into excavation.

L. Remove excavated material that is unsuitable for re-use from site.

M. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 2200.

N. Remove excess excavated material from site.

O. Repair or replace items indicated to remain that are damaged by excavation.

P. Excavate subsoil from areas to be further excavated, re-landscaped, or regraded.

Q. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

R. Benching Slopes: Horizontally bench existing slopes greater than 3:1 to key placed fill material into slope to provide firm bearing.

S. Stability: Replace damaged or displaced subsoil as specified for fill.

T. Where unauthorized excavations have been carried below or beyond points required, restore these areas to the elevations and dimensions shown on the Drawings with material approved by Engineer and compact as specified. This Work shall be performed at no additional cost to the Owner.

U. Excavate unsatisfactory soil materials encountered that extend below required elevations to the additional depth as directed by Engineer.

1. Where removal of unsatisfactory material is due to fault or negligence of the Contractor, by inadequate shoring or bracing, dewatering, material storage or other failure to meet specified requirements, Work shall be performed at no additional cost to the Owner.

V. Areas that receive seeding shall be graded below finished grades shown, leaving space for topsoiling.

W. Stockpile excavated soil material satisfactory for backfill or fill until required. Place, grade, and shape stockpiles for proper drainage.

X. Cut slopes shall be shaped and cleaned of loose rock as the work progresses in accordance with the following sequence:

1. Slopes whose vertical height is less than 5 feet shall be shaped, cleaned, and seeded (where required) in one operation.

3.4 EXCAVATION (FOR STRUCTURES)

A. Conform to elevations and dimensions shown on the drawings. Extend excavation sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and for other construction required. Foundation concrete shall not be placed until the bearing stratum has been examined and found satisfactory for the design bearing capacity.

B. Where rock is encountered, notify Engineer. When the entire structure will bear on rock, it shall be used to support the foundation. Where only a part of the foundation will bear on rock, excavate 8 inches below subgrade of floor or footings and backfill with aggregate fill and thoroughly compact.

3.5 SURFACE WATER CONTROL

A. Control and remove unanticipated water seepage into excavation.

B. Provide ditches, berms, and other devices to divert and drain surface water from excavation area.

C. Divert surface water and seepage water within excavation areas into sumps or settling basins prior to pumping water into drainage channels and storm drains.

3.6 DEWATERING

A. Design and provide dewatering system to permit Work to be completed on dry and stable subgrade.

B. Operate dewatering system continuously until backfill is minimum 2 feet above normal ground water table elevation.

C. When dewatering system cannot control water within excavation, notify Engineer and stop excavation work.

1. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.

2. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.

D. Modify dewatering systems when operation causes or threatens to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells.

E. Discharge groundwater and seepage water within excavation areas into sumps or settling basins prior to pumping water into drainage channels and storm drains.

F. Remove dewatering and surface water control systems after dewatering operations are discontinued.

3.7 PROOFROLLING

A. Proofroll areas to receive fill, pavement, and building slabs to identify areas of soft yielding soils.

1. Use loaded tandem-axle pneumatic tired dump truck or large smooth drum roller.

2. Load equipment to maximum 50 tons gross weight and make a minimum of 4 passes with 2 passes perpendicular to the others.

B. Undercut such areas to firm soil, backfill with granular fill, and compact to density equal or greater than requirements for subsequent fill material.

C. Do not proofroll or undercut until soil has been dewatered.

3.8 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.9 PROTECTION

A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

END OF SECTION

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SECTION 31 2316.13 - TRENCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Backfilling and compacting for utilities outside the building.

1.2 RELATED REQUIREMENTS

A. Section 31 2200 - Grading

B. Section 31 2316 - Excavation: Building and foundation excavating.

C. Section 31 2323 - Fill: Backfilling at building and foundations.

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

B. Utility Structures: Manholes, catch basins, inlets, valve vaults, hand holes, and other utility access structures as indicated on Drawings.

C. Trench Terminology:

1. Trench Bottom: Area under bottom of trench supporting bedding.

2. Bedding: Fill placed under utility pipe to 1/6 pipe diameter.

3. Initial Backfill: Fill placed from 1/6 of outside pipe diameter to 12 inches above top of pipe.

4. Final Backfill: Fill placed from initial backfill to subgrade

1.4 REFERENCES

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2017.

B. AASHTO T 99 - Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop; 2015.

C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

G. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017.

H. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

I. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017.

J. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

K. VDOT Road and Bridge Standards - Virginia Department of Transportation Road and Bridge Standards; 2016.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Compaction Density Test Reports.

1.6 FIELD MEASUREMENTS

A. All excavation shall be unclassified regardless of material encountered.

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or side dimensions, without specific approval of Engineer. Unauthorized excavation shall be replaced at Contractor's expense.

C. For trenches up to 6 feet deep, the pay limit width for additional and omitted excavations shall be the outside of the pipe bell, plus 12 inches. For trenches over 6 feet deep, the pay limit for additional and omitted excavations shall be the outside diameter of the pipe bell, plus 12 inches, plus 2 inches of width per foot for each foot of depth greater than 6 feet. For payment purposes, trench widths shall be considered uniform from top to bottom. Any excavation outside of the pay limit is considered unauthorized excavation unless approved by the Engineer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where directed by the Engineer.

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination.

3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. Aggregate fill shall meet VDOT requirements for No. 25 or No. 26 crusher run aggregate or No. 57 coarse aggregate.

B. Clean earth fill shall be free of debris, roots, frozen materials, organic matter, rock or gravel larger than 1 inch in any dimension or other harmful matter.

C. Native fill shall be 95 percent free of stones larger than 4 inches in any dimension or other harmful matter.

D. Bedding Material: From trench bottom to 1/6 of outside pipe diameter.

1. Pipe: Clean earth fill or aggregate fill.

2. PVC Pipe: Aggregate fill.

E. Bedding for Structures: Aggregate fill.

F. Initial Backfill: From 1/6 of outside pipe diameter to 12 inches minimum above pipe.

1. Pipe: Clean earth fill or aggregate fill.

2. PVC Pipe: Aggregate fill.

G. Final Backfill to Subgrade:

1. Under Traveled Rights-of-Way: Aggregate fill.

2. Under Landscape, Road Shoulders, and Existing or Future Paved Areas: Native fill or aggregate fill.

2.2 ACCESSORIES

A. Concrete: Class A3 concrete conforming to VDOT Road and Bridge Standards.

1. Compressive strength of 3,000 psi at 28 days.

2. Air entrained, content of 6% (plus or minus 2%).

3. Water cement ratio of 0.49.

4. Slump of 1-5 inches.

5. Minimum cement content of 588 lbs. per cubic yard.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.2 PREPARATION

A. Call Local Utility Line Information service at number shown on Drawings not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum locations.

C. See Section 31 2200 for additional requirements.

D. Locate, identify, and protect utilities that remain and protect from damage.

E. Notify utility company to remove and relocate utilities.

F. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

G. Protect plants, lawns, rock outcroppings, and other features to remain.

3.3 TRENCHING

A. Excavate subsoil required for utilities.

B. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Cut trenches wide enough to allow inspection of installed utilities.

F. Hand trim excavations. Remove loose matter.

G. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

H. Remove excavated material that is unsuitable for re-use from site.

I. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 2200.

J. Remove excess excavated material from site.

K. Trench Width: Excavate bottom of trenches in accordance with the following schedule or as indicated on Drawings:

1. 0 - 6' Trench Depth: Outside diameter of pipe bell, plus 12 inches.

2. Greater than 6' Trench Depth: Outside diameter of pipe bell, plus 12 inches, plus 2 inches of width per foot for each foot of depth greater than 6 feet.

L. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.

M. Maintain vertical faces to an elevation equal to 12 inches above top of pipe.

1. When Project conditions permit, side walls may be sloped or benched above this elevation.

2. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this Section.

N. Support Utilities and Structures:

1. Keep trench width at top of trench to practical minimum to protect adjacent or crossing utility lines.

2. Support utilities crossing trench by means acceptable to utility company.

3. Do not interfere with 45-degree bearing splay of foundations.

4. Provide temporary support for structures above and below ground.

O. When subsurface materials at bottom of trench are loose or soft, excavate to firm subgrade or to depth directed by Engineer.

1. Cut out soft areas of subgrade not capable of compaction in place.

2. Backfill with aggregate fill and compact to density equal to or greater than requirements of subsequent backfill material.

P. When rock is encountered, excavate rock encountered 6 inches below the pipe for pipe bedding.

Q. Where rock is encountered so that a manhole, vault, or other structure will bear on rock, it shall be used to support the foundation. Where only a part of the foundation will bear on rock, at least 8 inches of compacted granular material shall be provided below bottom of footings.

R. Trim excavation. Hand trim for bell and spigot pipe joints where required. Shape trench bottom to afford circumferential support to the lower fourth of the pipe or excavate 6 inches below bottom of pipe for pipe bedding. Remove loose matter.

S. Excavate trench bottom for PVC pipe to a depth 3 inches below the pipe and backfill overdepth with aggregate fill.

T. Correct over excavated areas with compacted backfill as specified for authorized excavation or replace with flowable fill as directed by Engineer.

U. All excavating in stream channels shall be performed in accordance with all applicable permits for the project.

3.4 SURFACE WATER CONTROL

A. Control and remove unanticipated water seepage into excavation.

B. Provide ditches, berms, and other devices to divert and drain surface water from excavation area.

C. Divert surface water and seepage water within excavation areas into sumps or settling basins prior to pumping water into drainage channels and storm drains.

3.5 DEWATERING

A. Design and provide dewatering system to permit Work to be completed on dry and stable subgrade.

B. Operate dewatering system continuously until backfill is minimum 2 feet above normal ground water table elevation.

C. When dewatering system cannot control water within excavation, notify Engineer and stop excavation work.

1. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.

2. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.

D. Modify dewatering systems when operation causes or threatens to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells.

E. Discharge ground water and seepage water within excavation areas into sumps or settling basins prior to pumping water into drainage channels and storm drains.

F. Remove dewatering and surface water control systems after dewatering operations are discontinued.

3.6 BEDDING, HAUNCHING, AND INITIAL BACKFILL

A. Place bedding full width of trench to the depth indicated on Drawings and compact by tamping or rodding to prevent settlement. Perform in accordance with schedule at end of this Section.

B. Install utility pipe and conduit in accordance with the respective utility section.

C. Support pipe uniformly along entire length of pipe.

D. Carefully place initial backfill to 12 inches above top of pipe or to depth indicated on Drawings. Compact in accordance with schedule at end of this Section.

E. Backfill shall be placed by hand, uniformly on each side of the pipe and compacted in layers not exceeding 6 inches.

3.7 FINAL BACKFILLING TO SUBGRADE

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Fill up to finish grade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Place fill material in continuous layers and compact in accordance with schedule at end of this section.

G. Layers shall not exceed 12 inches. Under road shoulders and under existing or future paved areas, layers shall not exceed 8 inches.

H. Employ compaction equipment suitable for materials to be compacted and work area locations. Use power driven hand tampers for compacting materials adjacent to structures.

I. Replace topsoil to at least original depth in areas to be seeded.

3.8 DISPOSAL OF EXCESS OR UNSATISFACTORY MATERIALS

A. Dispose of excess or unsatisfactory material offsite and legally.

B. Furnish Engineer with certificate of disposal site or agreement from private property owner.

3.9 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.10 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform laboratory material tests in accordance with ASTM D1557 or AASHTO T 180.

C. Perform in place compaction tests in accordance with the following:

1. Density Tests: ASTM D1556/D1556M, ASTM D2167, ASTM D6938, or ASTM D698 (AASHTO T 99).

2. Moisture Tests: ASTM D6938.

D. Frequency of Tests: One test per lift for every 1,000 feet of trench.

E. Contractor shall employ an independent testing firm to assure compliance with these specifications for materials and compaction.

F. If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

3.11 PROTECTION OF FINISHED WORK

A. Section 01 7000 - Execution and Closeout Requirements: Protecting finished Work.

B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.12 CLEANING

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

3.13 SCHEDULE OF COMPACTION

A. Compact each layer of fill or backfill to not less than the following percentages of the maximum density at optimum moisture content as determined by ASTM D698 (AASHTO T 99):

1. 95 percent beneath and within 25 feet of buildings and structures, including those shown for future construction.

2. 95 percent beneath pavements, walks, and road shoulders, including those shown for future construction.

3. 90 percent in other unpaved areas.

4. Minimum compaction in any area shall be to the density of the adjacent soil.

END OF SECTION

SECTION 31 2323 - FILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Filling, backfilling, and compacting for footings, slabs-on-grade, paving, site structures, and utilities.

B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.2 RELATED REQUIREMENTS

A. Section 31 2200 - Grading

B. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.

C. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.3 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2017.

B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

G. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017.

H. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017.

I. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Compaction Density Test Reports.

1.5 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination.

3. Protect stockpiles from erosion and deterioration of materials.

1.6 COMPACTION TESTING

A. Contractor will provide compaction testing.

B. Engage an independent, qualified testing laboratory to provide testing in this section. Results shall be submitted to the Engineer. Test locations shall be approved by Engineer.

1.7 EXCAVATION

A. See Section 31 2316 for excavation.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. Aggregate fill shall meet VDOT requirements for No. 57 coarse aggregate.

B. Filtering material shall be a graded mixture of natural or crushed gravel, crushed stone, or natural sand with 100 percent passing a 1/2-inch sieve and none passing a No. 50 sieve, ASTM D448, Size No. 8.

C. Structural fill shall be free of debris, roots, frozen materials, organic matter, rock or gravel larger than 1 inch in any dimension, or other harmful matter.

D. Native fill shall be 95% free from stones larger than 4 inches in any dimension or other harmful matter.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. See Section 31 2200 for additional requirements.

C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

D. Verify structural ability of unsupported walls to support imposed loads by the fill.

3.2 PREPARATION

A. Scarify subgrade surface to a depth of 6 inches to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

E. Proofroll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Fill up to finish grade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Obtain fill from excavation or other approved sources. The material shall be such that it can be compacted in accordance with these specifications. Maximum rock size shall be 75 percent of compacted layer thickness or maximum of 6 inches diameter. Prevent nesting of large rocks and compact fill to prevent voids. Maximum rock size within 12 inches of footing elevations shall be 2-inch diameter.

G. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified percentage of maximum density.

H. Fill material that has been removed as too wet to permit compaction may be stockpiled or spread to dry. When moisture content is reduced to a satisfactory value, the material may be used as fill or backfill.

I. Place fill to obtain elevations shown on the Drawings. Do not place fill on muddy or frozen areas.

J. Excavate depressions caused by removal of stumps or other clearing operations to firm subgrade, fill with clean earthfill, and compact as specified.

K. When the existing ground surface has been disturbed and has a density of less than that specified for the particular area classification, scarify the ground surface, pulverize, adjust moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.

L. Backfill footing drains as shown on Drawings.

M. Place backfill and fill materials evenly adjacent to structures. Prevent wedging action of the backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.

N. Place aggregate fill material under all building slabs on grade. Compact to density required for fill under buildings.

O. Place fill material in continuous layers and compact in accordance with schedule at end of this Section.

P. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.

Q. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

R. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft., unless noted otherwise.

S. Make gradual grade changes. Blend slope into level areas.

T. Remove surplus backfill materials from site.

U. Leave fill material stockpile areas free of excess fill materials.

V. Reshape and re-compact fills subjected to vehicular traffic.

3.4 COMPACTION

A. Compact soil materials using equipment suitable for materials to be compacted and work area locations. Use power-driven hand tampers for compacting materials adjacent to structures.

B. Provide equipment capable of adding moisture to the soil material as determined by moisture-density tests.

C. Where required, uniformly apply water to the surface of subgrade or layer of soil material in such manner as to prevent free water appearing on the surface, either during or subsequent to compaction operations.

3.5 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

3.6 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform laboratory material tests in accordance with ASTM D1557, ASTM D698, or AASHTO T 180.

C. Perform in place compaction tests in accordance with the following:

1. Density Tests: ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.

2. Moisture Tests: ASTM D6938.

D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

E. Frequency of Tests: Tests shall be performed on each lift of fill placed at the rates of one (1) test per 10,000 square feet of fill area, but not less than two (2) sets per lift, regardless of size of fill.

3.7 PROTECTION OF FINISHED WORK

A. Section 01 7000 - Execution and Closeout Requirements: Protecting finished Work.

B. Reshape and re-compact fills subjected to vehicular traffic and erosion.

C. Where compacted areas are disturbed by subsequent construction or adverse weather, scarify the surface, reshape, and compact to the required density. Use hand tamper for recompaction over underground utilities and underfloor subdrains.

D. Protect graded areas from the action of the elements. Settlement or other damage that occurs prior to acceptance of the Work shall be repaired and grades satisfactorily re-established.

E. Repair after cleanup. Upon completion of construction work and after spoil and debris have been removed, regrade any areas disturbed by the operations.

3.8 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

3.9 SCHEDULE

A. Fill Beneath and Within 25 Feet of Buildings and Structures, Including Those Shown for Future Construction

1. Place structural fill and aggregate fill in layers not more than 8 inches in loose depth.

2. Compact to minimum 95 percent of maximum density at optimum moisture content.

B. Fill Beneath Pavements, Walk, and Road Shoulders, Including Those Shown for Future Construction:

1. Place structural fill and aggregate fill in layers not more than 8 inches in loose depth.

2. Compact to minimum 95 percent of maximum density at optimum moisture content.

C. Fill Beneath Other Unpaved Areas:

1. Place structural fill and aggregate fill in layers not more than 12 inches in loose depth.
2. Compact to minimum 90 percent of maximum density at optimum moisture content.

END OF SECTION

SECTION 32 1123 - AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course.

B. Paving aggregates.

1.2 RELATED REQUIREMENTS

A. Section 31 2200 - Grading

B. Section 31 2316.13 - Trenching: Compacted fill over utility trenches under base course.

C. Section 31 2323 - Fill: Topsoil fill at areas adjacent to aggregate base course; compacted fill under base course.

1.3 REFERENCE STANDARDS

A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses; 2017.

B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2017.

C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

D. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

E. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

F. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

G. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

H. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

I. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017.

J. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017.

K. VDOT Road and Bridge Specifications - Virginia Department of Transportation Road and Bridge Specifications; 2016.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Samples: 10 lb. sample of each type of aggregate; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

E. Compaction Density Test Reports.

F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When aggregate materials need to be stored on site, locate where directed by Owner.

C. Aggregate Storage, General:

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination.

3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 MATERIALS

A. Subbase and Aggregate Base Material: Coarse aggregate type as indicated on Drawings conforming to Section 208 of the VDOT Road and Bridge Specifications.

B. Fine Aggregate: Natural sand or stone sand type as indicated on Drawings conforming to Section 202 of the VDOT Road and Bridge Specifications.

C. Coarse Aggregate: Coarse aggregate type as indicated on Drawings conforming to Section 203 of the VDOT Road and Bridge Specifications.

D. Crusher Run Aggregate: Crusher run aggregate type as indicated on Drawings conforming to Section 205 of the VDOT Road and Bridge Specifications.

E. Geotextile Fabric: Non-biodegradable, type as indicated on the Drawings conforming to Section 245 of the VDOT Road and Bridge Specifications.

2.2 SOURCE QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.

B. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

E. Use sources approved by VDOT.

F. Perform Work in accordance with VDOT Road and Bridge Specifications; maintain one copy of document on site.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.3 INSTALLATION

A. Place aggregate in minimum 3-inch and maximum 6-inch layers and roller compact to specified density. When total thickness is 6 inches or less, place in one layer. When total thickness is greater than 6 inches, place in two equal layers.

B. Have each layer of material compacted and approved prior to placing succeeding layers.

C. Level and contour surfaces to elevations and gradients indicated on Drawings.

D. Add small quantities of fine aggregate to coarse aggregate when required to assist compaction.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

A. Flatness: Maximum variation of 1/2-inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/2-inch.

C. Variation From Design Elevation: Within 1/2-inch.

3.5 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted aggregate base course in accordance with ASTM D1556.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("Standard Proctor").

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: Two tests per layer for every 5,000 square feet.

F. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade, pavers, and paving.

3.6 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 32 1723.13 - PAINTED PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, and curb markings.

1.2 RELATED REQUIREMENTS

A. Section 32 1313 - Concrete Paving.

1.3 REFERENCE STANDARDS

A. VDOT Road and Bridge Specifications 2020 - Road and Bridge Specifications; 2020.

B. VDOT Road and Bridge Standards - Virginia Department of Transportation Road and Bridge Standards; 2016.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with Section 704 of VDOT Road and Bridge Specifications 2020 .

B. VDOT Road and Bridge Standards

1.5 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer or:

1. Waterborne Paint: Apply when ambient air temperature and surface temperature is minimum 50 degrees F and rising and at a maximum of 160 degrees F.

2. Thermoplastic: Do not apply until ambient air temperature and temperature of pavement is 50 degrees F or higher.

C. Do not apply materials during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.

D. Volatile Organic Content (VOC): Do not exceed State or Environmental Protection Agency maximum VOC on traffic paint.

PART 2 PRODUCTS

2.1 MATERIALS

A. Line and Zone Marking Paint:

1. Roadway Markings: As required by authorities having jurisdiction.

2. Waterborne Paint: Ready mixed, fast dry waterborne traffic paints, lead-free, non-toxic, suitable for roadway or parking lots.

3. Match existing line colors.

    a. Parking Lot Lines: 4-inch, white.

    b. Handicapped Symbols: Blue.

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/Engineer of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Maintenace and Protection of Traffic:

1. Provide short-term traffic control in accordance with Section 01 5000 - Temporary Facilities and Controls.

2. Prevent interference with marking operations and to prevent traffic on newly applied markings before markings dry.

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

C. Surface Preparation.

1. Clean and dry paved surface prior to painting.

2. Blow or sweep surface free of dirt, debris, oil, grease or gasoline.

D. Provide templates to control paint application by type and color at necessary intervals.

3.3 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Apply uniformly painted markings of color(s), lengths, and widths as indicated on the drawings true, sharp edges and ends.

1. Wet Film Thickness: 0.015 inch.

2. Length Tolerance: Plus or minus 3 inches.

3. Width Tolerance: Plus or minus 1/8 inch.

E. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.

1. Mark the International Handicapped Symbol at indicated parking spaces.

2. Hand application by pneumatic spray is acceptable.

F. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.4 APPLICATION TOLERANCES

A. Section 01 4000 - Quality Requirements: Tolerances.

B. Maximum Variation from Wet Film Thickness: 1 mil.

C. Maximum Variation from Wet Paint Line Width: Plus or minus 1/8-inch.

D. Maximum Variation from Specified Application Temperature: Plus or minus 5 degrees F.

3.5 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

END OF SECTION

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SECTION 32 9219 - SEEDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Seeding, mulching and fertilizer.

D. Maintenance.

1.2 RELATED REQUIREMENTS

A. Section 31 2200 - Grading: Preparation of subsoil and placement of topsoil in preparation for the Work of this Section.

B. Section 31 2323 - Fill: Topsoil material.

1.3 REFERENCE STANDARDS

A. ASTM D977 - Standard Specification for Emulsified Asphalt; 13e1.

1.4 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, Brome Grass, and any vegetative species other than specified species to be established in given area.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data for seed mix, fertilizer, mulch, and other accessories.

C. Test Reports: Indicate topsoil nutrient and pH levels with recommended soil supplements and application rates.

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

E. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

1.6 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

C. Perform Work in accordance with the Virginia Erosion and Sediment Control Handbook.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 PRODUCTS

2.1 SEED MIXTURE

A. Permanent Seeding

SPECIES	MINIMUM WEIGHT	MINIMUM PURITY	MINIMUM GERMINATION	SEEDING RATE (LBS. PER ACRE)
KENTUCKY 31 OR TURF TYPE TALL FESCUE	90%	97%	85%	225
KENTUCKY BLUEGRASS	10%	97%	85%	25

B. Temporary Seeding:

SEEDING DATE	SPECIES	MINIMUM WEIGHT	MINIMUM PURITY	MINIMUM GERMINATION	SEEDING RATE (LBS. PER ACRE)
02/16-04/30	ANNUAL RYEGRASS	100%	97%	90%	100
05/01-08/31	GERMAN MILLET	100%	98%	85%	50
09/01-02/15	50/50 MIX OF ANNUAL RYEGRASS & CEREAL RYE	100%	97%	90%	100

2.2 SOIL MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, large stones, waste, debris, contamination, weeds and roots; pH value of minimum 5.5 and maximum 7.5.

B. Topsoil: Excavated from site and free of weeds.

2.3 ACCESSORIES

A. Mulching Material:

1. Type I mulch shall be Curlex Blanket Erosion Control Fabric manufactured by American Excelsior Company. The fabric shall be manufactured of materials which degrade in 6 to 8 months under outdoor exposure.

2. Type II mulch composed of threshed straw of cereal grain, pine needles, or wood fiber shall be free of objectionable weed seeds or other harmful material.

B. Mulch Binder:

1. Asphalt adhesive for use with Type II mulch shall be emulsified asphalt meeting meeting requirements of ASTM D977, Grade SS-1.

2. Synthetic Mulch Binder for Use with Type II Mulch: Curasol, DCA-70, Petroset, or Terra Tack.

C. Fertilizer: Commercial grade; recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis. When test is not available, use mixture to the following proportions:

1. Nitrogen: 10 percent.

2. Phosphoric Acid: 20 percent.

3. Soluble Potash: 10 percent.

D. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

E. Erosion Fabric: EC-2 or EC-3 matting, open weave.

F. Herbicide: As required to combat type of weeds encountered.

G. Stakes: Softwood lumber, chisel pointed.

H. String: Inorganic fiber.

I. Lime: Lime shall be ground agricultural grade limestone. Fineness shall be such that 100 percent will pass a No. 20 sieve, and not less than 50 percent will pass a No. 100 sieve. Lime shall be as required by soil testing.

2.4 TESTS

A. Provide analysis of topsoil fill under provisions of Section 01 4000.

B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

C. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this Section.

3.2 PREPARATION

A. Prepare subgrade in accordance with Section 31 2200.

B. Place topsoil in accordance with Section 31 2200.

3.3 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions or at a rate recommended by soil analysis.

B. Apply after smooth raking of topsoil and prior to roller compaction.

C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.

D. Mix thoroughly into upper 3 inches of topsoil.

E. Lightly water to aid the dissipation of fertilizer. Irrigate top level of soil uniformly.

3.4 SEEDING

A. Apply seed at a rate evenly in two intersecting directions. Rake in lightly.

B. Do not seed areas in excess of that which can be mulched on same day.

C. Permanent Seeding Season:

1. Appalachian Region:

a. Fall: August 15 - November 1.

b. Spring: March 1 - June 1.

D. Do not sow immediately following rain, when ground is too dry, or during windy periods when winds are over 12 mph.

E. Immediately following seeding, apply mulch at a rate of 4,500 lbs./acre or 2 bales per 1,000 square feet. Remove straw clumps from seeded area. Maintain clear of shrubs and trees.

F. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

G. Following germination, immediately re-seed areas without germinated seeds that are larger than 8 by 8 inches.

3.5 HYDROSEEDING

A. Apply fertilizer, mulch, and seeded slurry with a hydraulic seeder at a rate of 6 lbs per 1000 sq ft evenly in two intersecting directions.

B. Apply water with a fine spray immediately after each area has been hydroseeded. Saturate to 4 inches of soil and maintain moisture levels 2 to 4 inches.

C. Following germination, immediately re-seed areas without germinated seeds that are larger than 8 by 8 inches.

3.6 PROTECTION

A. Identify seeded areas with stakes and string around area periphery. Set string height to 12 inches. Space stakes at 5 feet on center.

B. Cover seeded slopes where grade is 3H:1V or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

C. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Provide 12 inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.

D. Secure outside edges and overlaps at 36 inch intervals with stakes.

E. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

F. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

3.7 MAINTENANCE

A. Warranty all seeded areas within 1 year from date of acceptance.

B. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition. In the event that growth is not established by final project inspection, continue the specified attention until acceptance by Owner.

C. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

D. Neatly trim edges and hand clip where necessary.

E. Immediately remove clippings after mowing and trimming.

F. Water to prevent grass and soil from drying out.

G. Roll surface to remove minor depressions or irregularities.

H. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

I. Immediately reseed areas that show bare spots.

J. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

SECTION 33 1116 - WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe and fittings for water lines including domestic water lines and fire water lines.

B. Tied Joint Restraint System.

C. Valves, Fire hydrants, and Domestic water hydrants.

1.2 RELATED REQUIREMENTS

A. Section 31 2316 - Excavation: Excavating of trenches.

B. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.

C. Section 31 2323 - Fill: Bedding and backfilling.

D. Section 33 1300 - Disinfecting of Water Utility Distribution: Disinfection of utility water piping.

1.3 REFERENCES

A. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Plastic Pipe Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds; 2011.

B. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2012.

C. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2015.

D. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2015.

E. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings; 1996 (Reapproved 2010).

F. ASTM F876 - Specification for Crosslinked Polyethylene (PEX/XLPE) Tubing

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section; require attendance by all affected installers.

B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, hydrants and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

E. Tied Joint Restraint System:

1. Shop Drawings: Indicate restrained joint details and materials being utilized. Submit layout drawings showing piece numbers and locations. Also, indicate restrained joint locations.

2. Product Data: Submit catalog data for restrained joint details and installation instructions.

3. Design Data: Submit design calculations showing determination of restrained lengths and submit joint restraint details. Use joint restraint devices specifically designed for applications described in manufacturer’s data.

4. Manufacturer's Installation Instructions: Submit installation instructions.

5. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with utility company requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers with labeling in place including manufacturer's name and pressure rating.

B. Stockpile pipe in locations agreed upon by Owner, Contractor, and Architect/Engineer.

PART 2 PRODUCTS

2.1 WATER PIPE

A. Polyethylene Tubing: ASTM F876 Crosslinked Polyethylene (PEX/XLPE) - 1"; marked with NSF 61 designation for potable water use.

1. Fittings: Insert or compression type.

2.2 VALVES

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Tapping Sleeves and Valves:

1. Tapping Sleeves:

a. Manufacturers:

1) American Flow Control.

2) Clow Valve Company.

3) Mueller Co.

4) Substitutions: Equal per Section 01 6000 - Product Requirements.

b. Description: Ductile iron or cast-iron dual compression type.

c. Outlet Flange Dimensions and Drilling: ASME B16.1, Class 125 and MSS SP-60.

C. Ball Valves Up To 2 Inches:

1. Manufacturers:

a. Crane; Crane Energy Flow Solutions.

b. Hammond Valve.

c. Milwaukee Valve Company.

d. NIBCO INC.

e. Stockham; Crane Energy Flow Solutions.

f. Substitutions: Equal per Section 01 6000 - Product Requirements.

2. Brass or bronze body, teflon or chrome coated brass or bronze ball, teflon seats and rubber stem seals, tee stem pre-drilled for control rod, AWWA inlet end, compression outlet with electrical ground connector, with control rod, valve key, blowout proof stem, and extension box.

3. Pressure rating equal to or greater than adjacent piping.

4. Substitutions: See Section 01 6000 - Product Requirements.

D. Valve Boxes:

1. Valves 12-Inch Diameter and Smaller: Cast-iron, two-piece, as manufactured by Sigma, or approved equal.

2. Cast iron lid marked “WATER”.

2.3 TIED JOINT RESTRAINT SYSTEM

A. Manufacturers:

1. Dresser Piping Specialties.

2. Ebaa Iron Sales, Inc.

3. Star Pipe Products, Inc.

4. Substitutions: Equal per Section 01 6000 - Product Requirements.

B. Steel Types:

1. High Strength Low-Alloy Steel, ASTM A588, heat-treated.

2. High Strength Low-Alloy Steel, ASTM A588.

3. Carbon Steel ASTM A36.

C. Components:

1. Tie Bolts:

a. 5/8-inch for 2-inch and 3-inch mechanical joints, 3/4 inch for 4 inch to 12 inch mechanical joints and flanged joints, ASTM A588, Grade B; ASTM A325, Type 3, except increase tensile strength of full-body threaded section to 40,000 pounds minimum for 5/8 inch and 60,000 pounds minimum for 3/4 inch by heat-treating (quenching and tempering) to manufacturer's reheat and hardness specifications.

b. 3/4-inch for 14-inch to 24-inch mechanical joints, ASTM A588, Grade B; ASTM A325, Type 3.

c. 1 inch for 30-inch and larger mechanical joints and flanged joints, ASTM A588, Grade B; ASTM A325, Type 3; except increase tensile strength of full-body thread section to 100,000 pounds minimum by heat-treating (quenching and tempering) to manufacturer’s reheat and hardness specifications.

2. Tie Nut: Hex nut for each tie bolt and tie rods.

a. ASTM A563, Grade C3; plain, zinc plated, or galvanized.

3. Tiepin: 3/4-inch round bar stock for use on bends and hydrants.

a. 6-inch hairpin shape, ASTM A588; ANSI B1.1; plain, zinc plated, or galvanized.

4. Tie Coupling: Used to extend continuous threaded rods and provided with center stop to aid installation.

a. ASTM A588; plain, zinc plated, or galvanized.

5. Tie Clamp: Retainer clamp for ductile iron, asbestos cement and polyvinyl chloride, push-on pipe in front of bell.

a. ASTM A36; ASTM A307 Grade A; ASTM A563, Grade A; plain, zinc plated, or galvanized.

6. Tie Rod: Continuous threaded rod for cutting to desired lengths.

a. ASTM A588, Grade B; ASTM A325, Type 3; ANSI B1.1; plain zinc plated, or galvanized.

7. Tie Bar: Steel bar used to restrain push-in plugs.

a. ASTM A36; plain, zinc plated, or galvanized.

8. Tie Washer: Round flat washers.

a. ASTM A588, ASTM F436, Type 3; plain, zinc plated, or galvanized.

9. Factory Applied Finishes: Zinc plated or galvanized to meet the following requirements:

a. ASTM B633 for electrodeposited coating of zinc on steel.

b. ASTM A153 for galvanizing iron and steel hardware.

c. Galvanizing for rolled, pressed, and forged steel shapes: ASTM A123; minimum 2.0 ounces per square foot coating thickness; galvanize after fabrication.

2.4 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 2316.13.

B. Cover: As specified in Section 31 2316.13.

2.5 ACCESSORIES

A. Concrete for Thrust Restraints: Concrete type specified in Section 03 3000.

B. Meter: As required by the City of Staunton Public Works Department.

C. Meter Setting Equipment: As required by the City of Staunton Public Works Department.

1. Provide at all meter settings.

D. Manhole and Cover: As required by the City of Staunton Public Works Department.

E. Pipeline Markers:

1. Underground Pipeline Markers

a. Description: Plastic Ribbon and Trace Wire Tape: Bright colored blue, continuously printed with “WATER SERVICE” in large letters, minimum 6 inches wide by 4 mil thick, with magnetic detectable conductor manufactured for direct burial service.

b. Underground pipe markers shall be required for non-metallic pipe only.

PART 3 EXECUTION

3.1 EXAMINATION

A. See Section 01 7000 - Execution and Closeout Requirements for verification of existing conditions before starting Work.

B. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.2 PREPARATION

A. Remove scale and dirt on inside and outside before assembly.

B. Prepare pipe connections to equipment with flanges or unions.

3.3 TRENCHING

A. See the Section 31 2316 - Excavation and Section 31 2323 - Fill for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Form and place concrete for pipe thrust restraints at each change of pipe direction. Place concrete to permit full access to pipe and pipe accessories.

D. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.4 BACKFILLING

A. Backfill and compact around sides and to top of pipe in accordance with Section 31 2316.13.

B. Maintain optimum moisture content of bedding material to attain required compaction density.

3.5 INSTALLATION - PIPE

A. Install ductile iron pipe and fittings in accordance with AWWA C600.

B. Install PVC pipe in accordance with AWWA C605 and manufacturer's instructions.

C. Handle and assemble pipe in accordance with manufacturer's instructions and as indicated on Drawings.

D. Steel Rods, Bolt, Lugs, and Brackets: Coat buried steel with one coat of coal tar coating before backfilling.

E. Normal Conditions: Maintain 10 ft. horizontal and 18-inch vertical separation of water main from sewer piping or as required by local code.

F. Unusual Conditions: When local conditions prevent a horizontal separation of at least 10 feet, the water line may be laid closer to a sewer or sewer manhole provided that:

1. The bottom of the water line is at least 18 inches above the top of the sewer.

2. Where this vertical separation cannot be obtained, the sewer shall be constructed of AWWA-approved water pipe pressure-tested in place to 50 psi without leakage prior to backfilling. The sewer manhole shall be of watertight construction and tested in place.

G. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs. Use only equipment specifically designed for pipe cutting. The use of chisels or hand saws shall not be permitted. Grind edges smooth with beveled end for push-on connections.

H. Flanged Joints: Not to be used in underground installations except within structures.

I. Route pipe in straight line. Relay pipe that is out of alignment or grade.

J. Sanitary and/or Combined Sewers or Sewer Manholes: No water pipes shall pass through or come in contact with any part of a sewer or sewer manhole.

K. Install pipe with no high points. If unforeseen field conditions arise which necessitate high points, install air release valves as directed by Engineer.

L. Install pipe to have bearing along entire length of pipe. Excavate bell holes to permit proper joint installation. Do not lay pipe in wet or frozen trench.

M. Prevent foreign material from entering pipe during placement.

N. Install pipe to allow for expansion and contraction without stressing pipe or joints.

O. Close pipe openings with watertight plugs during work stoppages.

P. Install access fittings to permit disinfection of water system performed under Section 33 1300.

Q. Group piping with other site piping work whenever practical.

R. Establish elevations of buried piping with not less than 3 ft. of cover. Measure depth of cover from final surface grade to top of pipe barrel.

3.6 INSTALLATION - VALVES AND HYDRANTS

A. Install valves in conjunction with pipe installation; set valves plumb.

B. Provide buried valves with valve boxes installed flush with finished grade.

3.7 SERVICE CONNECTIONS

A. Install water service where indicated on the Drawings or as directed by the Owner and/or Architect/Engineer.

B. Plug or cap all service lines that are not connected to structure plumbing.

C. Provide water service as shown on the Drawings.

D. Provide sleeve in retaining wall for service main. Support with reinforced concrete bridge. Calk enlarged sleeve watertight.

E. Anchor service main to interior surface of foundation wall.

F. Provide 18 gage, 0.0478 inch galvanized sheet metal sleeve surrounding service main to 6 inches above floor and 6 feet minimum below grade. Size for 2 inches minimum of glass fiber insulation stuffing.

3.8 INSTALLATION - TAPPING SLEEVES AND VALVES

A. Install tapping sleeves and valves in accordance with utility company requirements, as indicated on Drawings and in accordance with manufacturer’s instructions.

B. Have Utility representative witness tap.

3.9 PIPELINE MARKERS

A. Underground Pipeline Markers

1. Install continuously over top of pipe buried 6 inches below subgrade, above pipe line.

3.10 CONCRETE THRUST RESTRAINT

A. Provide valves, tees, bends, caps, and plugs with concrete thrust blocks as indicated on Drawings.

B. Pour concrete thrust blocks against undisturbed earth. Locate thrust blocks at each elbow or change of pipe direction to resist resultant force and so pipe and fitting joints will be accessible for repair.

C. Do not encase fitting joints and flanges.

3.11 TIED JOINT RESTRAINT

A. Preparation

1. Clean surfaces of pipe and fittings to receive tied joint restraint system.

B. Installation

1. Excavate and backfill in accordance with Section 31 2316.13 - Trenching.

2. Install pipe and fittings in accordance with Section 33 3111 - Sanitary Utility Sewerage Piping.

3. Install joint restraint system so joints are mechanically locked together to prevent joint separation.

C. Erection Tolerances:

1. Section 01 4000 - Quality Requirements: Tolerances.

2. Torque nuts on mating threaded fasteners to 45 foot pounds to 60 foot pounds for 5/8-inch nut or per manufacturer’s recommendations.

3. Torque nuts on mating threaded fasteners to 75 foot pounds to 90 foot pounds for 3/4-inch nut or per manufacturer’s recommendations.

4. Torque 1 inch nuts to 100 foot pounds to 120 foot pounds or per manufacturer’s recommendations.

3.12 DISINFECTION OF POTABLE WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 33 1300.

3.13 FIELD QUALITY CONTROL

A. Section 01 4000 - Quality Requirements: Requirements for inspecting, testing.

B. Perform soil compaction tests in accordance with Section 31 2316.13.

C. Perform pressure test on potable water distribution system in accordance with AWWA C600, AWWA C605, or as specified.

D. Test Pressure:

1. 1.5 x working pressure at test location elevation associated with the test section.

    a. Do not exceed the rated pressure of pipe, fittings, valves, hydrants, and/or other related appurtenances.

E. Pressure/Leakage Test Procedure:

1. After completion of pipeline installation, including backfill, but prior to final connection to existing system, conduct concurrent pressure and leakage tests.

F. Provide equipment required to perform leakage and pressure tests. The meter utilized for testing shall have a low flow registration less than or equal to 0.03 gpm. The pressure gauge utilized for testing shall have a 4-inch dial or larger and gradation of 2 psi increments.

G. Conduct tests for at least two-hour duration.

H. No pipeline installation will be approved when pressure varies by more than 5 psi. Water shall be added to the test section to maintain the test pressure. The amount of water used shall be recorded.

I. Hydrostatic test boundaries shall be each valved section of water line. Each valve shall be subjected to test pressure on at least one side.

J. Before applying test pressure, properly fill, flush, and expel air from section of piping under test.

K. Slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test.

L. Examine exposed piping, fittings, valves, hydrants, and joints carefully during pressure test. Repair or replace damage or defective pipe, fittings, valves, hydrants, or joints discovered, following pressure test.

M. At the conclusion of the test, water shall be added to increase the pressure to the start test pressure. The amount of water added shall be recorded.

N. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

$L = (SD \sqrt{P}) / C$
L = testing allowance, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches

P = average test pressure during hydrostatic test, in psig
C = 148,000
When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

O. When test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections and retest until leakage is within allowable limits. Correct visible leaks regardless of quantity of leakage.

END OF SECTION

SECTION 33 1300 - DISINFECTING OF WATER UTILITY DISTRIBUTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Disinfection of potable water transmission, distribution and service systems as specified in Section 33 1116.

B. Disinfection of building domestic water piping specified in Section 22 1005.

C. Testing and reporting results.

1.2 RELATED REQUIREMENTS

A. Section 33 1116 - Water Utility Distribution Piping.

1.3 REFERENCE STANDARDS

A. AWWA B300 - Hypochlorites; American Water Works Association; 2010 (ANSI/AWWA B300).

B. AWWA B301 - Liquid Chlorine; American Water Works Association; 2010 (ANSI/AWWA B301).

C. AWWA B302 - Ammonium Sulfate; American Water Works Association; 2010 (ANSI/AWWA B302).

D. AWWA B303 - Sodium Chlorite; American Water Works Association; 2013.

E. AWWA C651 - Disinfecting Water Mains; American Water Works Association; 2014 (ANSI/AWWA C651-14).

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures and Section 01 7000 - Execution and Closeout Requirements for submittal requirements.

B. Test Reports: Indicate results comparative to specified requirements.

C. Certificate: From authority having jurisdiction indicating approval of water system.

D. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.

E. Disinfection report:

1. Type and form of disinfectant used.

2. Date and time of disinfectant injection start and time of completion.

3. Test locations.

4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.

5. Date and time of flushing start and completion.

6. Disinfectant residual after flushing in ppm for each outlet tested.

F. Bacteriological report:

1. Date issued, project name, and testing laboratory name, address, and telephone number.

2. Time and date of water sample collection.

3. Name of person collecting samples.

4. Test locations.

5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.

6. Coliform bacteria test results for each outlet tested.

7. Certification that water conforms, or fails to conform, to bacterial standards of authority having jurisdiction, suitable for human consumption.

1.5 QUALITY ASSURANCE

A. Cleaning, disinfection and testing of water lines shall be the responsibility of the Contractor. Perform Work in accordance with AWWA C651-14.

B. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum three years documented experience.

C. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of the State in which the Project is located.

D. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.1 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 3000 - Administrative Requirements for verification of existing conditions before starting Work.

B. Verify that piping system has been cleaned, inspected, and pressure tested.

C. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

3.2 DISINFECTION

A. Provide and attach equipment required to perform the Work.

B. Perform disinfection of water distribution system.

C. Introduce treatment into piping system.

D. Maintain disinfectant in system for 24 hours minimum.

E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water. The new system must be thoroughly flushed at a velocity of not less than 3.0 ft. per second until no trace of dirt or foreign matter is visible. Adequate provisions shall be made for drainage of flushing water. The sterilizing agent used must produce a solution of water and chlorine of not less than 25 mg/L available chlorine throughout the entire new piping system. Prior to flushing, the chlorine residual shall be measured. If it is less than 10 mg/L, the system shall be redisinfected using 25 mg/L available chlorine in accordance with AWWA standards. After the chlorine solution has remained in the new piping system for at least 24 hours, the lines shall be thoroughly flushed until the normal residual chlorine in the system is measured.

F. Replace permanent system devices removed for disinfection.

3.3 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 4000.

B. Disinfection, Flushing, and Sampling:

1. Notify Engineer, Owner, and testing agency 72 hours in advance of test and have witness test.

2. Disinfect pipeline installation in accordance with AWWA C651. Use of liquid chlorine is not permitted.

3. Upon completion of retention period required for disinfection, the treated water shall contain no less than 10 mg/L chlorine through the entire length of the main. Flush pipeline until chlorine concentration in water leaving pipeline is no higher than that generally prevailing in existing system or is acceptable for domestic use.

4. Legally dispose of chlorinated water. When chlorinated discharge may cause damage to environment, apply neutralizing chemical to chlorinated water to neutralize chlorine residual remaining in water.

5. After final flushing and before pipeline is connected to existing system, or placed in service, employ a State Health Department-approved independent testing laboratory to sample, test and certify water quality suitable for human consumption. A minimum of two samples shall be collected from each sampling site for total coliform analysis. The number of sites depends on the amount of new construction but must include all dead end lines, be representative of the water in the newly constructed mains, and shall be collected a minimum of every 1,200 linear feet. These samples must be collected at least 16 hours apart and must show the water line to be absent of coliform bacteria.

6. If the membrane filter method of analysis is used for the coliform analysis, non-coliform growth must also be reported.

7. The chlorine residual must also be measured and reported.

8. All samples must be analyzed by a State certified laboratory.

9. Results of the bacterial examination shall be forwarded to the Engineer.

10. If laboratory results indicate the presence of coliform bacteria, the samples are unsatisfactory and disinfection shall be repeated until the samples are satisfactory. Cleaning, disinfection, and testing will the responsibility of the Contractor. Water for these operations will be furnished by the Owner, but the Contractor shall include in the Bid the cost of loading, hauling, and discharging the water.

11. Testing and disinfection of the completed sections shall not relieve the Contractor of his responsibility to repair or replace any cracked or defective pipe. All work necessary to secure a tight line shall be performed at Contractor's expense.

END OF SECTION

SECTION 33 4111 - STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Storm drainage piping, fittings, and accessories.

1.2 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete for cleanout base pad construction.

B. Section 31 2316 - Excavation: Excavating of trenches.

C. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.

D. Section 31 2323 - Fill: Bedding and backfilling.

1.3 REFERENCE STANDARDS

A. VDOT Road and Bridge Specifications - Virginia Department of Transportation Road and Bridge Specifications; 2016.

B. AASHTO M 252 - Standard Specification for Corrugated Polyethylene Drainage Pipe; 2009.

C. AASHTO M 294 - Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500 MM (12- to 60- in.) Diameter; 2013.

D. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2014.

E. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Material; 2014.

1.4 ADMINISTRATIVE REQUIREMENTS

A. See Section 01 7000 - Execution and Closeout Requirements, for coordination and project conditions.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures and Section 01 7000 - Execution and Closeout Requirements for submittal requirements.

B. Product Data: Provide data indicating pipe, pipe accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

E. Field Quality Control Submittals: Document results of field quality control testing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 6000 - Product Requirements for requirements for transporting, handling, storing, and protecting products.

B. Block individual and stockpiled pipe lengths to prevent moving.

C. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

D. Do not place pipe flat on ground. Cradle to prevent point stress.

PART 2 PRODUCTS

2.1 SEWER PIPE MATERIALS

A. Plastic Pipe: ASTM D3350, High Density Polyethylene (HDPE) corrugated wall pipe with integrally formed smooth liner; inside nominal diameter of 4 inch, meeting the requirements of AASHTO M 252, Type S, for diameters between 3 inches and 10 inches and AASHTO M 294, Type S, for diameters between 12 inches and 60 inches, soil-tight, bell and spigot joints with rubber gaskets, with pipe and fittings manufactured from virgin PE compounds with cell classification 3254420C.

2.2 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.3 CLEANOUTS

A. See drawings for details.

2.4 BEDDING AND COVER MATERIALS

A. General: Conform to Section 31 2316.13 - Trenching and Section 31 2323 - Fill for bedding and backfill around and on top of pipe.

B. Bedding for Flexible Pipe (HDPE and CMP): Aggregate fill; shall meet VDOT Road and Bridge Specifications requirements for No. 25 or No. 26 crusher run aggregate or No. 57 coarse aggregate.

PART 3 EXECUTION

3.1 EXAMINATION

A. See Section 01 7000 - Execution and Closeout Requirements for verification of existing conditions before starting work.

B. Verify trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 TRENCHING

A. See Section 31 2316.13 - Trenching for additional requirements.

B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.3 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions and as indicated on Drawings. Seal watertight.

1. Plastic Pipe: Also comply with ASTM D2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet. Begin at downstream end and progress upstream.

D. Connect to building storm drainage system, foundation drainage system, and utility/municipal sewer system.

E. Seal joints watertight.

F. Keep pipe and fittings clean until Work is completed and accepted by Engineer. Cap open ends during period of work stoppage.

G. Lay bell and spigot pipe with bells upstream.

3.4 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 4000.

B. Request inspection prior to and immediately after placing aggregate cover over pipe.

C. When tests indicate work does not meet specified requirements, remove work, replace and retest.

3.5 PROTECTION

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

1. Take care not to damage or displace installed pipe and joints during construction of pipe supports, backfilling, testing, and other operations.

2. Repair or replace pipe that is damaged or displaced from construction operations.

END OF SECTION