



PROJECT MANUAL

CITY OF SHAKOPEE

SHAKOPEE RIVER CITY CENTER

205 1ST Avenue East., Shakopee, MN. 55379

95% CONSTRUCTION DOCUMENTS REVIEW
(Not For Construction)

02 February 2023

OWNER:

CITY OF SHAKOPEE
485 Gorman Street
Shakopee, MN 55379

CONTRACTOR:

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PROJECT DIRECTORY

PROJECT: CITY OF SHAKOPEE
SHAKOPEE RIVER CITY CENTER
250 1ST Avenue East
Shakopee, MN. 55373

PACKAGE: CONSTRUCTION DOCUMENTS

ISSUE DATE: 07 February 2023

RSP Commission #: 3550.001.01

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PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for substitutions.

1.2 RELATED SECTIONS

- A. Section 00 21 00 – Instructions to Bidders: Deadlines for substitutions prior to Bids.
- B. Form 01 25 01 - Substitution Request Form.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 1. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.
 - 2. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

1.4 SUBSTITUTION PROCEDURES

- A. All substitutions must be requested on the "Substitution Request Form" provided in this Project Manual. No consideration will be given to substitutions requested otherwise.
- B. During the Bidding Period, Document 00 21 00 - Instructions for Bidders govern times for submitting requests for Substitutions for Convenience under requirements specified in this Section. Late requests for substitution will be rejected by the Architect
 - 1. The Architect will consider Substitutions for Convenience for all specified products unless specifically noted as "No Substitution".
- C. Substitutions for Convenience: During the Bidding Period, the Architect will consider Substitutions for Convenience when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Requested substitution does not require extensive revisions to the Contract Documents.
 - 2. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 3. Substitution request is fully documented and properly submitted.
 - 4. Requested substitution will not adversely affect Contractor's construction schedule.
 - 5. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - 6. Requested substitution is compatible with other portions of the Work.
 - 7. Requested substitution has been coordinated with other portions of the Work.
 - 8. Requested substitution provides specified warranty.
 - 9. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

- D. Substitutions for Cause: In the time following the Bidding Period Architect will consider further requests from Contractor for Substitutions for Cause for products, materials or methods which guarantee an economic advantage to the Owner, or when, due to no fault of the Contractor, one or more of the following conditions exist:
1. Unavailability.
 2. Cannot be provided within Contract Time.
 3. Cannot receive required approval by a governing authority, and requested substitution can be so approved.
 4. Cannot be provided in manner compatible with other work.
 5. Cannot be coordinated with other work.
 6. Cannot be warranted as required.
 7. Cannot be used without adversely affecting Owner's insurance coverage on completed work.
 8. Will encounter other substantial non-compliances only overcome by substitution request.
- E. Request for substitution constitutes a representation that Contractor:
1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
 2. Will provide the same warranty for substitution as for specified product.
 3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects.
 4. Certifies cost data presented is complete and includes all related costs under this Contract.
 5. Waives claims for additional costs which may subsequently become apparent.
 6. Certifies proposed substitution will overcome conditions requiring substitution.
- F. Substitutions will not be considered if they are:
1. Not submitted on the "Substitution Request Form" provided in this Project Manual for approval by the Architect.
 2. Indicated or implied on shop drawing or product data submittals without separate written request.
 3. Acceptance will require substantial revision of Contract Documents.
- G. Substitute products shall not be ordered or installed without written acceptance by Architect.
- H. Architect will determine acceptability of proposed substitution, and will notify Contractor of acceptance, rejection or need for additional information in writing as described in Section 00 21 00 – Instructions to Bidders.
- I. In the event that additional information is requested, Architect will notify Contractor of substitution acceptance or rejection in writing within ten days of receipt of such information.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 01 25 10 - SUBSTITUTION REQUEST FORM

To: RSP Architects, Ltd.
1220 Marshall Street NE
Minneapolis, MN 55413
Attention: Dustin Bennis

dustin.bennis@rsparch.com

<u>SECTION #</u>	<u>PARA #</u>	<u>SPECIFIED PRODUCT</u>	<u>PROPOSED SUBSTITUTION</u>
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REASON FOR SUBSTITUTION: _____

ATTACH COMPLETE TECHNICAL DATA, LITERATURE AND SAMPLE IF APPLICABLE

- A. Does proposed substitution fail to satisfy, in any respect, characteristics specified for original product(s)? [Y] [N]
- B. Does substitution affect dimensions shown on drawings? [Y] [N]
- C. Does substitution affect other trades? [Y] [N]
- D. Does warranty differ from that specified? [Y] [N]
- E. Does substitution affect cost to Owner? [Y] [N]

If so, how much? Add \$ _____ Deduct \$ _____

F. If you indicated "Yes" to any of the items above, attach thorough explanation on your Company letterhead as follows:

- Explain any differences between proposed substitution and specified product.
- Summarize experience with product and manufacturer in Project area.

The undersigned states that the function, appearance and quality of the Proposed Substitution are equivalent or superior to the Specified Item. The undersigned agrees that, if necessary, in the sole opinion of the Architect/Engineer, to make this product perform as intended all additional costs shall be paid by the contractor.

For use by Architect:

Submitted by: _____	Accepted: _____
Position: _____	Accepted As Noted: _____
Company: _____	Not Accepted: _____
Address: _____	Received Too Late: _____
Date: _____	By _____
Telephone: _____	Date _____
Signature: _____	Remarks _____

END OF FORM

SECTION 01 35 16 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Procedural requirements.
- B. Rehabilitation and renovations of existing spaces and materials.
- C. Installation of products removed in Section 02 41 20.

1.2 RELATED SECTIONS

- A. Section 01 74 19 – Construction Waste Management and Disposal.
- B. Section 02 41 20 - Selective Demolition for Remodeling: Removal and storage of products to be reinstalled in this Section.

1.3 SYSTEM DESCRIPTION

- A. Items indicated to "remain" shall be left in their present condition.
- B. Items indicated to be "repaired" shall be restored, not replaced, following the general guidelines of Part 3 of this Section, and any more specific guidelines specified in Sections governing work of the respective materials.
- C. Items indicated to be "replaced" shall follow the more specific guidelines specified in Sections governing work of the respective materials.
- D. Contractor shall notify Architect if items indicated to "remain" or be "repaired", appear to need "replacement". Beginning replacement work without prior approval may result in loss of compensation for additional work.

PART 2 - PRODUCTS

2.1 PRODUCTS FOR PATCHING AND EXTENDING WORK

- A. New Materials: As specified in individual Sections.
- B. Match existing products and work for patching and extending work.
- C. Determine type and quality of existing products by inspection and any necessary testing, and workmanship by use of existing as a standard. Presence of a product, finish, or type of work, requires that patching, extending, or matching shall be performed as necessary to make Work complete and consistent with specifications.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify that demolition is complete, and areas are ready for installation of new work.
- B. Beginning of restoration work means acceptance of existing conditions.

3.2 PREPARATION

- A. Cut, move, or remove items as necessary for access to alterations and renovations work; replace and restore at completion.
- B. Remove unsuitable material not marked for salvage, such as rotted wood, rusted metals, and deteriorated masonry and concrete and properly dispose off-site. Replace materials as specified for finished work.
- C. Remove debris and abandoned items from area and from concealed spaces and properly dispose off-site.
- D. Prepare surfaces and remove surface finishes to provide for proper installation of new work and new finishes.
- E. Close openings in exterior surfaces to protect existing work and salvage items from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.
- F. Provide temporary shoring, bracing and structural supporting members of work to be cut to carry existing and imposed loads as required.
- G. Avoid interference with use of adjoining areas continually occupied by the Owner or interruption of free passage to adjoining areas continually occupied by the Owner.
- H. Maintain all means of egress and exit ways from space and adjacent spaces.

3.3 INSTALLATION

- A. Coordinate work of alterations and renovations to expedite completion sequentially and to accommodate Owner occupancy.
- B. Remove, cut, and patch work in a manner to minimize damage and to provide means of restoring products and finishes to like-new condition.
- C. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent new finishes.
- D. In addition to specified replacement of equipment and fixtures, restore existing plumbing, heating, ventilation, air conditioning and electrical systems.
- E. Install products as specified in individual Sections.

3.4 TRANSITIONS

- A. Where new work abuts or aligns with existing, make a smooth and even transition. Patched work shall match existing adjacent work in texture and appearance. Patch work of finishes should extend to a corner or an intentionally defined line in the finish surface.
- B. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

3.5 ADJUSTMENTS

- A. Where removal of partitions results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads. Where a change of plane of 1/8 inch or more occurs, submit recommendation for providing a smooth transition for Architect review.
- B. Trim existing doors as necessary to clear new floor finishes; refinish trimmed areas.
- C. Fit work at penetrations of surfaces.

3.6 REPAIR OF DAMAGED SURFACES

- A. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- B. Repair substrate prior to patching finish.

3.7 FINISHES

- A. Finish surfaces as specified in individual Sections.
- B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections or corners.

3.8 CLEANING

- A. Clean daily the Owner-occupied areas of work in which Contractor is working or traversing.

END OF SECTION

SECTION 02 41 20 - SELECTIVE DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Demolition and removal of selected site elements.
- B. Demolition and removal of selected portions of building or structure.
- C. Remove designated building equipment and fixtures.
- D. Remove designated partitions and components.
- E. Cap and identify utilities.
- F. Temporary partitions to allow building occupancy.

1.2 RELATED SECTIONS

- A. Section 01 11 00 – Summary of the Work.
- B. Section 01 50 00 – Temporary Facilities and Controls.
- C. Section 01 60 00 – Product Requirements.
- D. Section 01 74 19 – Construction Waste Management and Debris.
- E. Section 01 77 00 – Closeout Procedures.
- F. Section 01 81 13 – Sustainable Design Requirements.

1.3 SUBMITTALS

- A. Submit the following meeting submittals:
 - 1. Pre-Construction meeting minutes.
- B. Materials and Equipment Submittals: Submit the following:
 - 1. Demolition and removal procedures and schedule.
- C. Closeout Submittals: Submit the following under provisions of Section 01 77 00:
 - 1. Project record drawings.

1.4 PRECONSTRUCTION CONFERENCE

- A. Convene a preconstruction conference one week prior to commencing work of this Section.
- B. Require attendance of persons directly involved with the work of this and related Sections.
- C. Review schedule of demolition, demolition procedures and conditions, and coordination with related work.

1.5 EXISTING CONDITIONS

- A. Hazardous Materials or Substances: In the event the Contractor encounters on the site material it reasonably believes to be a hazardous material or substance, the Contractor shall immediately suspend Work in the area and report the condition to the Owner and Architect in writing.
- B. Conduct demolition to minimize interference with areas of the building which continue to be occupied by the Owner. Maintain protected egress and access at all times.
- C. Provide, erect, and maintain temporary barriers and security devices.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Erect and maintain weatherproof closures for exterior openings as specified in Section 01 00 10.
- B. Erect and maintain temporary partitions to prevent spread of dust, fumes, noise, and smoke to provide for Owner occupancy as specified in Section 01 50 00.
- C. Protect existing items which are not indicated to be altered.
- D. Disconnect, remove, and cap designated utility services within demolition areas.
- E. Mark location of disconnected utilities. Identify and indicate capping locations on Project Record Documents.

3.2 EXECUTION

- A. Demolish in an orderly and careful manner. Protect existing foundations and supporting structural members.
- B. Except where noted otherwise, immediately remove demolished materials from site.
- C. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect under provisions of Section 01 60 00.
- D. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.
- E. Do not burn or bury materials on site.
- F. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.
- G. Remove all items indicated on Drawings.
- H. Remove all architectural, structural, mechanical and electrical appendages, accessories, conduit, piping, equipment or any other addition to the building structure that is not intended to remain, or that will not, as determined by Architect, serve any useful purpose to the proposed Project.

3.3 SALVAGING DEMOLITION WASTE

- A. Salvaged items for sale and donation: Not permitted on Project site.
- B. Salvaged Items for Reuse in the Work:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- C. Salvaged Items for Owner's Use:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.
- D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

END OF SECTION

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. **Section Includes:**
 - 1. Dimensioned lumber, plywood and accessories.

1.2 RELATED ITEMS

- A. Section 06 20 13 – Exterior Finish Carpentry.
- B. Section 07 53 23 – Elastomeric Membrane Roofing (Fully Adhered).
- C. Section 07 62 00 – Sheet Metal Flashing and Trim.

1.3 REFERENCES

- A. Engineered Wood Association, (APA):
 - 1. Voluntary Product Standard PS 1-95 For Construction and Industrial Plywood.
- B. American National Standards Institute, (ANSI):
 - 1. ANSI A208.2: Medium Density Fiber (Fibre) Board (MDF) for Interior Applications.
- C. American Wood Preservers' Association, (AWPA):
 - 1. AWPA U1, Use Category System: User Specification for Treated Wood.
- D. American Wood Council, (AWC):
 - 1. AWC, Details for Conventional Wood Frame Construction - WCD-1.
- E. American Lumber Standard Committee, Incorporated (ALSC):
 - 1. PS 20, American Softwood Lumber Standard.
- F. Underwriters Laboratories, Inc., (UL):
 - 1. UL, Building Materials Directory.

1.4 SUBMITTALS

- A. Submit the following under the provisions of Section 01 30 00.

PART 2 - PRODUCTS

2.1 SUSTAINABILITY CHARACTERISTICS

- A. Comply with Sustainability Characteristics for each Sustainability Focus Material in Accordance with Section 01 81 13 - Sustainability Design Requirements, Appendix A and Appendix B.

2.2 LUMBER

- A. **General:** Conform to requirements of PS20. Provide lumber bearing grade and trade mark of appropriate grading association. Provide new, sound, and thoroughly seasoned lumber.
- B. **Moisture Content:** Do not exceed 19% moisture content of dimension lumber at time of installation. Do not exceed 14% moisture content of finish lumber. Dress lumber S4S, unless otherwise specified.

- C. Grades and Species:
 - 1. Non-Load Bearing Studs: Stud grade, Douglas Fir-larch, Hem-fir, Western Hemlock or Southern Pine.
 - 2. Miscellaneous Blocking, Nailers, and Framing Lumber: Standard Light Framing grade, Douglas Fir-larch, Hem-fir, Western Hemlock or Southern Pine.
 - 3. Boards: No.2 Common Ponderosa Pine, Sugar Pine or Idaho White Pine.

2.3 PLYWOOD AND SHEATHING

- A. General: Conform to requirements of PS 1. Provide panels bearing appropriate APA grade and trademark. Provide exterior grade plywood where any face or edge is permanently exposed to the weather.
- B. Grades, Types, and Thickness: unless otherwise indicated.
 - 1. Roof Parapet: APA Rated Sheathing, C-D, Group 2, Exposure 1, Minimum 24/0, 3/4 thick, unless noted otherwise.
 - 2. Roof Blocking: APA C-D, Group 2, Exposure 1, thickness as required.
 - 3. Equipment Backing Panels: Plywood, APA A-C INT, Exterior glue; Identification Index Group 2; fire-retardant treated; 3/4 in. min. thickness. Equipment backing panels shall have a Class C or III having a flame spread index of not more than 200 when tested in accordance with ASTM E84.

2.4 ROUGH HARDWARE

- A. Provide anchor bolts, headed bolts and strap anchors as indicated on Drawings or otherwise required to attach wood members to masonry and concrete. Deliver anchor bolts to site promptly to be built in as work progresses.
- B. Unless noted otherwise, provide anchor bolts 3/8" in diameter minimum, threaded one end with 1-1/2" right angle bend opposite end. Extend horizontal bolts 6" minimum into concrete and masonry. Extend vertical bolts 6" minimum into concrete and 16" minimum into masonry.
- C. Expansion Anchors:
 - 1. "Kwik Bolts" as manufactured by Hilti; ICBO RR#2156.
 - 2. "Trubolt" wedge anchors as manufactured by ITW Ramset/Redhead; ICBO #1372.
 - 3. "Wedge-All" wedge anchor as manufactured by Simpson Strong-Tie, ICBO #3631.
 - 4. "Power-Bolt" as manufactured Powers/RAWL; ICBO #5225.
- D. Injection Adhesive Anchors:
 - 1. Hilti, "HIT HY20 Injection Adhesive Anchors".
 - 2. Simpson Strong-Tie: "Epoxy-Tie Adhesive (ET)".
 - 3. Powers/Rawl, "Chem-Fast Anchor System".
 - 4. ITW Ramset/Redhead Epcon system, C6 epoxy or approved equal.
- E. Concrete Screws: Tapered flathead.
 - 1. Hilti "Kwik-Con II" fasteners.
 - 2. Simpson Strong-Tie "Titen" screw anchors.
 - 3. Powers/RAWL "Tapper" anchoring system.
 - 4. ITW Ramset/Redhead "Tapcon" anchors.

2.5 PRESERVATIVE TREATMENT

- A. Preservative Treatment: Pressure impregnated lumber in the following locations with a waterborne preservative in accordance with AWPA Standard U1 and the following Use Categories.
 - 1. Use Categories:
 - a. UC1: Interior lumber and plywood above ground.
 - b. UC3B: Exterior lumber and plywood above ground.
 - c. UC4A: Exterior lumber and plywood in contact with ground.
 - 2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no Arsenic or Chromium.
 - 3. Dry lumber to moisture content of not more than 19% after treatment.

- B. Application: Treat items as indicated on Drawings and as follows.
 - 1. Lumber/plywood used for blocking in contact with concrete or masonry.
- C. Fasteners and Hardware: Due to the corrosive nature of the preservative treatment, provide stainless steel fasteners and hardware that are in contact with treated wood.

2.6 FIRE RETARDANT TREATMENT

- A. Fire Retardant Treatment: pressure impregnated lumber and plywood bearing a UL label indicating fire hazard classification (smoke contribution and flame spread) of 25 or less, or "FR-S" Classification.
- B. Moisture Content: Kiln dry after treatment lumber and plywood exposed to view in finished work to a moisture content of not more than 12%. Dry other lumber and plywood after treatment to a moisture content of not more than 19%.
- C. Acceptable Manufacturers:
 - 1. CSI "D-BLAZE".
 - 2. Hickson "Dricon".
 - 3. Hoover "Pyro-guard".
- D. Provide fire retardant treatment at the following locations and as otherwise required to IBC 2006, 603.1:
 - 1. Plywood and blocking at the back of roof parapet and parapet caps.
 - 2. Plywood and blocking used in conjunction with composite metal panels as indicated on Drawings.
 - 3. At top and bottom of MP-12 "Red" composite metal panels.
 - 4. All wood used in Ceiling Plenum.
 - 5. Plywood used within stud partitions only where indicated on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. Accurately construct work square, true, to required levels and line, and adequately fastened and anchored to produce a rigid system of sufficient strength to support loads. Conform to N.F.P.A. "Manual for House Framing" as a minimum standard of construction and assembly, unless otherwise indicated.
- B. Conform to APA recommendations for plywood application, unless otherwise indicated.

3.2 BLOCKING

- A. Install wood blocking, bucks, nailers and similar items securely to receive intended work. Shim blocking as necessary to provide a true and level surface.
- B. Install wood curbs and blocking at roof, and other work in conjunction with roofing and sheet metal, to meet approval of roofing and sheet metal installers.
- C. Space blocking and furring, at walls to receive merchandising fixturing, to provide proper support.
- D. Install fasteners according to manufacturer's recommendations.

3.4 PROTECTION

- A. Cover wood curbs and blocking with a temporary waterproof covering securely fixed in place. Maintain coverings until permanent flashing is installed.

END OF SECTION

SECTION 06 20 13 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood at Trellis.
2. Exterior wood trim.

1.2 RELATED SECTIONS

A. Section 06 10 00 – Rough Carpentry; for deck and stair framing not exposed to view.

1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
- B. Evaluation Reports: For the following, from ICC-ES:
1. Wood-preservative-treated wood.

PART 2 - PRODUCTS

2.1 EXTERIOR WOOD TRELLIS

- A. Exterior Wood Trellis: Ipe (Tabebuia Serratifolia) solid wood, 3" x 6" nominal. Advantage Lumber Standard Ipe Decking, 1-877-232-3915.

2.2 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Stainless steel fasteners.
- B. Tapered wood plugs to match species. 3/8" Dia.
- C. Hidden siding fasteners. Including starter clips and siding clips. Stainless steel, for use with siding edge profile.
- D. Ipe Oil: Penetrating oil finish, with UV protection, formulated for use with Ipe.

PART 3 - EXECUTION

3.2 INSTALLATION, GENERAL

- A. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 2. Install wood lumber to comply with manufacturer's written instructions.
 3. Secure wood members framing with manufacturer's hidden siding fasteners.
 4. Where indicated on Drawings, use manufacturer's tapered wood plugs to cover fasteners. Locate fasteners at indicated on Drawings and to align horizontally and vertically.
 5. Rout radius edge on boards that are resized. Radius to match factory edge.
 6. Install metal framing anchors to comply with manufacturer's written instructions.
 7. Seal with Manufacturer's recommended penetrating oil finish.

END OF SECTION

SECTION 07 19 00 - WATER REPELLENT COATINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Water repellent coating to exterior burnished concrete masonry surfaces.

1.2 RELATED SECTIONS

- A. Section 07 92 00 - Joint Sealants.

1.3 REFERENCES

- A. ASTM E514 – Standard Test Method for Water Penetration and Leakage Through Masonry.

1.4 PERFORMANCE

- A. Applied coating to exhibit ability to repel moisture absorption from material being treated.

1.5 QUALITY ASSURANCE

- A. Applicator: Authorized by manufacturer.

1.6 SUBMITTALS

- A. Material and Equipment Submittals: Submit the following under provisions of Section 01 33 00:
 - 1. Product Data.
 - 2. Installation Instructions.
- B. Quality Assurance Submittals: Submit the following under provisions of Section 01 40 00:
 - 1. Test Reports: Submit test reports, conducted by an independent testing laboratory, indicating that surfaces treated with water repellent coating demonstrate a 100 percent reduction in leakage when tested in accordance with ASTM E514.
 - 2. Certification: Manufacturer's authorized representative's certification that:
 - a. Surfaces to which coating to be applied is in proper condition to receive application.
 - b. Installers are properly trained in manufacturer's recommended installation procedures, and are prepared to use manufacturer's recommended equipment for the application.
 - c. Materials delivered to site are those approved by Architect.
- C. Closeout Submittals: Submit the following under provisions of Section 01 70 00:
 - 1. Warranties: As specified in herein.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply coating when ambient or surface temperature is lower than that recommended by manufacturer.

1.8 WARRANTY

- A. Materials Warranty: Five year manufacturer's standard warranty, from date of Substantial Completion; agreeing to replace the water repellent coating materials, at no cost to the Owner.
- B. Maintenance Warranty: Two year warranty, from date of Substantial Completion, signed jointly by Contractor and coating installer; agreeing to maintain the water repellent coating free from the penetration of moisture, at no cost to the Owner.

PART 2 - PRODUCTS

2.1 WATER REPELLENT COATING

- A. Masonry Water Repellent Coating: Clear, penetrating, VOC compliant (<400g/L), solvent based, breathable water repellent coating containing a minimum of 40% alkyltriakoxo or isobutyltrialkoxo silane.
 - 1. BASF Corporation Building Systems, "MasterProtect H440 VT".
 - 2. Substitutions: Under the provisions of Section 01 25 00.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify joint sealants are installed and cured. Do not apply coating if sealants have not been installed, and adhesion of sealants to coating is questionable.
- B. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of coating.
- C. Notify manufacturer of intent to start work of this Section, if required by warranty.
- D. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Remove loose particles and foreign matter.
- B. Remove oil or foreign substance with a chemical solvent which will not affect coating.
- C. Scrub and rinse surfaces with water and let dry.
- D. Ensure material to be used will not damage adjacent glass or other materials, and protect thoroughly if such a possibility exists.
- E. If applied on unscheduled surfaces, remove immediately, by method approved by manufacturer.
- F. Protect landscaping, adjacent property, and vehicles.

3.3 APPLICATION

- A. Delay work until masonry mortar substrate is cured a minimum of 60 days.
- B. Apply coating uniformly in accordance with manufacturer's instructions.
- C. Apply water repellent coating prior to application of burnished CMU acrylic highlight sealer.
- D. Apply amount of coats recommended by manufacturer to meet warranty requirements.

3.4 TESTING AND INSPECTING

- A. Twenty days after completion of this portion of Work, and as a condition of its acceptance, conduct a "Rilem Tube Test" at five (5) separate locations to demonstrate that Work of this Section will successfully repel water.
- B. Notify Architect of test date, and time to coincide with Architect's regular scheduled visits.
- C. If evidence of significant moisture penetration is discovered and any of the five test locations locations, conduct additional testing in close proximity to failed test.
- D. Apply additional coat of approved water repellent to entire exterior surface at no additional cost to the Owner. Repeat testing and re-application until satisfactory test results are achieved.
- E. Twenty days after completion of this portion of Work, and as a condition of its acceptance, demonstrate, on a section of wall selected randomly by Architect, by running water test that Work of this Section will successfully repel water.
- F. Notify Architect of test date, and time to coincide with Architect's regular scheduled visits.

- G. By means of an outrigger, or similar acceptable equipment, place nozzle of 3/4 inch garden hose, equipped with sprinkler attachment, approximately 10'-0" away from wall where approved by Architect, aiming nozzle such that water will strike wall at slight downward angle.
- H. Run water on wall at full available force for not less than six hours.
- I. Upon completion of test period, wait for a minimum 2 hour, and maximum 4 hour period, then inspect for any evidence of moisture penetration, and as follows:
 - 1. Single-Wythe Construction: Inspect inside and outside surfaces of wall for dark, damp patches at mortar joints at bottom of masonry units.
 - 2. Cavity and Double-Wythe Construction: Inspect outside surfaces for dark, damp patches at mortar joints at bottom of masonry units.
- J. If evidence of moisture penetration is discovered, apply additional coat of approved water repellent to entire exterior surface, unless Contractor can prove to satisfaction of Architect that the tested area is the only unsatisfactory portion of the Work.
- K. Repeat testing and application, at no extra cost to Owner, until no evidence of moisture penetration is found.

END OF SECTION

SECTION 07 53 23 – ELASTOMERIC MEMBRANE ROOFING - FULLY ADHERED

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fully-adhered EPDM membrane roofing.
- B. Roof insulation.
- C. Flexible flashings.
- D. Accessory sealants.

1.2 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry: Wood nailers.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashing and counterflashing work.

1.3 REFERENCES

- A. ASCE/SEI 7 – Minimum Design Loads for Buildings and Other Structures.
- B. ASTM C578 - Preformed, Cellular Polystyrene Thermal Insulation.
- C. ASTM C1177 – Standard Specification for Glass Mat Gypsum Board Substrate for Use as Sheathing.
- D. ASTM D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
- E. ASTM D751 - Standard Test Methods for Coated Fabrics.
- F. ASTM D4637 – Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane.
- G. CAN/ULC-S770-00 - Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams.
- H. NRCA - The NRCA Roofing and Waterproofing Manual.
- I. UL Building Materials Directory.
- J. UL 790 - Test Methods for Fire Tests of Roof Coverings

1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed built-up roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Built-up roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by built-up roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Provide built-up roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.

1.5 SUBMITTALS

A. Materials and Equipment Submittals: Submit the following:

1. Shop Drawings:

- a. Prepared by roofing membrane manufacturer, indicating roof configuration, sheet layout, perimeter details and all joint details or termination conditions and conditions of interface with other materials. Assign Shop Drawings a project number or name referencing this specific project.
- b. Pre-Warranty Submittal: Indicate pre-warranty number, project number, or letter of intent to Warranty, from membrane manufacturer, stating that manufacturer acknowledges this specific project, being installed by this specific contractor, under these specific conditions, and that manufacturer will warranty roof under all of these conditions.

2. Product Data and Installation Instructions: Indicating sheet membrane, elastic flashing, joint cover sheet, and joint and crack sealants, with temperature range for application of membrane.

B. Quality Control Submittals: Submit the following:

1. Certification: Indicating that applicator has been factory trained and approved by membrane manufacturer to install roofing membrane.
2. Certification: Indicating compliance with specified regulatory requirements.
 - a. Submit test reports, listing cards, or other documentation showing compliance.
3. Inspection Report: Indicating approval by membrane manufacturer's inspector.

C. Closeout Submittals: Submit the following:

1. Warranty: As specified in this Section.

1.6 QUALITY ASSURANCE

- A. Applicator: Company specializing in installation of sheet roofing membranes with three years experience with product intended for use on this project, and approved in writing by membrane manufacturer.
- B. Applicator shall notify Architect in writing of deviations from manufacturer's standards, specifications, or details.
- C. Work of this Section to conform to NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

1.7 REGULATORY REQUIREMENTS

- A. Underwriters Laboratories, Inc. (UL): Class A Fire Hazard Classification in accordance with UL 790.

1.8 PREINSTALLATION CONFERENCE

- A. Convene a pre-installation conference one week prior to commencing work of this Section.
 1. Require attendance of Contractor, roofing system application, and parties directly affecting work of this Section.
 2. Review conditions of installation, installation procedures and coordination required with Related Work.
 3. Notes shall be taken of this meeting and distributed to all attendees with a copy sent to the Architect.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in weather protected environment clear of ground and moisture. Protect foam board insulation from direct sunlight exposure.
- B. Stand roll materials on end.

1.10 WARRANTY

- A. Manufacturer's standard ten (10) year no dollar limit (NDL) "Roofing Guarantee", including roofing membrane, flashing, roof insulation, and roof accessories. The "Roofing Guarantee" shall bear signatures of the Applicator and Contractor.
 - 1. Warranty: Replace or repair defective roof materials due to faulty workmanship and materials.
- B. Provide two year Contractor's warranty per this Section.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND SYSTEMS

- A. Basis of Design: Carlisle SynTec Incorporated; "FleeceBack Roofing Systems".
- B. Other Acceptable Manufacturers:
 - 1. Firestone Building Products.
 - 2. Johns Manville Roofing Systems.
 - 3. Substitutions: Under the provisions of Section 01 25 00.

2.2 MEMBRANE MATERIALS

- A. EPDM Membrane: Carlisle SureSeal FleeceBACK 145 EPDM Membrane incorporates 90-mil thick Sure-Seal non-reinforced EPDM membrane laminated to 55-mil thick non-woven polyester fleece-backing resulting in a total finished sheet thickness of 145 mils. Membrane shall conform to ASTM Standard D4637-, Type III (Fabric -Backed membrane) with the following physical properties:
 - 1. Breaking Strength: 250 lbf when tested in accordance with ASTM D751, Grab Method.
 - 2. Elongation: 480% when tested in accordance with ASTM D412.
 - 3. Tearing Strength: 60 lbf when tested in accordance with ASTM D751.
 - 4. Puncture Resistance: 28 lbf when tested in accordance with ASTM D120.
- B. Flexible Flashing: Provide flashings components as recommended by membrane manufacturer for a complete installation.
- C. Pre-Molded Accessories: Provide pre-molded flashing components such as inside and outside corners, pipe boots, tube sleeves and other accessories as recommended by membrane manufacturer.

2.3 INSULATION MATERIALS

- A. Flat and Tapered Perlite Board Insulation; Tapered roof insulation with a minimum 1/8" per foot taper conforming to ASTM C728. Insulation is to be supplied in 2' x 4' or 4' x 4' boards. Thickness to be a minimum 1/2". Taper as indicated on Drawings.
 - 1. GAF, "GAFTMP".
 - 2. Johns Manville, "Fesco Board".
- B. Provided tapered insulation as indicated on Drawings.

2.4 COVER BOARD

- A. Cover Board: Georgia Pacific, DensDeck Prime –gypsum core that incorporates glass-mat facings on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. Available in 1/4" to 5/8" and 4' x 4' or 4' x 8' size boards.
 - 1. Provide cover board over flat and tapered insulation as recommended by primary roof membrane manufacturer to achieve desired warranty.

2.5 ACCESSORIES

- B. Membrane Adhesives: Carlisle Flexible FAST Adhesive, two component, low-rise polyurethane adhesive designed for bonding FleeceBACK membrane and/or insulation to various substrates.
- C. Seaming Materials: Butyl based tape, as recommended by membrane manufacturer.
- D. Sealants: Lap sealant, night seal, and water cut-off mastic as recommended by membrane manufacturer.
- E. Adhesive for Insulation: Appropriate to purpose intended and approved by UL and FM for selected roofing system.
- F. Nailers: Preservative treated wood, No.2 or better as specified in Section 06 10 00, and standard battens or nailing strips as recommended by membrane manufacturer.
- G. Roof Walkway System: Rubber Walkway Pads as manufactured or supplied by primary membrane manufacturer, compatible with roof membrane.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify deck substrate is clean and dry. Verify deck is supported and secured.
- B. Verify roof openings and penetrating elements through roof are solidly set, and wood nailing strips and reglets are in place.
- C. Do not apply roofing materials to damp, frozen, dirty, or dusty deck surfaces, or surfaces unacceptable to manufacturer or applicator.
- D. Beginning installation means acceptance of substrate.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 PROTECTION

- A. Protect building surfaces against damage from roofing work and here work must continue over finished roof membrane, protect surfaces.

3.4 AIR AND VAPOR BARRIER

- A. Adhere air and vapor barrier membrane to concrete deck. Provide perimeter mechanical fasteners as recommend by primary roof membrane manufacturer.

3.5 INSULATION APPLICATION

- A. Install insulation with adhesive in two layers with insulation offset and staggered, in accordance with insulation manufacturer's instructions.
- B. When using multiple layers of insulation, joints of each succeeding layer shall be parallel and offset in both directions with respect to layer below.
- C. Lay insulation boards with 1/4" joints maximum; do not force joints. Cut insulation to fit neatly to perimeter blocking and around protrusions through roof.
- D. Lay tapered boards for distance as indicated, for positive drainage. Walk the boards into the adhesive and roll using a 30" wide, 150 pound segmented steel roller to ensure full embedment.

3.6 MEMBRANE INSTALLATION

- A. Install membrane roofing in accordance with manufacturer's written installation instructions.
- B. Apply adhesive at a rate recommended by membrane manufacturer.
- C. Roll out membrane. Bond sheet to substrate except those areas directly over or within 3" of a working crack or expansion joint. Work out air bubbles, wrinkles, and fishmouths. Firmly press sheet into place without stretching.
- D. Overlap edges and ends and perform lap splicing.
- E. Seal to adjoining surfaces.
- F. Continue membrane up vertical surfaces as indicated.
- G. Seal items penetrating membrane with counterflashing membrane material.
- H. Install membrane flashings. Seal watertight to membrane.
- I. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or moving.
- J. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day. Terminate the membrane according to membrane manufacturer's recommendations at the end of daily work, or when inclement weather is approaching.
- K. Prior to Paver Installation
 - 1. Ensure that all membrane splices have been overlaid, all membrane flashing has been installed, and that all membrane terminations have been completed prior to installation of pavers or pedestals.
 - 2. Prior to paver installation, ensure an inspection of the completed roofing system is conducted by a Field Service Representative of Roofing Manufacturer.
- L. Drainage Board Placement: Position drainage board so that all drainage channels are down-facing and down-slope to facilitate drainage.
- M. Pedestal/Paver Installation: Install pedestal paver system in accordance with the requirements of Section 03 48 16 - Precast Concrete Paver System.

3.7 FIELD QUALITY CONTROL

- A. Roof shall be inspected by inspector under the direct employment of the primary membrane manufacturer.
- B. Correct defects and irregularities.

3.8 PROTECTION

- A. Protect finished installation.
- B. After installation, close off area to prevent unauthorized traffic.

END OF SECTION

CONTRACTOR'S WARRANTY

Trade: _____

Manufacturer and System Installed _____

Contractor: _____

Contract Number and Date: _____

Project and Location: _____

Area of Roof Installation: _____

Date of Substantial Completion
(Effective Warranty Date): _____

Contractor warrants to Owner that the roofing system identified above has been installed in accordance with the specifications of the contract, referenced above, and the specifications of the manufacturer of the roofing system, so as to qualify for the issuance of said manufacturer's labor and material warranty to Owner. Contractor further warrants to Owner that subject to the terms, conditions and limitations stated herein, and subject to the rights of the manufacturer of the roofing system installed, under its warranty to Owner, Contractor, for a period of two (2) years commencing with the date of substantial completion of the installation, will repair any leaks in the membrane installed, which are the direct result of defects in workmanship of Contractor.

This warranty shall be subject to the same exclusions as those contained in the warranty of the roofing system manufacturer provided to Owner, pertaining to notice of leaks or defects; damage by natural disasters or structural failures; acts of negligence, accident or misuse (except those of Contractor); damages from metal work or accessories not furnished by Contractor; alterations or repairs not authorized by the manufacturer of the roofing system; Owner's failure to inspect and maintain the roof; and warranty transferability.

Contractor's liability hereunder shall be limited to the repair or necessary replacement of the roof membrane without cost to Owner and shall not include incidental or consequential damages. No action to enforce this warranty may be brought, unless commenced within one year from its expiration date.

CONTRACTOR

By: _____
(Officer)

Title: _____

Company: _____

Date Executed: _____

SECTION 07 61 00 - SHEET METAL ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Prefinished galvanized steel roofing.
- B. Associated flashings.
- C. Installation of joint sealants.

1.2 RELATED SECTIONS

- A. Section 01 25 00 – Substitution Procedures.
- B. Section 06 10 10 – Rough Carpentry.

1.3 REFERENCES

- A. ASTM A755 – Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
- B. ASTM A792 – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- C. ASTM D226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- D. ASTM D2244 – Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
- E. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
- F. SMACNA – Sheet Metal and Air Conditioning Contractors' National Association.

1.4 PRE-INSTALLATION MEETINGS

- A. Conduct a pre-installation meeting at the Project Site.
 - 1. Meet with Owner's Representative, metal roof Installer, metal roof manufacturer's representative and installers whose work interfaces with or affects the metal roof panels.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
 - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 5. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
 - 6. Review temporary protection requirements for metal panel systems during and after installation.
 - 7. Review procedures for repair of metal panels damaged after installation.
 - 8. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 PERFORMANCE REQUIREMENTS

- A. General Performance: Sheet metal roofing system including, but not limited to, metal roof panels, cleats, clips, anchors and fasteners, sheet metal flashing integral with sheet metal roofing, fascia panels, trim, battens, underlayment, and accessories shall comply with requirements indicated without failure due to defective manufacture, fabrication, installation, or other defects in construction. Sheet metal roofing shall remain watertight.
- B. Roof panel and attachment method shall be capable of resisting wind pressures imposed on it pursuant to applicable building codes.

1.6 SUBMITTALS

- A. Material and Equipment Submittals: Submit the following under provisions of Section 01 33 00:
 - 1. Shop Drawings:
 - a. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - b. Accessories: Include details of the flashing, trim, and anchorage systems.
 - 2. Calculations: Include calculations with registered engineer seal, verifying roof panel and attachment method resist wind pressures imposed on it pursuant to applicable building codes.
 - 3. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes. Include similar Samples of trim and accessories involving color selection.
 - 4. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - a. Metal Panels: 12 inches long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.
- B. Closeout Submittals: Submit the following:
 - 1. Warranties: As specified in this Section.

1.7 QUALITY ASSURANCE

- A. Installer: Company specializing in sheet metal roof installations with 3 years documented experience and approved by sheet metal roofing manufacturer.
- B. Sheet Metal Roofing Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels until installation. Remove as panels are being installed. Verify film is not left on installed panels.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 WARRANTY

- A. Special Galvalume Substrate Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, or perforating.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: 20 years and 6 months from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, chipping, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- C. Special Installer Warranty: Furnish a written warranty signed by the Panel Applicator guaranteeing materials and workmanship for watertightness of the roofing system, flashings, penetrations, and against all leaks.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 STANDING SEAM SHEET METAL ROOFING

- A. Standing Seam Sheet Metal Roofing (SSR-1):
 - 1. Atas, Field-lok.
 - 2. Substitutions: Under the provisions of Section 01 25 00.
- B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together. Provide optional batten cap.
 - 1. Standing Seam: Maximum 1" high x 13.5" wide x longest practical length, with concealed clip fasteners and factory installed joint sealant.
 - 2. Metallic-Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with ASTM A792, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755.
 - a. Nominal Thickness: 0.020 inch (20 gage).

3. Finish:
 - a. Exterior Finish: Two-coat fluoropolymer.
 - b. Painted materials shall have a removable plastic film to protect the paint during roll forming, shipping and handling.
 - c. Color: As selected by Architect from full line of available colors.
4. Clips: Continuous Zee-rib to accommodate thermal movement.
 - a. Material: 0.020-inch nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
5. Joint Type: Single folded.
6. Panel Coverage: 13.5 inches.
7. Panel Height: 1.0 inches.
8. Trim:
 - a. Factory fabricated trim from the same materials and finishes as roof panels.
 - b. Flat sheets for local fabrication of trim with strippable film.

2.2 UNDERLAYMENT

- A. Self Adhering Underlayment:

2.3 ACCESSORIES

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 1. Joint Sealant: Silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
- D. Sheathing: Specified in Section 06 10 00.
- E. Sealant: Specified in Section 07 92 00.

2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Fabricate sheet metal roofing and accessories at the shop to greatest extent possible.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
- E. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
- F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
- H. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat applied by panel manufacturer on a continuous coil coating line, with a top side dry film thickness of 0.75 ± 0.05 mil (0.0013 mm) over 0.2 ± 0.05 mil (0.0013 mm) primer coat, to provide a total dry film thickness of 0.95 ± 0.10 mil (0.024 mm). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect roof underlayment over deck to verify substrate is clean and smooth, free of depressions, waves, or projections, properly sloped to eaves.
- B. Verify underlayment is dry and free of snow or ice.
- C. Verify roof penetrations are complete.
- D. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, and cleats before starting installation.
 - 1. Space fasteners as required by manufacturer for specified UL classification for wind-uplift resistance.
- C. Protect elements surrounding work of this Section from damage or disfigurement.

3.3 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment on roof sheathing under sheet metal roofing. Use adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal roofing. Apply at locations indicated, in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.4 SHEET METAL ROOFING INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels to be level to 1/4 inch in 20 ft.
 - 2. Flash and seal metal panels at perimeter of all openings. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 4. Install flashing and trim as metal panel work proceeds.
 - 5. Panels should be continuous without end laps.
 - 6. Align bottoms of metal panels and fasten.
 - 7. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
 - 1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
 - 1. Install clips to supports with self-tapping fasteners.
 - 2. Install pressure plates, if required, at locations indicated in manufacturer's written installation instructions.
 - 3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied vinyl weatherseal are completely engaged.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.

- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal roofing within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof panels where inspections indicate that installation does not comply with specified requirements.

3.7 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Prefinished cap flashings.
- B. Overflow scuppers and downspouts.
- C. Counterflashings over roof membrane base flashings.
- D. Miscellaneous flashing work not specified as work of other sections.

1.2 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry: Wood blocking, nailers, and grounds.
- B. Section 07 53 23 – Elastomeric Membrane Roofing (Fully Adhered).
- C. Section 07 92 00 - Joint Sealers.
- D. Section 08 41 13 – Aluminum Entrances and Storefronts: Flashings and accessories.
- E. Section 09 91 00 - Painting: Prime and finish painting.
- F. Mechanical and Plumbing: For flashing sleeves and collars for mechanical items protruding through roofing membrane.

1.3 REFERENCES

- A. ASTM B32 - Solder Metal.
- B. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.
- C. FM 1-49 - Factory Mutual; Loss Prevention Data.
- D. SMACNA - Architectural Sheet Metal Manual.

1.4 SYSTEM DESCRIPTION

- A. Work of this Section is to physically protect related work from damage that would permit water leakage to building interior.
- B. Roof perimeter flashing installations to meet requirements of FM 1-49.

1.5 QUALITY ASSURANCE

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

1.6 SUBMITTALS

- A. Material and Equipment Submittals: Submit the following under provisions of Division 1 – General Requirements:
 - 1. Shop Drawings: Prepare detailed shop drawings which describe material profiles, jointing pattern, jointing details, fastening methods, and installation details for all conditions required to complete the project.
 - 2. Samples: Submit 6" x 6" samples of prefinished sheet metal for custom color approval.

- B. Closeout Submittals: Submit the following under provisions of Division 1 – General Requirements.
 - 1. Warranty.

1.7 STORAGE AND HANDLING

- A. Store products under provisions of Division 1 – General Requirements.
- B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation.
- C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.8 WARRANTY

- A. Provide manufacturer's standard 20 year warranty covering color fade, chalking and film integrity; agreeing to replace, without additional cost, flashing which fails in materials or workmanship.
- B. Prior to acceptance of work, furnish written five (5) year warranty covering all sheet metal flashings specified herein using the form at the end of this Section.
- C. Failure of materials or workmanship includes, but is not limited to, leaking of construction and discoloration of finish in excess of normal weathering.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

- A. Prefinished Cap Flashings and Facias: Pre-coated galvanized steel; ASTM A653, G90; 24 gage minimum core steel, shop pre-coated with fluoropolymer coating.
 - 1. Acceptable Manufacturers for Pre-finished Galvanized Steel:
 - a. Copper Sales, Inc., Una-Clad.
 - b. Peterson Aluminum Corporation, Pac-Clad.
 - c. Vincent Metals, ColorKlad.
 - 2. **MTL-1:** Refer to Material Identifications on Sheet A301 s for specific sheet metal flashing colors.
- B. Non-Coated Galvanized Steel: ASTM A525, G90; 24 gage core steel.

2.2 GAUGES OF SHEET METAL

- A. As indicated on Drawings. Where not indicated, use galvanized iron of minimum gauges as follows:
 - 1. Fascias, coping, and roof flashing with an exposed vertical face of 8" or less. 24 gauge
 - 2. Fascias, coping, and roof flashing with an exposed vertical face of 8" to 10". 22 gauge
 - 3. Fascias, coping, and roof flashing with an exposed vertical face of 10" to 15". 20 gauge
 - 4. Gutters and Downspouts: 20 gauge
 - 5. Hook strips and keepers. 22 gauge
 - 6. Other sheet metal work. 24 gauge

2.3 ACCESSORIES

- A. Fastener: Galvanized steel or stainless steel with soft neoprene washers at exposed fasteners. Finish exposed fasteners same as flashing metal.
- B. Underlayment: ASTM D266; No.15 asphalt saturated roofing felt.
- C. Protective Backing Paint: Bituminous.
- D. Slip Sheet: Rosin sized building paper.
- E. Sealant: As specified in Section 07 92 00.
- F. Bedding Compound: Type compatible with materials with which it will come in contact.
- G. Plastic Cement: Type compatible with materials with which it will come in contact.

2.4 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.
- C. Form pieces in longest practical lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with cover plate seam.
- F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4" and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.5 FINISH

- A. Shop prepare and prime exposed ferrous metal surfaces.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed, and secure.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, and cleats before starting installation.
- C. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.
- D. Insert flashings into reglets to form tight fit. Secure in place with lead or plastic wedges at maximum 24 inches on center. Seal flashings into reglets with sealant.

- E. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Architect.
- F. Seam and seal all joints.
- G. Apply plastic cement compound between metal flashings and felt flashings.
- H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- I. Seal metal joints watertight.

3.3 INSTALLATION

- A. Conform to drawing details included in SMACNA Architectural Sheet Metal manual.

END OF SECTION

SECTION 07 84 00 - FIRESTOPPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Firestopping materials and accessories.

1.2 RELATED SECTIONS

- A. Section 07 92 00 - Joint Sealers: Other sealants.
- B. Section 09 21 16 – Gypsum Board Systems.
- C. Mechanical: Firestopping of penetrations caused by mechanical services.
- D. Electrical: Firestopping of penetrations caused by electrical services.

1.3 REFERENCES

- A. ASTM E 84 - Surface Burning Characteristics of Building Materials
- B. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
- C. ASTM E 814 - Fire Tests of Through-Penetration Fire Stops
- D. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010.
- E. NFPA 101: Life Safety Code.
- F. UL-05 - Fire Resistance Directory
- G. UL 263 – Fire Tests of Building Construction and Materials.
- H. UL 723 - Test for Surface Burning Characteristics of Building Materials
- I. UL 1479 - Fire Tests of Through-Penetration Firestops

1.4 SUBMITTALS

- A. Material and Equipment Submittals: Submit the following:
 - 1. Drawings: Detail drawings including manufacturer's descriptive data, typical details, installation instructions and the fire-test data and/or report as appropriate for the fire resistance rated construction and location. Submittal shall indicate the firestopping material to be provided for each type of application. When more than 5 penetrations are to receive firestopping, drawings shall indicate location and type of application.
 - 2. Certificates: Certificates attesting that firestopping material complies with the specified requirements. The label or listing of the Underwriters Laboratories will be acceptable evidence. In lieu of the label or listing, a written certificate may be submitted from an approved, nationally recognized testing agency equipped to perform such services, stating that the items have been tested and conform to the specified requirements and testing methods.

1.5 QUALITY ASSURANCE

- A. Do not use more than one manufacturer for each type of firestopping material or firestopping application.
- B. Do not change source or brands of firestopping materials during the course of the work.

1.6 PERFORMANCE REQUIREMENTS

- A. Low Emitting Materials: Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. VOC Content of Interior Firestopping Materials Primers: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 1. Firestopping Materials: Not more than 250 g/L.

1.7 SYSTEM DESCRIPTION

- A. Firestopping shall consist of furnishing and installing a material or a combination of materials to form an effective barrier against the spread of flame, smoke and gases, and maintain the integrity of fire resistance rated walls, partitions, floors, and ceiling-floor assemblies, including through-penetrations and construction joints. Through-penetrations include the annular space around pipes, tubes, conduit, wires, cables and vents. Construction joints include those used to accommodate expansion, contraction, wind, or seismic movement; firestopping material shall not interfere with the required movement of the joint. Following list includes some possible locations and applications, but is not all inclusive:
 - 1. Penetrations of duct, conduit, tubing, cable and pipe through floors and through fire-resistance rated walls, partitions, and ceiling-floor assemblies.
 - 2. Penetrations of vertical shafts such as pipe chases and elevator shafts.
 - 3. Gaps at perimeter of fire-resistance rated walls and partitions, such as between the top of the walls and the bottom of roof decks.
 - 4. Openings between curtainwalls and structural floor slabs.
 - 5. Construction joints in floors and fire rated walls and partitions.
 - 6. At expansion joints in walls, floors and wall and floor slab assemblies.
 - 7. Other locations where required to maintain fire resistance rating of the construction.

1.8 PREINSTALLATION CONFERENCE

- A. Convene a pre-installation conference one week prior to commencing work of this Section.
 - 1. Attendance required of Contractor, system installer, and parties directly affecting work of this Section.
 - 2. Review conditions of installation, installation procedures and coordination required with Related Work.

1.9 INSPECTION

- A. A representative of the manufacturer shall be on the site during the initial firestopping applications and periodically during the application period to ensure that preparations are adequate, that surfaces are clean and suitable for application, and that materials are applied according to the manufacturer's recommendations and the contract requirements.

1.10 INSTALLER QUALIFICATIONS

- A. Each installer of firestopping material shall be trained and have a minimum of 3 years experience in the installation of firestopping of the type specified.

1.11 STORAGE AND DELIVERY

- A. Materials shall be delivered in the original unopened packages or containers showing name of the manufacturer and the brand name. Materials shall be stored off the ground and shall be protected from damage and exposure to elements. Damaged or deteriorated materials shall be removed from the site.

PART 2 - PRODUCTS

2.1 SUSTAINABILITY CHARACTERISTICS

- A. Comply with Sustainability Characteristics for each Sustainability Focus Material in Accordance with Section 01 81 13 - Sustainability Design Requirements, Appendix A and Appendix B.

2.2 ACCEPTABLE MANUFACTURERS

- A. 3M.
- B. Hilti.
- C. Specified Technologies, Inc. (STI).
- D. Tremco.
- E. Substitutions: Under the Provisions of Section 01 25 00.

2.3 FIRESTOPPING MATERIALS

- A. Firestopping materials shall consist of commercially manufactured products complying with the following minimum requirements:
 - 1. Fire Hazard Classification: Material shall have a flame spread of 25 or less, and a smoke developed rating of 50 or less, when tested in accordance with ASTM E 84 or UL 723. Material shall be an approved firestopping material as listed in UL-05.
 - 2. Toxicity: Material shall be nontoxic to humans at all stages of application.
 - 3. Fire Resistance Rating: Firestopping will not be required to have a greater fire resistance rating than that of the assembly in which it is being placed.
 - a. Through-Penetrations: Firestopping materials for through-penetrations, as described in paragraph GENERAL REQUIREMENTS, shall provide "F" and "T" fire resistance ratings in accordance with ASTM E 814 or UL 1479, except that T Ratings are not required for penetrations smaller than or equal to a 4 inch nominal pipe or 16 square inches in overall cross sectional area. Fire resistance ratings shall match the rating required for the assembly through which it is protecting.
 - b. Construction Joints and Gaps: Fire resistance ratings of construction joints, as described in paragraph GENERAL REQUIREMENTS, and gaps such as those between floor slabs or roof decks and curtain walls shall be the same as the construction in which they occur.
- B. Fire Stop and Joint Sealant Systems: Fire-resistive joint sealing systems as listed in Underwriter's Laboratories Building Material Directory, Through-Penetration Firestop Devices. Materials and systems shall qualify for tests set forth in IBC. Use only tested-listed assemblies.
- C. Intumescent Materials: Intumescent caulks, putty and sheets shall be capable of expanding up to 10 times when exposed to temperatures over 250 degrees F. One part no-mixing system that is non-corrosive and compatible with synthetic cable jackets; UL classified as passing ASTM E84 fire and hose stream tests, flame spread less than 20, fuel contribution 0 when tested in accordance with ASTM E84.
- D. Silicone Foam Sealant: Fire retardant, service temperature from minus 50 degrees F to plus 450 degrees F; nontoxic and nonallergenic; UL classified as passing ASTM E119 fire and hose stream tests, flame spread rating 20, fuel contributed factor 20 when tested in accordance with ASTM E84.
- E. Firestopping Pillows: Intumescent, highly resilient pillow consisting of a one piece mineral fiber core sealed with a water resistant intumescent membrane. The coated core is heat sealed in a fire-retardant poly bag. Fire stopping pillows shall have a service temperature less than 130 degrees F. Fire stopping pillows shall be UL classified and tested to the requirements of ASTM E814.
 - 1. Wire Mesh: Provide wire mesh where required to comply with specific firestopping system utilized.
- F. Sheets, Foams and Wraps: Non-combustible, intumescent, rigid boards, wraps and accessories.
- G. Devices: UL Tested-listed devices as recommended by manufacturer for intended use.
- H. Mortar: UL Tested-listed mortar mix for intended use.
- I. Fiber Packing: Minimum 2000 degrees F rated alumina-silica or ceramic fiber loose fill, blanket or board forms.

- J. Mineral Fiber Safing Insulation: Thermafiber, Inc., Thermafiber Mineral Fiber Safing Insulation, unfaced, 4" thick unless noted otherwise on Drawings.
 - 1. Performance Characteristics:
 - a. R-Value: 4.2 per inch.
 - b. Facing: Unfaced.
 - c. Density: 4.0 pcf (nominal).
 - d. Surface-Burning Characteristics: ASTM E 84. Unfaced material will have maximum flame spread 0 and smoke developed of 0.
 - 2. Install spray applied smoke seal FS-2 over mineral fiber safing insulation.
- K. Spray Applied Smoke Seal Material: Water-based, sprayable firestopping material that dries to form a tough, elastomeric coating. The coating shall be tested and listed by independent test agencies such as UL, ULC, Intertek. In addition, the coating shall have Factory Mutual approval. The coating shall comply with the current requirements of the International Building Code (IBC), NBCC, NFPA 5000 and NFPA 101.
 - 1. 3M, FireDam Spray 200. Gray.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Areas to receive firestopping shall be free of dirt, grease, oil, or loose materials which may affect the fitting or fire resistance of the firestopping system.
- B. Start of installation of firestopping constitutes acceptance of surface and conditions of substrate.

3.2 INSTALLATION

- A. Install firestopping materials strictly according to the material manufacturer's instructions and the rated design.
- B. Firestopping material shall completely fill void spaces regardless of geometric configuration, subject to tolerance established by the manufacturer. Firestopping for filling floor voids 4 inches or more in any direction shall be capable of supporting the same load as the floor is designed to support or shall be protected by a permanent barrier to prevent loading or traffic in the firestopped area. Firestopping shall be provided in the following locations, except in floor slabs on grade:
 - 2. Penetrations of duct, conduit, tubing, cable and pipe through floors and through fire-resistance rated walls, partitions, and ceiling-floor assemblies.
 - 3. Penetrations of vertical shafts such as pipe chases and utility chutes.
 - 4. Gaps at perimeter of fire-resistance rated walls and partitions, such as between the top of the walls and the bottom of roof decks.
 - 5. Construction joints in floors and fire rated walls and partitions.
 - 6. Other locations where required to maintain fire resistance rating of the construction.

3.3 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 ft. from end of wall and at intervals not exceeding 30 ft.
- B. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.4 INSPECTION

- A. Firestopped areas shall not be covered or enclosed until inspection is complete and approved. A manufacturer's representative shall inspect the applications initially and periodically during the work to assure that the completed work has been accomplished according to the manufacturer's written instructions and the specified requirements.

END OF SECTION

SECTION 07 92 00 - JOINT SEALERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Furnish and install sealant and backing materials, including cleaning and preparation of joint surfaces, for the following applications:
 - 1. Pavement and sidewalk joints.
 - 2. Concrete construction, expansion and contraction joints.
 - 3. Masonry joints.
 - 4. Perimeter joints at aluminum, storefronts and entrances.
 - 5. Miscellaneous caulking and sealing not specified as work of other sections.

1.2 RELATED SECTIONS

- A. Section 07 62 00 - Sheet Metal Flashing and Trim: Sealants used in conjunction with metal flashings for roofing.
- B. Section 07 84 00 - Firestopping: Firestopping materials and accessories.
- C. Section 08 41 13 – Aluminum Entrances and Storefronts.
- D. Section 08 8000 - Glazing: Sealants used in conjunction with glazing methods.

1.3 REFERENCES

- A. ASTM C790 - Recommended Practices for Use of Latex Sealing Compounds.
- B. ASTM C804 - Recommended Practice for Use of Solvent-Release Type Sealants.
- C. ASTM C834 - Latex Sealing Compounds.
- D. ASTM C920 - Elastomeric Sealants.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- F. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010.

1.4 SUBMITTALS

- A. Material and Equipment Submittals: Submit the following:
 - 1. Product Data: Submit sealant manufacturer's technical data. Include manufacturer's recommendations for joint size; joint preparation; back-up material; sealant storage, mixing and application instructions; and specific instructions for use of primer on this Project.
 - 2. Samples: Submit cured samples of sealant colors for color selection.
 - a. For each sealant type indicated for "color as selected," or for which no color is indicated, submit color card indicating available stock colors from manufacturer's complete line of pre-formulated colors for each type of sealant.
 - b. For custom colors, request color selection from the Architect prior to sample submittal.

B. Quality Control Submittals Submit the following:

1. Schedule of sealant types, colors and respective locations.
2. Letter from the sealant manufacturer stating that the sealant has been tested for compatibility (including resistance to staining and adhesion) with adjacent materials and is acceptable for use in the Project
3. Résumé: Submit résumé from proposed installer verifying completion of a minimum of three similar projects as specified in Quality Assurance article. Include names, locations, and brief description of each project, including owner, general contractor, and contact information.

C. Closeout Submittals: Submit the following:

1. Warranty.

1.5 QUALITY ASSURANCE

A. Installers:

1. Use only skilled workmen specially trained in the techniques of sealing, and familiar with the published recommendations of the manufacturers of the sealants being used.
2. Installers shall be capable of demonstrating successful completion of a minimum of three projects similar in type and scope to that of this project, within the Phoenix area within the past 2 years.

B. Verify that sealants are compatible with the substrates and accessory materials provided under other Sections. Send examples of adjacent materials to the sealant manufacturer for compatibility testing. Notify Architect of evidence of incompatibility.

C. Pre-Construction Conferences:

1. Two Stage Sealant Pre-installation Meeting
 - a. Schedule and administer a meeting to review and discuss the sealant installation a minimum of one week (7 calendar days) prior to start of commencing dual stage sealant work.
 - b. Require in attendance, the Architect, the sealant installer, the sealant manufacturer's representative, and all other parties affected by work of this Section.
 - c. Agenda: Address material selections, warranty requirements, scheduling, preparation and protection requirements, environmental conditions, material selections, warranty requirements and all typical and special details.

1.6 PERFORMANCE REQUIREMENTS

- A. Low Emitting Materials: Sealant products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. VOC Content of Interior Sealants and Sealant Primers: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
1. Sealants: Not more than 250 g/L.
 2. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.
 3. Sealant Primers for Porous Substrates: Not more than 775 g/L.

1.7 ENVIRONMENTAL CONDITIONS

- A. Do not apply joint sealing materials at temperatures above or below manufacturer's recommendations, during rain or snow, or to damp or frosted surfaces.
- B. Do not apply sealant to substrates or accessories that are moist.

1.8 WARRANTY

- A. Installer's Warranty: Provide original statement on Installer's letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within warranty period specified.
 - 1. Installer's Warranty Period: 2 years from the date of Substantial Completion
- B. Silicone Sealant Manufacturer's Warranty: Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or failure under normal use within warranty period specified.
 - 1. Manufacturer's Warranty Period: 20 years from the date of Substantial Completion.
- C. Warranty: Warranty to include labor and material required to replace sealants which fail because of loss of cohesion or adhesion, or do not cure.

PART 2 - PRODUCTS

2.1 SUSTAINABILITY CHARACTERISTICS

- A. Comply with Sustainability Characteristics for each Sustainability Focus Material in Accordance with Section 01 81 13 - Sustainability Design Requirements, Appendix A and Appendix B.

2.2 MATERIALS, GENERAL

- A. **SLNT-1:** Silicone sealant with movement capability of $\pm$ 50 percent and conforming to ASTM C920, Type S, Grade NS, Class 50 or 100/50; non-staining. Color: As selected by Architect; provide custom colors as required.
 - 1. Dow Chemical Company, Dowsil 795 Silicone Building Sealant.
 - 2. Tremco Commercial Sealants and Waterproofing, Spectrem 1.
- B. **SLNT-2:** Self-leveling, two component, non-staining, non-bleeding polyurethane sealant with movement capability of $\pm$ 25 percent and conforming to ASTM C920, Type M, Grade P, Class 25. Color: As selected by the Architect.
 - 1. Pecora Corporation, Urexpan NR-200.
 - 2. BASF, Masterseal SL2.
 - 3. Tremco, THC-900/THC-901.
 - 4. Tremco, Vulkem 245.

2.3 PRIMER

- A. Non-staining type, as recommended by sealant manufacturer to suit application.

2.4 JOINT BACKING

- A. Compressible Joint Material: Foamtech closed cell polyethylene by NMW, Inc. in thickness shown on Drawings.
 - 1. Order material score cut by manufacturer for easy "peel off" of top section to facilitate installation of rod and sealant.
- B. Backer Rod:
 - 1. Provide pre-formed, compressible, non-staining, closed cell polyethylene or open cell expanded polyurethane foam rod compatible with the sealant used and acceptable by the sealant manufacturer for the specific application, except as follows:
 - a. Provide closed cell backer rod with self-leveling sealant (SLNT-2) horizontal applications.

2. Provide round rod, size as recommended by manufacturer based on width and depth of joint and condition located:
 - a. Joints up to 1/2" wide, rod shall equal width of joint plus 1/8"
 - b. Joints 1/2" wide and larger, rod shall be equal to the joint width plus 1/4".
 - c. Provide bond breaker tape where joint depth does not allow space for backer rod as recommended by sealant manufacturer to suit application

- C. Do not use joint backing impregnated with oil, tar, or asphalt.

2.5 ACCESSORIES

- A. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- B. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- C. Vent Tubes: Polyvinyl chloride or other non-staining material; 1/4 to 3/8 inch inside diameter; length to penetrate joint backing and project a minimum of 1/8 inch beyond the sealant. Design tube to allow for free movement of air between outside environment and cavity, and prevent water entry under negative pressure; baffle if required.

2.6 WORKING TIME

- A. Use two-component sealants within maximum period of time after mixing recommended by sealant manufacturer for specific material and job conditions, and discard sealant not used within this time.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify joint dimensions, physical, and environmental conditions are acceptable to receive work of this Section.
- B. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean, prepare, and design joints in accordance with manufacturer's instructions. Remove any loose materials and other foreign matter which might impair adhesion of sealant.
- B. Verify that joint shaping materials and release tapes are compatible with sealant.
- C. Examine joint dimensions and size materials to achieve required width/depth ratios.
- D. Use joint filler to achieve required joint depths, to allow sealants to perform properly.
- E. Use bond breaker where required.
- F. Apply masking tightly around joints to protect adjacent surfaces from excess sealant.
- G. Prime as required for proper bond to substrate materials.

3.3 INSTALLATION

- A. Perform installation in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Install joint backing according to manufacturer's instructions in joints to receive sealant and as indicated on Drawings. Use proper size and shape pieces so installed joint backing is compressed approximately 30% and face of foam is at required depth. Do not twist or braid rod stock. Do not puncture skin of rod stock. Carefully roll rod stock into joint without stretching.
- C. Perform installation in accordance with ASTM C1193.
- D. Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature ranges.
- E. Tool joints to form smooth, uniform beads, with slightly concave surfaces. Do not use tooling agents, unless specifically recommended by sealant manufacturer.
- F. Form joints free of air pockets, foreign embedded matter, ridges, and sags.

3.4 EXPANDING FOAM SEALANT INSTALLATION

- A. Install joint seal in accordance with manufacturer's instructions and final approved Shop Drawings.
- B. Remove joint seal from pre-compressed packaging, immediately insert into joint, and allow to expand.
- C. Use temporary retainers if required to maintain joint seals in position until expansion is complete.

3.5 CLEANING

- A. Clean excess sealant, primer, or bond breaker with cleaning solution as recommended by primary sealant manufacturer. Do not use acidic cleaning materials.
- B. Upon completion, remove and dispose of masking.

PART 4 - SCHEDULES

4.1 SEALANT SCHEDULE

<u>Type</u>	<u>Location</u>
SLNT-1	Perimeter joints at aluminum curtainwall, windows and storefronts.
	Masonry control joints.
	Miscellaneous exterior caulking and sealing.
SLNT-2	Exterior sidewalks adjacent to building.

END OF SECTION

SECTION 08 33 23 – HIGH PERFORMANCE OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. High performance overhead coiling doors.

1.2 RELATED SECTIONS

- A. Division 26 – Electrical.

1.3 SUBMITTALS

- A. Material and Equipment Submittals: Submit the following:

1. Product Data: For each type of high performance overhead coiling door and accessory.
 - a. Include construction details, material descriptions, dimensions of individual sub-assemblies (side frames, header, control panel, motor), profiles for slats, and finishes.
 - b. Include operating characteristics, electrical characteristics, and furnished accessories.
 - c. Include description of automatic closing device and testing and resetting instructions.
2. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - a. Include plans, elevations, sections, and mounting details.
 - b. Show locations of controls, locking devices, and other accessories.
 - c. Include diagrams for power, signal, and control wiring.

- B. Closeout Submittals: Submit the following:

1. Manufacturer's operation and maintenance data.

1.4 DESIGN CRITERIA

- A. Rolling door to have NEWGEN® Guide and Curtain Lok™ system to provide a near airtight seal and knock-away feature for easy reassembly upon impact.
- B. After accidental impact, door must be capable of reset from ground level without the use of ladders, tools or lift equipment.
- C. Rolling door SBR curtain for service temperature range of --40°F to +180°F.

1.5 QUALITY ASSURANCE

1. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 10 years of documented experience in manufacturing of doors and equipment of similar to that indicated for this Project and that have a proven record of successful in-service performance.
 2. Installer Qualifications: Installers, trained by the primary product manufacturer, with a minimum 3 years documented experience installing and maintenance of units similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
 3. Source Limitations: Obtain each type of door, frame, operator and sensor components specified in this Section from a single source, same manufacturer unless otherwise indicated.
- B. All rolling counter doors shall be designed to a standard maximum of 10 cycles per day and an overall maximum of 20,000 operating cycles for the life of the door

1.6 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. High Performance Overhead Coiling Doors shall be free of defects in material and workmanship for a period of one (1) year from the date of substantial completion.
- C. Special Product Warranty: Manufacturer's warranty in which manufacturer agrees to repair or replace components which fail to perform as follows:
 - 1. 5-year / 1,000,000 Cycle Limited Warranty on Drive Motor and Gearbox.
 - 2. 2-year / 300,000 Cycle Limited Warranty on all other Mechanical and Electrical Components.
- D. During the warranty period a factory-trained technician shall perform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form shall be submitted to the Owner.

PART 2 - PRODUCTS

2.1 HIGH PERFORMANCE OVERHEAD COILING DOORS

- A. Basis of Design: Horman Model HD-CD 3025 springless design.
 - 1. Substitutions: Under the provisions of Section 01 25 00.

2.2 CURTAIN

- A. Two (2) layers of Styrene Butadiene Rubber (SBR) each 3.2 mm ($\frac{1}{8}$ in) thick, 70 durometer, reinforced with 1-ply, 110 lb polyester cord center. Overall thickness is $\frac{1}{4}$ in. Material provides normal resiliency and flexibility at temperatures ranging from -40°F to +180°F.
- B. Complete with molded Curtain Loks™ that are mechanically attached to the vertical edges of the curtain material. This retention system maintains and holds the curtain in guides under heavy windload conditions.
- C. Continuous glued SBR windlock or moulded in place Teflon windlock designs will not be accepted.
- D. Standard Color: Black. Also available in Blue or Grey EPDM, Black nitrile, flame- retardant self-extinguishing Black MSHA rated.
- E. Wind Resistance: Up to 21 lbf/sq. ft. (90 mph).

2.3 GUIDES

- A. Side curtain retention: NEWGEN® 5 inch Guides shall be one-piece extruded aluminum to form a slot of sufficient depth to allow the Curtain Lok™ to move freely in the guides at all times. Aluminum members are to be of sufficient thickness and rigidity to maintain the Curtain Lok™ within the guides during normal operation while enabling the Curtain Lok™ to release during accidental impact.
- B. Steel guides (bolted or spring-loaded) will not be accepted.

- C. Side frame: Galvanized steel (10 gauge) mounting angles with reinforcement brackets are provided for installation directly onto concrete or steel door framing. Additional customization of door frame is not required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.
- B. Commencement of work by installer is acceptance of substrate.

3.2 INSTALLATION

- A. Install high speed overhead coiling doors with necessary hardware, anchors, inserts, hangers and supports, in accordance with manufacturer's instructions.
- B. Fit, align, and adjust door assembly level and plumb; provide smooth operation.
- C. Following completion of installation, including related work by others, lubricate, test, and adjust for ease of operation, free from warp, twist, or distortion, and leave installation in good operating condition.

END OF SECTION

SECTION 08 41 13 - ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Storefront framing system.
- B. Thermally Broken Aluminum doors and frames.
- C. Door Hardware
- D. Anchors, brackets, and attachments.

1.2 RELATED SECTIONS

- A. Section 07 92 00 - Joint Sealers: Perimeter sealant and back-up materials.
- B. Section 08 80 00 - Glass and Glazing: Glass; Glazing Channels.

1.3 REFERENCES

- A. Aluminum Association.
- B. AAMA 607.1 - Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
- C. ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
- D. ASTM E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.
- E. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- F. ASTM E331 - Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- G. ADAAG - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities.
- H. National Fenestration Rating Council Incorporated: NFRC 400 – Procedure for Determining Fenestration Product Air Leakage

1.4 PERFORMANCE

- A. Limit mullion deflection to 1/175, or flexure limit of glass with full recovery of glazing materials, whichever is less.
- B. System to accommodate, without damage to system or components, or deterioration of perimeter seal: Movement within system; movement between system and perimeter framing components; dynamic loading and release of loads; and deflection of structural support framing.
- C. Energy Performance: Certify and label energy performance according to NFRC as follows
 - 1. Thermal Transmittance (U-factor):
 - a. Fixed glazing and framing areas shall have U-factor of not more than 0.36 as determined according to NFRC 100.
 - b. Entrance door glazing and framing areas shall have U-factor of not more than 0.77 as determined according to NFRC 100.
 - 2. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 65 as determined according to NFRC 500.

1.5 SUBMITTALS

- A. Material and Equipment Submittals: Submit under provisions of Section 01 33 00:
 - 1. Shop Drawings: Include elevations; system and component dimensions; components within assembly; framed opening requirements and tolerances; anchorage and fasteners; reinforcement; glass and infills; detailed door hardware schedule; and affected related work.
 - 2. Product Data: Submit for each item of hardware scheduled for aluminum entrances.
 - 3. Manufacturer's Installation Instructions.
- B. Closeout Submittals: Submit the following under provisions of Section 01 77 00:
 - 1. Warranty: As specified in this Section.

1.6 PREINSTALLATION CONFERENCE

- A. Convene a pre-installation conference under provisions of Section 01 31 00 one week prior to commencing work of this Section.
 - 1. Attendance required of Contractor, system installer, and parties directly affecting work of this Section.
 - 2. Review conditions of installation, installation procedures and coordination required with Related Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, store, and protect system components under provisions of Section 01 60 00.
- B. Provide wrapping to protect prefinished aluminum surfaces.

1.8 WARRANTY

- A. Finish: Provide finish coating applicator's standard 5 year warranty.
- B. Materials: Provide 2 year manufacturer's warranty for replacement or repair of materials due to faulty fabrication, workmanship and materials.
- C. Installation: Provide 2 year warranty for replacement or repair of materials due to faulty workmanship and installation

PART 2 - PRODUCTS

2.1 STOREFRONT FRAMING

- A. Exterior Storefront Framing (**SF-1**): Aluminum extrusions conforming to ASTM B221, alloy G.S.10A-T5; thermally broken, Front Set, flush glazing system, shear block assembly; 2" x 4-1/2" profile for 1" glazing. Provide extruded aluminum mullion and sill extensions as indicated on Drawings
 - 1. EFCO Corporation, Series 403
 - 2. Kawneer Company, Inc., Trifab VersaGlaze 451T.
 - 3. Oldcastle Building Products, Series 3000 Thermal.
 - 4. Tubelite, Inc., T14000 Series Storefront.
 - 5. Substitutions: Under the provisions of Section 01 25 00.
- B. Color Anodic Finish: CW-2 shall have a Class I, Dark Bronze Anodized finish conforming AA-M12C22A42/A44, (Mechanical Finish) nonspecular as fabricated; Chemical Finish, medium matte; Color Anodic Coating, Architectural Class I, 0.018 mm or thicker complying with AAMA 611.

2.2 ALUMINUM ENTRANCES

- A. Thermally Broken Aluminum Entrances: Aluminum extrusions conforming to ASTM B221, alloy G.S.10A-T5, 1/8" (0.125") minimum wall thickness; medium stile, 2" thick, 3-1/2" wide top rail and vertical stiles, 10" wide bottom rail; manufacturer's standard glazing stops, with exterior stops anchored for non-removal. Provide Insul-bar type thermal barrier consisting of two strips of crimped in place glass reinforced polyamide 6/6 nylon thermal barriers with a minimum 1/4" separation between interior and exterior frame components.
 - 1. EfcO Corporation, Thermastile Entrances.
 - 2. Kawneer Company, Inc., 360 Insulclad Entrances.
 - 3. Oldcastle Building Products, MS-375TC.
 - 4. Provide thermally broken aluminum entrance doors at Door 126C and all other exterior aluminum door locations without a vestibule.
- B. Color Anodic Finish: CW-2 shall have a Class I, Dark Bronze Anodized finish conforming AA-M12C22A42/A44, (Mechanical Finish) nonspecular as fabricated; Chemical Finish, medium matte; Color Anodic Coating, Architectural Class I, 0.018 mm or thicker complying with AAMA 611.

C. Accessories:

1. Weatherstripping: Manufacturer's standard head, jamb, and meeting stile weatherstripping.

2.3 GLASS AND GLAZING MATERIALS

- A. Glazing Materials: As specified in Section 08 80 00.

2.4 DOOR HARDWARE

- A. Butts: 4 1/2" x 4-1/2" ball bearing butt hinge.
- B. Deadatch: Adams Rite 4900 Heavy Duty Dead Latch.
- C. Pulls: Ives 8103EZHD-2 – 12" C-to-C BHMA 630 – Satin Stainless Steel.
- D. Push Bar: Ives 9100HD BHMA 630 – Satin Stainless Steel.
- E. Closers: LCN 4040-Cush.
- F. Thresholds: 1/2" x 4" mill finish aluminum threshold.
- G. Weatherstripping and Sweeps: Manufacturer's standard.

2.5 SEALANT MATERIALS

- A. Sealant and Backing Materials: As specified in Section 07 92 00.

2.6 ACCESSORIES

- A. Fasteners: Aluminum or non-magnetic stainless steel, warranted by manufacturer to be non-corrosive and compatible with aluminum components. Avoid use of exposed fasteners. Provide matching Phillips flat-head screws for exposed fasteners.
- B. Glazing Accessories: Manufacturer's standard elastomeric glazing gaskets and setting blocks designed specifically for specified system.

2.7 FABRICATION

- A. Fabricate doors and frames allowing for minimum clearances and shim spacing around perimeter of assembly. Shop fabricate frame components where possible.
- B. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof.
- C. Develop drainage holes with moisture pattern to exterior.
- D. Prepare components to receive anchor devices. Fabricate anchorage items.
- E. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- F. Prepare components with required internal reinforcement for door hardware.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions, or more stringent requirements indicated.
- B. Use anchorage devices to securely attach frame assembly to structure.
- C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- D. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.
- E. Install glass in accordance with Section 08 80 00, using dry method of glazing.

- F. Install perimeter sealant and backing materials, in accordance with Section 07 92 00.
- G. Adjust operating hardware.

3.3 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant **manufacturer**.

PART 4 - SCHEDULES

4.1 ALUMINUM ENTRANCE HARDWARE SCHEDULE

Group 01: Each door shall have:

Butts (4)	5BB1HW 4 1/2 x 4 1/2 - 630
Deadlatch	Adams Rite 4900
Latch Paddle	Adams Rite 4590
Cylinder (1)	Removavle Core Mortise Cylinder
Pull	Ives 8103EZHD-2 – 12" C to C BHMA 630.
Push Bar	Ives 9100HD BHMA 630
Stile Plates	BBW 445 (mount above push bar)
Stile Plates	BBW 446 (mount above pull)
Closer	LCN 4040-Cush
Threshold	Reese S245A
Weatherstripping	Door Manufacturer's Standard

Note: Install top post of pull B B with one post of push bar.

END OF SECTION

SECTION 08 80 00 – GLASS AND GLAZING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Glass and glazing for aluminum entrances and curtain wall system.

1.2 RELATED SECTIONS

- A. Section 07 92 00 - Joint Sealers: Sealant and back-up materials.
- B. Section 08 41 13 – Aluminum Entrances and Storefronts.

1.3 REFERENCES

- A. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
- B. ASTM C1036 - Specification for Flat Glass.
- C. ASTM C1048 - Specification for Heat Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants
- F. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants
- H. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass
- I. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings
- J. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation
- K. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010.
- L. CPSC 16CFR-1201 - Consumer Product Safety Commission, Safety Standard for Architectural Glazing Materials, current edition.
- M. FS DD-M-411 - Mirrors, Plate Glass, Framed and Unframed.
- N. GANA (SM) - FGMA Sealant Manual; Glass Association of North America.
- O. Insulated Glass Certification Council (IGCC).
- P. NFPA 252 – Fire Tests of Door Assemblies.
- Q. NFPA 257 – Fire Test for Window and Glass Block Assemblies.
- R. Glass Association of North America (GANA): Glazing Manual.
- S. SIGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units; Sealed Insulating Glass Manufacturers Association; 2004
- T. National Fenestration Rating Council Inc. (NFRC).

1.4 SUBMITTALS

A. Material and Equipment Submittals: Submit the following:

1. Product Data:

- a. Glass Units: Provide product data indicating compliance with specified requirements. Include information on size limitations, glazing materials, glass and special handling or installation requirements.
- b. Glazing Sealant: Provide data on glazing sealant. Identify colors available.

2. Samples:

- a. Glass Units: Submit three 12" x 12" samples of each type of glass as specified.
- b. Glazing Sealant: Submit color samples for color selection.

3. Submittals specified in this Section shall be incorporated into submittal specified in other Sections, where glass is to be provided in those Sections.

4. Shop Drawings: Show size and thicknesses of glass, proposed "bites" in frames, sizes and locations of blocking, spacers, beads, stops and edge treatments. Note quality, type and strength of each light.

B. Sustainable Design Submittals: Sustainability Data: Submit Sustainability Data for each Sustainability Focus Material in accordance with Section 01 81 13 - Sustainable Design Requirements.

- 1. Low Emitting Materials: Submit laboratory test reports indicating that glazing products comply with the requirements for low emitting materials.
- 2. VOC Content: Submit product data for interior sealants indicating compliance with VOC content requirements.

C. Quality Assurance Submittals: Submit the following:

- 1. Submit glass manufacturer's written and graphic analysis demonstrating compliance with requirements as follows:
 - a. Indicate the design criteria for each worse case glazing condition.
 - b. Indicate calculations verifying conformance to thermal and structural criteria for each worse case glazing condition.
 - c. For each separate worse case glazing condition, indicate glass thickness, type, and whether glass is annealed, heat-strengthened, or tempered.
- 2. Submit coated glass manufacturer's written verification of review and approval of all glazing details and conditions, including pocket widths, edge bites and edge stresses, and glass thicknesses.
- 3. Submit structural glazing sealant manufacturer's written recommendations and approvals for structural glazing installations.

D. Warranty: Submit draft of manufacturer's and fabricator's warranty for Architect's review.

E. Certification: Submit written certification that the exterior structural glazing system was installed in strict accordance with the written recommendations of the structural glazing sealant manufacturer.

F. Closeout Submittals: Submit the following:

- 1. Warranty: As specified in this Section.

1.5 QUALITY ASSURANCE

- A. Comply with safety glazing requirements of ASTM Z97.1 and CPSC 16CFR1201.
- B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).
- C. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, ultra-clear float glass, tinted glass, laminated glass, and insulating glass.
- D. Source Limitations for Glass Sputter-Coated with Solar-Control Low-E Coatings: Where solar-control low-e coatings of a primary glass manufacturer that has established a certified fabricator program is specified, obtain sputter-coated solar-control low-e-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer.
- E. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.
- F. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.
 - 1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
 - 2. Glass Testing Agency Qualifications: An independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- G. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.
 - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
 - 2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in area, provide glazing products that comply with Category II materials, and for lites 9 sq. ft. or less in area, provide glazing products that comply with Category I or II materials.
- H. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
- I. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
 - 1. Insulating Glass Certification Council.
- J. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Provide cushions at edges of glass to prevent impact damage during shipment and storage.
- B. Keep vacuum cups free from foreign material that could scratch glass.
- C. Comply with insulating unit fabricators requirements for limits on exposure to reduced barometric pressure during shipment.

1.7 WARRANTY

- A. Submit the following warranties:
- B. Insulating Glass Unit Warranty
 - 1. Furnish ten year manufacturer's warranty, including coverage of units for seal failure, interpane dusting or misting, and replacement of same.
 - 2. Provide a ten (10) year warranty to include coverage for coated glass from deterioration of glass and coatings (solar control, low-E, and spandrel frits) due to normal conditions of use, including cleaning, which is consistent with manufacturer's recommended cleaning methods and replacement of same.
 - 3. Provide a ten (10) year warranty to include coverage for delamination of laminated glass and replacement of same.
 - 4. Include all labor and materials for replacement of failed unit(s). Replacement shall include coordination with the Owner, immediate provision for maintaining openings secure and weathertight, timely ordering and fabrication of replacement items as required, installation, and cleaning.

PART 2 - PRODUCTS

2.1 INSULATED GLASS MATERIALS

- A. **LoE Coated Clear Insulated Glass Units (GL-1):** Insulated Glass Units to be in compliance with ASTM E2190; dual sealed unit with primary polyisobutylene seal, secondary silicone seal and a 1/2" airspace; total unit thickness of 1". Provide black spacer.
 - 1. Outboard Glass Substrate: 1/4" thick, clear glass conforming to ASTM C1036 Type I, Class 1, q3, 1/4" thick with LoE coating applied to the No. 2 surface.
 - 2. Inboard Glass Substrate: 1/4" thick, clear glass conforming to ASTM C1036 Type I, Class 1, q3, 1/4" thick.
 - 3. Visible Light Transmittance: 70 percent.
 - 4. Exterior Visible Light Reflectance: 11 percent.
 - 5. Shading Coefficient: 0.45.
 - 6. Solar Heat Gain Coefficient (SHGC): 0.39.
 - 7. U-Value, Winter: 0.29.
 - 8. Basis of Design: Vitro Architectural Glass, Solarban 60 (2) Clear + Clear.
 - 9. Alternate Products. Subject to conformance with the requirements specified above the following manufacturers and products are also acceptable.
 - a. Sungate 400 (2) Clear + Clear.
 - b. Guardian SN68 Clear + Clear.
- B. **Tempered LoE Coated Clear Insulated Glass Units (GL-1T):** Insulated Glass Units to be in compliance with ASTM E2190; dual sealed unit with primary polyisobutylene seal, secondary silicone seal and a 1/2" airspace; total unit thickness of 1". Provide black spacer.
 - 1. Outboard Glass Substrate: 1/4" thick, tempered, clear glass conforming to ASTM C1048 Type I, Class 2 - Tinted, q3, Kind FT with LoE coating applied to the No. 2 surface.
 - 2. Inboard Glass Substrate: 1/4" thick, tempered clear glass conforming to ASTM C1048 Type I, Class 1 - Clear, q3, Kind FT.
 - 3. Visible Light Transmittance: 70 percent.
 - 4. Exterior Visible Light Reflectance: 11 percent.
 - 5. Shading Coefficient: 0.45.
 - 6. Solar Heat Gain Coefficient (SHGC): 0.39.
 - 7. U-Value, Winter: 0.29.
 - 8. Basis of Design: Vitro Architectural Glass, Solarban 60 (2) Clear + Clear.
 - 9. Alternate Products. Subject to conformance with the requirements specified above the following manufacturers and products are also acceptable.
 - a. Sungate 400 (2) Clear + Clear.
 - b. Guardian SN68 Clear + Clear.
- 10. Provide GL-1T where indicated on Drawings and at other locations as required to comply with Code Required Safety Glazing requirements.

2.2 GLAZING ACCESSORIES

- A. Silicone Glazing Sealant: Compatible with insulating glass seal. Specified in Section 07 90 00.
- B. Butt Glazing Sealant: Compatible with insulating glass seal. Specified in Section 07 90 00.
- C. Setting Blocks: Silicone, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- D. Edge Blocks/Shims: Silicone, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- E. Glazing Clips: Manufacturer's standard type.
- F. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; Architect selected color.

2.3 FABRICATION

- A. Insulating Glass Units:
 - 1. Dual lite units fabricated from glass as scheduled; 1/2 inch nominal airspace; dual seal system.
 - 2. Edge Seal: Dual Seal System: polyisobutylene primary seal and silicone secondary seal. Outer seal shall be compatible with glazing system.
 - 3. Spacer Bar: Mill finish aluminum; fill with desiccant; bent and soldered corners and a straight butyl injected key joint.
 - 4. Certified through the Insulating Glass Certification Council (IGCC) in accordance with ASTM E2190.
 - 5. Each piece shall bear certification number, date, and manufacturer's identification mark.
 - 6. Assembly of insulating units shall be by a fabricator approved by the glass materials manufacturer.
- B. Tempered and Heat Strengthened Glass
 - 1. Tempered Glass: ASTM C1048, FT; glass which has been heat treated to strengthen glass in bending to not less than 4 times the annealed strength; certified safety glass in accordance with ANSI Z97.1 and/or 16 CFR 1201.
 - 2. Heat Strengthened Glass: ASTM C1048, HS; glass which has been heat treated to strengthen glass in bending to not less than 2 times annealed strength.
 - 3. Fabricate tempered and heat strengthened glass units so that roller distortion and/or ripples shall run in the same direction for the entire job. Unless precluded by the manufacturing process, roller-wave shall be orientated in the horizontal direction. All glass shall be heat-treated through the horizontal tempering process
 - 4. Unless otherwise approved by the building official, provide manufacturer's label on each light, indicating type and thickness of glass.
 - 5. Comply with IBC 2006 requirements for identification and labeling of safety-glazing materials in hazardous locations subject to human impact loads.
 - 6. Fabrication Process: Horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated
- C. Laminated Glass (PVB):
 - 1. Comply with ASTM C1172
 - 2. Two layers of glass as scheduled with a minimum .030 inch thick polyvinyl butyral (PVB) interlayer. Use minimum .060 thick polyvinyl butyral (PVB) interlayer at skylight conditions with heat treated glass.
 - 3. Film:
 - a. Type: Polyvinyl butyral sheets, uniform in color, specifically manufactured for use in fabrication of laminated glass sheets, ultraviolet stabilized, uniform thickness as specified.
 - b. Translucent Laminating Film: As selected by Architect.
- D. Low E Reflective Coating: ASTM C1376; Coating shall be applied by using magnetic enhanced sputtered vacuum deposition technology; thickness as required to obtain the performance levels scheduled.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.
- C. Verify surfaces of glazing channels or recesses are clean, free of obstructions, and ready for work of this Section.
- D. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

- A. Clean contact surfaces and wipe dry.
- B. Seal frame corner joints, and other leakage points with sealant. At insulating glass units the sealant shall be compatible with the seal of the unit. Do not plug weep holes.
- C. Prime surfaces scheduled to receive sealant, unless otherwise recommended by the sealant manufacturer.

3.3 INSTALLATION

- A. Setting Blocks: Place minimum 4" long setting blocks in frames for support of glass. Place at quarter points unless otherwise recommended by glass manufacturer in writing or approved otherwise.
- B. Set glass tightly in position with proper clearances in accordance with the referenced standards.
- C. Perimeter glass clearances within setting frame shall be in accordance with GANA recommendations, and as required by the glass manufacturer to provide for wind, earthquake drift, and thermal expansion.
- D. Unless specified otherwise, glaze units with gaskets furnished with the framing systems specified in other sections.
- E. Adjust glazing materials to form a uniform sight line.

3.4 CLEANING

- A. After installation, mark pane with an "X" by using plastic tape or removable paste.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after work is completed.

END OF SECTION

SECTION 09 21 00 - GYPSUM SHEATHING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass mat faced exterior gypsum sheathing.

1.2 RELATED SECTIONS

- A. Section 06 10 00 – Rough Carpentry: Wood blocking and framing.

1.3 REFERENCES

- A. ASTM C1177, "Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- B. ASTM C1002 - Steel Screws for the Application of Gypsum Board.
- C. GA-201 - Gypsum Board for Walls and Ceilings.
- D. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.

1.4 QUALITY ASSURANCE

- A. Applicator: Company specializing in gypsum board systems work with 3 years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and protect products at the site in accordance with manufacturer's instructions.
- B. Deliver materials in original packages, containers or bundles bearing brand name, applicable standard designation, and name of manufacturer.
- C. Store materials under cover and keep them dry and protected from damage. Stack gypsum sheathing flat to prevent sagging.

1.6 SUBMITTALS

- A. Material and Equipment Submittals: Submit the following:
 - 1. Product Data: Submit product data for exterior gypsum sheathing.
 - 2. Samples: Submit samples of exterior gypsum sheathing.

PART 2 - PRODUCTS

2.1 FIBERGLASS MAT FACED EXTERIOR GYPSUM SHEATHING (G SHT-1)

- A. Glass Mat Faced Gypsum Sheathing (**G SHT-1**): ASTM C1177; silicone treated Type X gypsum core surfaced with inorganic glass fiber mat on the front and back; fire rated, 5/8" thick, 4'-0" wide x maximum permissible length; square cut edges and ends. Glass mat faced gypsum sheathing shall be noncombustible when tested in accordance with ASTM E136 and shall have a flame spread of 5 and smoke developed of 0 when tested in accordance with ASTM E84. Type X when tested in accordance with ASTM E119.
 - 1. Georgia Pacific, Dens-Glas Fireguard Gold.
 - 2. National Gypsum, Gold Bond eXP Fire Shield Type X Sheathing.
 - 3. USG Securock UltraLight Glass-Mat Sheathing Firecode X.

B. Panel Physical Characteristics

1. Panel complies with requirements of both ASTM C 1177 and C1396.
2. Classification: Type X, when tested in accordance with ASTM E 119.
3. Racking Strength - Ultimate: 711 lbs/lin ft. when tested in accordance with ASTM E72.
4. Flexural Strength - Parallel: 90 lbs, when tested in accordance with ASTM C473.
5. Humidified Deflection: less than 1/8 inch when tested in accordance with ASTM C473.
6. Nail Pull Resistance: 90 lbs, when tested in accordance with ASTM C473.
7. Water Absorption: less than 10% when tested in accordance with ASTM C473.
8. Surface Water Absorption: less than 1% when tested in accordance with ASTM C473.
9. Permeance: greater than 10 perms, when tested in accordance with ASTM E96.
10. Combustibility: Noncombustible when tested in accordance with ASTM E136.
11. Flame Spread/Smoke Developed: 5/0 when tested in accordance with ASTM E84.
12. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273.

2.2 ACCESSORIES

- A. Screws: ASTM C1002.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on Drawings.
- B. Beginning of installation means acceptance of substrate.

3.2 EXTERIOR GYPSUM SHEATHING

- A. Install glass mat faced sheathing with gold side facing out.
- B. Screw attach glass mat faced gypsum sheathing to framing using cadmium-plated fasteners. Provide size and spacing as recommended by sheathing manufacturer. Locate fasteners a minimum of 3/8" at from edges and ends of panels. Screw heads shall be flush with gypsum sheathing surface.

3.3 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8" in 10 feet in any direction, non-cumulative.

END OF SECTION

SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation:
 - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.
- B. Surface finish as scheduled:
 - 1. Painting interior and exterior exposed items and surfaces shown and otherwise scheduled to be painted.
 - 2. Surface preparation, priming and coats of paint specified in addition to shop-priming and surface treatments specified under other Sections of the Work.
 - 3. Field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the mechanical and electrical work in paint finished spaces.

1.2 RELATED SECTIONS

- A. Section 09 96 53 – Elastomeric Coatings: Coating for existing Exterior Insulation and Finish Systems (EIFS).
- B. Mechanical and Plumbing: Identification of mechanical equipment.
- C. Electrical: Identification of electrical equipment.

1.3 REFERENCES

- A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
- B. ASTM D2016 - Test Method for Moisture Content of Wood.

1.4 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.5 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with three years experience.
- B. Applicator: Company specializing in commercial painting and finishing with 3 years experience.
- C. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other Sections of these Specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required. Notify the Architect, in writing, of anticipated problems using specified coating systems with substrates primed by others.
- D. No claims as to the suitability of materials specified, or the applicator's inability to produce first class finishes with these materials will be considered unless such claims are made in writing prior to the start of the painting work.
- E. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only within recommended limits.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame, fuel, smoke rating requirements for finishes.

1.7 SUBMITTALS

- A. Material and Equipment Submittals: Submit the following:
 - 1. Product data.
 - 2. Samples: Submit three 6" x 6" samples illustrating range of colors and textures available for each surface finishing product scheduled, for selection.
 - 3. Manufacturer's application instructions.
 - 4. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
 - 5. Sustainability Data: Submit Sustainability Data for each Sustainability Focus Material in accordance with Section 01 81 13 - Sustainable Design Requirements

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.
- B. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
- C. Store paint materials at minimum ambient temperature of 45 deg. F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.
- D. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 deg. F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
- C. Minimum Application Temperatures for Latex Paints: 45 deg. for interiors; 50 deg. F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish Finishes: 65 deg. F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 - PRODUCTS

2.1 PRIMERS

- A. Rust Inhibiting Primer:
 - 1. ICI Dulux, 4020 Devflex Direct to Metal Primer & Flat Finish.
 - 2. Pratt and Lambert, Steeltech® Universal Acrylic HP Primer.
 - 3. Diamond Vogel Paints, CoteAll Multi-Purpose Alkyd Primer or Vers-Acryl 200 Acrylic Maintenance Primer/Finish.
- B. Exterior Exposed Architectural Steel:
 - 1. Primer: Tnemec Series 90-97 Tneme-Zinc Primer.
 - 2. Intermediate Coat: Tnemec Series 161 Tneme-Fascore.

2.2 FINISH PAINTS

- A. Semi-Gloss Alkyd Enamel:
 - 1. ICI Ultra-Hide Alkyd Semi-Gloss 1516.
 - 2. Moore, Alkyd Dulamel Eggshell 305.
 - 3. Diamond Vogel Paints, Satinamel .
- B. Exterior Exposed Architectural Steel:
 - 1. Finish Coat: Tnemec Series 1075U Endura-Shield II Semi-Gloss Acrylic Polyurethane.
- C. Acrylic Insulation Coating:
 - 1. Tnemec Series 971 Aerolon Acrylic.
- D, Exterior Masonry Stain:
 - 1. Tnemec, 617.

2.3 PAINT MATERIALS – GENERAL

- A. Chemical Components of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions:
 - 1. Flat Paints and Coatings: VOC content of not more than 50 g/L
 - 2. Non-Flat Paints and Coatings: VOC content of not more than 150 g/L
 - 3. Anticorrosive Coatings: VOC content of not more than 250 g/L.
 - 4. Varnishes and Sanding Sealers: VOC content of not more than 350 g/L
 - 5. Stains: VOC content of not more than 250 g/L
 - 6. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings)
 - 7. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.

2.3 MISCELLANEOUS MATERIALS

- A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions that may potentially affect proper application or final appearance.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Concrete: 12 percent.
- D. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

- A. Correct minor defects and clean surfaces which affect work of this Section.
- B. Shellac and seal marks which may bleed through surface finishes.
- C. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach or commercial mildew removers. Rinse with clean water and allow surface to dry.
- D. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing.
- E. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- F. Concrete Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil, grease and form release agents with a solution of tri-sodium phosphate or appropriate commercial solvent; rinse well and allow to dry. Remove stains caused by weathering or corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- G. Uncoated Steel and Iron Surfaces: Remove grease, scale, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- H. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- I. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.3 PROTECTION

- A. Protect elements surrounding the work of this Section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
- D. Remove empty paint containers from site.

3.4 APPLICATION

- A. Apply products in accordance with manufacturer's instructions or more stringent requirements specified herein.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply each coat to uniform finish.
- D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Sand lightly between coats to achieve required finish.
- F. Allow applied coat to dry before next coat is applied.

3.5 CLEANING

- A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

PART 4 - SCHEDULES

4.1 EXTERIOR PAINT SYSTEM SCHEDULE

- A. **EPS-1:** Exterior Ungalvanized Ferrous Metal:
 - 1 coat Rust Inhibiting Primer (if unprimed).
 - 2 coats Semi-Gloss Alkyd Exterior Enamel
- B. **EPS-2:** Exterior Galvanized Ferrous Metal:
 - 1 coat Galvanized Metal Primer.
 - 2 coats Semi-Gloss Alkyd Exterior Enamel
- C. **EPS-3:** Exterior Exposed Architectural Steel:
 - 1 coat Tnemec Series 90-97 Tneme-Zinc Primer 2.5-3.5 mils DFT (if primer not shop applied).
 - 1 intermediate coat Tnemec Series 161 Tneme-Fascure 4.0 – 6.0 mils DFT
 - 1 finish coat Tnemec Series 1075U Endura-Shield II Semi-Gloss Acrylic Polyurethane 2.0 – 5.0 mils DFT
- D. **EPS-4:** Acrylic Insulation Coating:
 - 1 prime coat Tnemec Series 90-97 Tneme-Zinc Primer 2.5-3.5 mils DFT (if primer not shop applied).
 - 1 Acrylic Insulation coat Tnemec Series 971 Tneme-Aerolon Acrylic 30.0 – 50.0 mils DFT
 - 1 finish coat Tnemec Series 1095 Endura-Shield II Semi-Gloss Acrylic Polyurethane 2.5 – 5.0 mils DFT

4.2 PAINT COLOR SCHEDULE

- A. **PT-1:** As specified in Section 09 96 53.
- B. **PT-2:** Refer to Materials Identifications on Sheet A301 for specific paint color selections.
- C. **STA-1:** Refer to Materials Identifications on Sheet A301 for specific paint color selections.

END OF SECTION

SECTION 09 96 53 - ELASTOMERIC COATINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Section includes surface preparation and application of elastomeric coatings to the following exterior substrates:
 - 1. Existing exterior insulation finish system walls (EIFS).

1.2 RELATED SECTIONS

- A. Section 09 91 00 – Painting.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of elastomeric coating.
- C. Samples for Verification: For each type of elastomeric coating indicated and in each color and gloss.
 - 1. Submit Samples on same type of substrate as that to receive application, 8 inches square.
 - 2. Apply coats on Samples in steps to show each separate coat, including primers and block fillers as applicable.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 5 gallons of each material, color, and texture applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Owner's Representative will select one surface to represent surfaces and conditions for application of each paint system.

- a. Vertical Surfaces: Provide one full (5' wide x full height) mock-up panel with specified finishes applied.
2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - b. Do not proceed with general application until mock-ups have been reviewed and approved by Owner's representative.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing. Approved mock-up may remain as part of the completed work.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 90 deg F unless otherwise permitted by manufacturer's written instructions.
- B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before starting or continuing coating operation.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace elastomeric coatings that fail within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Deterioration of coating beyond normal weathering.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ELASTOMERIC COATING FOR EXISTING EXTERIOR INSULATION FINISH SYSTEM (EIFS)

- A. Basis of Design Manufacturer: Sto Corporation, StoColor Lotusan Product No. 80217R.
 - 1. Substitutions: Under provisions of Section 01 25 00.
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Primer: Provide primers as recommended by coating manufacturer based upon the condition of the substrate.
 - 1. Surface Conditioner – for chalked or highly absorbent existing painted surfaces
 - a. Sto Corp, StoPrime Conditioner: water-based surface conditioner
 - 2. Primer:
 - a. Sto Corp, StoPrime (80804): Vertical above grade primer for use over prepared EIFS..

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with manufacturer's requirements for maximum moisture content, alkalinity, and other conditions affecting performance of work.
- B. Begin coating only when moisture content of substrate is 12 percent or less when measured with an electronic moisture meter.
- C. Begin coating no sooner than 28 days after substrate is constructed and is visually dry on both sides.
- D. Verify that substrate is within the range of alkalinity recommended by manufacturer.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in the "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.
- B. Remove hardware and hardware accessories, plates, machined surfaces, light fixtures, and similar items already installed that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
 - 2. Perform cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.
- D. Crack Repair: Fill cracks according to manufacturer's written instructions before coating surfaces.

3.3 ELASTOMERIC COATING APPLICATION FOR EIFS

- A. Surface Conditioner
 - 1. Do not apply primer or finish coating to StoPrime conditioner if it dries to a gloss. Remove gloss with mechanical abrasion. Omit conditioner if substrate condition is such that no conditioner is required based on mock-up and field adhesion tests
 - 2. Apply StoPrime Conditioner evenly with brush, roller or proper spray equipment to properly prepared mildly chalking substrates.
 - 3. Strictly follow application instructions for StoPrime Conditioner.
- B. Primer
 - 1. Omit primer application if substrate condition is such that no primer is required based on mock-up and field adhesion tests
 - 2. StoPrime: Apply uniformly with brush, roller, or proper spray equipment at 4-6 wet mils to prepared surface and allow to dry. Minimum final dry thickness shall be 2.3 mils.
 - 3. Finish Top Coat: Apply two uniform coats of StoColor Lotusan at 5-7 wet mils, per coat, by brush, roller, or with proper spray equipment. Apply first coat directly to prepared previously coated substrate and allow to dry completely before applying second coat. Final thickness of StoColor Lotusan shall be 2.4-3.3 dry mils, per coat.

3.4 QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following testing procedures:
 - 1. Owner may engage the services of a qualified testing agency to sample materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance of materials with product requirements.
 - 3. Owner may direct Contractor to stop coating application if test results show materials being used do not comply with requirements. Remove noncomplying materials from Project site, pay for testing, and recoat surfaces that were coated with rejected materials. Remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.
- B. Field Testing and Inspection: Owner reserves the right to engage the services of a qualified testing agency to verify installed thickness of elastomeric coatings.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities, touch up and restore damaged or defaced coated surfaces.

END OF SECTION

SECTION 10 99 00 - MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Mail Box

1.2 SUBMITTALS

- A. Material and Equipment Submittals: Submit the following under provisions of Section 01 33 00:
 - 1. Shop Drawings: Submit Shop Drawings indicating utility anchorage requirements and installation details.
 - 2. Product Data: Submit Product Data for approval.

PART 2 - PRODUCTS

2.3 MAIL BOX

- A. Mail Box: Epoch Design, Metro Mail Boss No. 7163 wall mount locking mail box.
 - 1. Color: As selected by Architect from manufacturer's standard color selections.

PART 3 - EXECUTION

2.1 INSTALLATION - GENERAL

- A. Install miscellaneous specialties in accordance with manufacturer's instructions.
- B. Install specialties plumb, true and square, in a neat, rigid, and substantial manner.
- C. After erection, clean surfaces.

END OF SECTION

SECTION 32 13 13 - CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete walks, stair steps, curbs, curb and gutter, parking areas, and roads.

1.2 RELATED REQUIREMENTS

- A. MnDOT Standard Specifications for Construction

1.3 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- B. ACI 301 - Specifications for Structural Concrete 2016.
- C. ACI 305R - Guide to Hot Weather Concreting 2010.
- D. ACI 306R - Guide to Cold Weather Concreting 2016.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- F. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2020.
- G. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2020.
- H. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.
- I. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.
- J. ASTM D8139 - Standard Specification for Semi-Rigid, Closed-Cell Polypropylene Foam, Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction 2017.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler, admixtures, and curing compound.
- C. Design Data: Concrete mix design.

PART 2 PRODUCTS

3.1 FORM MATERIALS

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish concrete paving work.
- B. Form Materials: Plywood, wood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 - 1. Use flexible or curved forms for all curves with a radius. For all curved pavement with a radius of 100 feet or less, set forms using a center pivot point and a flexible tape measure to swing a uniform arc.
- C. Formwork Accessories
 - 1. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
 - a. Composition: Colorless, reactive, water-based or solvent-based compound.
 - b. Do not use materials containing diesel oil or petroleum-based compounds.

3.2 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength; deformed billet steel bars; unfinished.

3.3 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.
- B. Concrete Materials: Provide in accordance with South Dakota DOT Standard Specifications for Roads and Bridges.

3.4 ACCESSORIES

- A. Curing Compound: ASTM C309, Type 1, Class A.
- B. Slab Isolation Joint Filler: 1/2 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 D8139, semi-rigid, closed-cell polypropylene foam.

3.5 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required minimum 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 Landscape Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- D. Concrete Properties:
 - 1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 4000 psi.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Cement Content: Minimum 600 lb per cubic yard.
 - 4. Water-Cement Ratio: Maximum 42 percent by weight.
 - 5. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
 - 6. Maximum Slump: 3 inches.

3.6 MIXING

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

PART 3 EXECUTION

5.1 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

5.2 BASE COURSE

- A. Prepare base course in accordance with South Dakota DOT Standard Specifications for Roads and Bridges.

5.3 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.

5.4 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

5.5 REINFORCEMENT

- A. Place reinforcement as indicated.

5.6 COLD AND HOT WEATHER CONCRETING

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

- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

5.7 PLACING CONCRETE

- A. Place concrete in accordance with South Dakota DOT Standard Specifications for Roads and Bridges.
- B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

5.8 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 1/2 inch wide expansion joints at 35 foot intervals and to separate paving from vertical surfaces and other components.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
 - 2. Secure to resist movement by wet concrete.
- C. Provide sawn scored or sawn joints.
 - 1. At locations as indicated on plans.
- D. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/4 minimum into depth of slab.

5.9 FINISHING

- A. Area Paving: Light broom, texture perpendicular to pavement direction.
- B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction.
- D. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

5.10 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- B. Maximum Variation From True Position: 1/4 inch.

5.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
 - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.
 - 2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
 - 3. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
 - 1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - 2. Perform one slump test for each set of test cylinders taken.
- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

5.12 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian or vehicular traffic over pavement until 75 percent design strength of concrete has been achieved.

END OF SECTION

SECTION 32 33 00 - SITE FURNISHINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Waste & Recycling Receptacles
- B. Bike Racks
- C. Decorative Planters
- D. Table and Chairs
- E. Cable Railing
- F. Light Bollards
- G. Tree Grates.
- H. Limestone Block

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.
- C. Shop Drawings: Indicate plans for each unit or group of units, elevations with model number, overall dimensions, construction, and anchorage details.

PART 2 PRODUCTS

3.1 PRODUCT NOTES

- A. See plans for quantities.
- B. See Drawings & Detail Sheets for product item names, materials, suppliers, colors, and finishes.

PART 3 EXECUTION

5.1 EXAMINATION

- A. Verify proper installation of mounting surfaces, preinstalled anchor bolts, and other mounting devices; and ready to receive site furnishing items.
- B. Do not begin installation until unacceptable conditions are corrected.

5.2 INSTALLATION

- A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.
- B. Provide level mounting surfaces for site furnishing items.

END OF SECTION

SECTION 32 80 00 - PLANTING IRRIGATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe and fittings, valves, sprinkler heads, emitters, and accessories.
- B. Control system.

1.2 DEFINITIONS

- A. Lateral Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
- B. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.
- C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.3 PERFORMANCE REQUIREMENTS

- A. Design, furnish and install a complete automatic irrigation system for the turf and plant bed areas as shown on the plans. Work to include layout, trenching, piping, backfill, valves, valve boxes, risers, emitters and controls.
- B. Delegated Design: design 100 percent head-to-head coverage irrigation system, including comprehensive analysis by a qualified irrigation designer, using performance requirements and design criteria indicated.
 - 1. Overspray onto buildings, sidewalks and parking or driveways is not permitted.
- C. Minimum Working Pressures; pipe shall be selected to accommodate twice the anticipated water pressure or pipe indicated below, whichever is greater.
 - 1. Main Piping: 200 psi
 - 2. Lateral Piping: 100 psi

1.4 REFERENCE STANDARDS

- A. ASTM D1784 - Standard Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds 2020.
- B. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series) 2020.
- C. ASTM D2464 - Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80 2015.
- D. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40 2021.
- E. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems 2020.
- F. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals 2019.
- G. ASTM F656 - Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings 2021.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work with site backfilling, landscape grading and delivery of plant life.
- B. Preinstallation Meeting: Convene one week prior to commencing work of this Section.

1.6 FIELD DIMENSION AND LAYOUT

- A. The Contractor is responsible for furnishing, setting, and marking all line, grade, and location stakes including offsets and general construction staking.
- B. Electronic design files WILL be available to the Contractor upon request, subject to the following conditions:

1. A signed Electronic File Transfer Agreement shall be required from each Contractor requesting the electronic design files prior to distribution.
2. Electronic design files will be distributed as DWG files. The Contractor will be responsible for obtaining the appropriate software to open, analyze, and/or convert these file formats for their own use, and understand the risks and limitations associated with that software

1.7 SUBMITTALS

- A. Product Data: The Contractor shall submit catalog information of all equipment for approval.
- B. Delegated Design Submittal: Comply with the following performance requirements and design criteria, including analysis data.
 1. Water service point-of-connection and pressure.
 2. Zone control valves.
 3. Piping layout and sizes.
 4. Sprinkler/emitter locations, head types and area of coverage.
 5. Schedule of irrigation equipment indicating type, model, size and quantity.
 6. Typical irrigation installation details.
 7. Location of sleeves under pavement.
- C. Qualification Data for Installer: Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- D. Operation and Maintenance Data:
 1. Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.
 2. Provide schedule indicating length of time each valve is required to be open to provide a determined amount of water.
- E. Statement of Warranty: Describing an understanding of the required warranty. Provide name and phone number for responsible contact. Include product warranties for each component warranted by manufacturer.
- F. Record Documents: The Contractor is responsible for documenting changes to the design.
 1. Record work that is installed differently than shown on the construction shop drawings. Record pipe and wiring network alterations and location changes to equipment. Keep documents current. Do not permanently cover work until as-built information is recorded.
 2. Turn over the "Record Drawings" to the Landscape Architect. Completion of the Record Drawings will be a prerequisite for irrigation system substantial completion and final payment.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: An installer that has successfully installed projects of similar scope and size, with minimum three years of experience.
 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

1.9 WARRANTY

- A. The purpose of this guarantee/warranty is to ensure that the Owner receives irrigation materials of prime quality, installed and maintained in a thorough and careful manner.
- B. For a period of one year from date of Project Substantial Completion, the Contractor will guarantee/warranty irrigation materials, equipment, and workmanship against defects. Fill and repair depressions. Restore landscape or structural features damaged by the settlement of irrigation trenches or excavations. Repair damage to the premises caused by a defective item. Make repair within seven days of notification from the Owner's Representative.

1. Contract documents govern replacements identically as with new work. Make replacements at no additional cost to the contract price.
2. Guarantee/warranty applies to originally installed materials and equipment and replacements made during the guarantee/warranty period.
- C. Provide winterization and spring start up services at no additional charge during the warranty period.

PART 2 PRODUCTS

3.1 IRRIGATION SYSTEM

- A. Electric solenoid controlled underground irrigation system, with pressure blow-out drain.

3.2 PIPE MATERIALS

- A. PVC Pipe: ASTM D2241; 200 psi pressure rated; solvent joints.
- B. PE Pipe with Controlled ID: ASTM F 771, PE 3408 compound; SDR 15.
 1. Insert Fittings for PE Pipe: ASTM D 2609, nylon or propylene plastic with barbed ends. Include bands or other fasteners.
- C. Fittings:
 1. PVC Socket Fittings: ASTM D 2466, Schedule 40.
 2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.
 - a. All threaded connections shall be sealed using Teflon tape or paste.
- D. Pipe Risers at Valves: Schedule 80 PVC nipples.
- E. Solvent Cement: ASTM D2564 for PVC pipe and fittings. Include primer according to ASTM F656.
- F. Sleeves: Sleeves for pipes passing beneath paving shall conform to ASTM D2241, Schedule 40. Minimum diameter of 4 inch or 2 sizes larger than pipe scheduled to pass through them.

3.3 OUTLETS

- A. Sprinkler performance must meet or exceed the product specified in the irrigation schedule, except gallons per minute flow may not be exceeded by more than 5%
 1. Rotary Type Sprinkler Head: Gear drive mechanism; fully adjustable for flow and pressure; size as indicated; with letter or symbol designating degree of arc and arrow indicating center of spray pattern.
 - a. Description:
 - 1) Body Material: ABS
 - 2) Nozzle: ABS
 - 3) Retraction Spring: Stainless steel.
 - b. Capacities and Characteristics:
 - 1) Flow varies as required to provide uniform distribution within each irrigation zone.
 - 2) Pop-up Height: 4-inches to 5-inches, aboveground to nozzle.
 - 3) Arc: Variable, adjustable dependent upon location. Adjustable heads are not acceptable for use in 360 degree applications.
 - 4) Inlet: bottom inlet, NPS 3/4" or 1".
 2. Pop-Up Spray Type Sprinkler Head:
 - a. Description:
 - 1) Body Material: ABS
 - 2) Nozzle: ABS, color coded.
 - 3) Retraction Spring: Stainless steel.
 - 4) Pattern: Fixed, with flow adjustment.
 - b. Capacities and Characteristics:

- 1) Flow: Varies as required to provide uniform distribution within each irrigation zone.
 - 2) Pop-up Height: 4-inches, aboveground to nozzle.
 - 3) Pressure-Regulated to 30 PSI.
 - 4) Arc: Full, half, quarter, or variable pattern nozzle as required to minimize overspray.
 - 5) Radius: Varies, up to 15 feet.
 - 6) Inlet: NPS 1/2. Use of side inlet is not allowed in freezing climates.
3. Pop-Up Rotary Nozzle Sprinkler Head:
- a. Description:
 - 1) Body Material: ABS
 - 2) Nozzle: ABS, color coded.
 - 3) Retraction Spring: Stainless steel.
 - 4) Pattern: Multi-stream, multi-trajectory.
 - b. Capacities and Characteristics:
 - 1) Flow: Varies as required to provide uniform distribution within each irrigation zone. As the arc and radius are adjusted, the flow rate shall change to maintain matched precipitation.
 - 2) Pop-up Height: 4-inches, aboveground to nozzle.
 - 3) Pressure-Regulated to 40 PSI.
 - 4) Arc: Infinitely adjustable arc from 45° to 105°, 90° to 210°, or 210° to 270° using the stainless steel arc ring. The full-circle sprinkler shall irrigate a full 360°.
 - 5) Radius: Varies, up to 30 feet.
 - 6) Inlet: NPS 1/2. Use of side inlet is not allowed in freezing climates.
4. Landscape Dripline:
- a. Description:
 - 1) Flexible, linear low-density polyethylene, ultraviolet (UV) resistance.
 - 2) Pressure compensating emitters factory molded into tubing at set intervals to deliver water at 10-60 PSI
 - 3) Fittings: UV-resistant, glass reinforced polypropylene
 - b. Capacities and Characteristics:
 - 1) Emitter spacing: 12-inch.
 - 2) Emitter flow: 0.4 GPH and 0.6 GPH.
 - 3) Line spacing: as determined through delegated design for project application.
 - 4) Flush cap at the end of each run for winterization.
 - 5) One operation indicator per zone shall provide a visual indication of system operation.
 - 6) Air relief valve at the high point of each zone.
 - c. Pressure Regulating Filter:
 - 1) Capable of operating between 20 - 120 PSI
 - 2) The downstream pressure shall be 25 or 40 PSI regardless of variations in upstream pressure.
 - 3) 150 mesh stainless steel filter, removable cap for service and cleaning.
5. Quick Coupler: Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.
- a. Locking-Top Option: Vandal-resistant locking feature. Include one (1) matching key(s).

- b. Delegated design Placement and Quantity: Quick couplers to be coordinated with Owner and Landscape Architect. Coordinate location(s) with Owner.
- 6. Swing Joints: molded of rigid polyvinyl chloride (PVC). Type 1, Cell classification 12454-B per ASTM D1784, with NPT threads and pipe sockets per ASTM D2464 and ASTM D2466, respectively. Each rotating joint shall be sealed with an O-ring, installed pre-compressed in a sealing groove free of parting lines to prevent leakage. 315 psi. maximum working pressure @ 73° F when tested in accordance with ASTM D3139.
 - a. Size swing joints to match inlet.
 - b. Pressure regulating to 50 PSI.

3.4 VALVES

- A. Automatic Control Valves: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid
- B. Valve Box and Cover: with open bottom and openings for piping; designed for installing flush with grade.
 - 1. Size: As required for valves and service but no smaller than the following:
 - a. 15"x21"x12" deep for control valves.
 - b. 10" diameter for quick coupling or isolation valves.
 - c. 6" diameter for drip irrigation flush valves.
 - 2. Shape: Rectangular for control valves, circular for specialties as indicated on details.
 - 3. Material: PE or ABS.
 - 4. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/8 inch minimum to 3/4 inches maximum, to 6" depth below base of box. Install prior to box installation.

3.5 CONTROLS

- A. Irrigation systems shall be equipped with controllers that contain the following features:
 - 1. Multiple programming capabilities, capable of storing a minimum of three different programs to allow for separate schedules.
 - 2. Multiple start times (cycling, cyle/soak, stackable start times), capable of a minimum of three different start times to allow for multiple irrigation cycles on the same zone for areas prone to runoff.
 - 3. Variable run times, capable of varying run times from 1 minute to 60 minutes.
 - 4. Variable scheduling, capable of interval scheduling (minimum of 14 days) to allow for watering on even day, odd day, calendar day and interval scheduling.
 - 5. Percent adjust (water budget) feature shall include a percent up/down adjust feature that permits the user to increase or decrease the run-times for each zone by a prescribed percentage, by means of one adjustment without modifying the settings for that individual zone.
 - 6. Capable to accept external soil moisture and/or rain sensors.
 - 7. Non-volatile memory or self-charging battery circuit.
 - 8. Complete shutoff capability for total cessation of outdoor irrigation.
- B. Smart Water Application Technologies (SWAT): Provide controllers that comply with the most current definitions and testing protocols published by SWAT for:
 - 1. Controllers, Climate-based
- C. Rain sensors, equip irrigation system with rain-sensor.
- D. Two-Wire Controllers:
 - 1. Wire Conductors: 14-2 cable with solid copper conductors; insulated for direct burial and compatible with control system specified.
 - 2. Decoders shall be compatible with control system and provided in single-station configurations.
- E. All connections shall be made with 3M DBY watertight wire connectors.

PART 3 EXECUTION

5.1 EXAMINATION

- A. Verify location of existing utilities.
- B. Verify that water stub out is available, in proper location, and ready for use.

5.2 PREPARATION

- A. Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, and structures.
- B. Layout and stake locations of system components.
- C. Review layout requirements with other affected work. Coordinate locations of sleeves under paving to accommodate system.

5.3 TRENCHING

- A. Trench Size:
 - 1. Minimum Cover Over Installed Mainline Piping: 18-inches.
 - 2. Minimum Cover Over Installed Lateral Piping: 12-inches.
 - 3. Minimum Cover Over Installed Sleeve Piping: 24-inches.
 - 4. Maximum Cover Over Installed Piping: 24-inches.
- B. Trench to accommodate grade changes.
- C. Maintain trenches free of debris, material, or obstructions that may damage pipe.

5.4 INSTALLATION

- A. Install pipe, valves, controls, and outlets in accordance with manufacturer's written instructions and details found on plan sheets.
- B. Connect to water source.
- C. Set outlets and box covers at finish grade elevations.
- D. Provide for thermal movement of components in system.
- E. Use threaded nipples for risers to each outlet.
- F. After piping is installed, but before outlets are installed and backfilling commences, open valves and flush system with full head of water.

5.5 CONTROL WIRE

- A. Wire Splices: No splices between controller and valve without prior approval and documentation on as-built drawings.
- B. Install control cable in same trench as irrigation piping and at least 2-inches below, or beside, piping. Bundle wires together and tape at 10 foot intervals. Provide an 18-inch expansion loop at all sleeve ends, direction changes and at every valve box. Allow expansion coils at zone valves long enough so valve bonnet may be removed for maintenance.
- C. Control system shall be properly grounded per manufacturer's published recommendations and at a minimum shall include surge protection at every 500 feet, or every 8 decoders, whichever is smaller.

5.6 FIELD QUALITY CONTROL

- A. Tests and Inspections:
- B. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 1. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Performance Testing: After system is 100% installed, perform a coverage test to determine whether water coverage and operation of the system is adequate for planting, without areas of

excessive flooding, dry spots, areas of insufficient overlap, or excessive overspray. If the irrigation system is determined by the Owner to be inadequate due to poor workmanship or materials, it shall be replaced or repaired at Contractor's expense and both pressure and coverage tests repeated until accepted.

5.7 BACKFILLING

- A. Excavated soil may be used as backfill. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, trash, and other extraneous matter. In rocky soil provide sand backfill material around and under the piping and risers by hand to a height of 6" above all piping. Backfill shall be compacted to 95% minimum density by mechanical tamping. Trench must be free of water during backfilling operation.
- B. All backfill around valves and risers shall be mechanically compacted to 95% minimum density.
- C. Backfill trench and compact to specified subgrade elevation. Protect piping from displacement.

5.8 SYSTEM STARTUP

- A. Prepare and start system in accordance with manufacturer's instructions.
- B. Contractor will review controller programming and update or change program throughout establishment period. Programming must conform to local watering restrictions. Contractor is liable for fines associated with watering during restricted times.
- C. Adjust control system to achieve time cycles required.
- D. Adjust head types for full water coverage as directed.

5.9 CLOSEOUT ACTIVITIES

- A. Instruct Owner 's personnel in operation and maintenance of system, including adjusting of controller timing. Use operation and maintenance data as basis for demonstration.

5.10 MAINTENANCE

- A. Provide one complete spring start-up and a fall shutdown by installer, at no extra cost to Owner.

END OF SECTION

SECTION 32 92 23 - SODDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Soil Preparation.
- B. Fertilizing.
- C. Sod installation.
- D. Turf establishment.

1.2 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Growing Season: A growing season is considered May 1 to October 1.
- C. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- D. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil or imported topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

1.3 REFERENCE STANDARDS

- A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding 2006.

1.4 SUBMITTALS

- A. Certificate: Certify grass species and location of sod source.
- B. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf and grasses during a calendar year. Submit before expiration of required initial establishment period.

1.5 QUALITY ASSURANCE

- A. Sod Producer: Company specializing in sod production and harvesting with minimum five years' experience, and certified by the State of Minnesota. .
- B. Installer's Field Supervision: require Installer to maintain an experienced full-time supervisor on Projectd site when work is in progress.
- C. Pre-installation Conference: Schedule a pre-installation meeting to review soil preparation and grading with the Contractor and Landscape Architect prior to seeding.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect exposed roots from dehydration.
- B. Do not deliver more sod than can be laid within 24 hours.

PART 2 - PRODUCTS

3.1 MATERIALS

- A. Sod: TPI (SPEC), Certified Turfgrass Sod quality; cultivated grass sod; type indicated below; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft. Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.
 - 1. Kentucky Blue Grass Mix: (minimum 3 variety blend).

3.2 ACCESSORIES

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition
 - 1. Composition: 18-24-12.
 - 2. Application rate: 7.0 lb/1000 SF
- B. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.
- C. Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

PART 3 EXECUTION

5.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

5.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Prepare surface soil
 - 1. Kill existing weed growth with non-selective herbicide a minimum of two weeks prior to planting date. Apply a second application as necessary a minimum of 24 hours prior to seeding or sodding.
 - a. Apply at rate recommended by manufacturer.
 - 2. Loosen soil to a depth of 4-inches.
 - 3. Remove stones larger than 1-1/2 inches. in any dimension and sticks, roots, trash, and other extraneous matter.
 - a. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

- E. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

5.3 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to installation of sod.
- C. Apply fertilizer no more than 48 hours before laying sod.
- D. Mix thoroughly into upper 2 inches of topsoil.

5.4 LAYING SOD

- A. Moisten prepared surface immediately prior to laying sod.
- B. Lay sod immediately after delivery to site to prevent deterioration.
- C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.
- D. Where new sod adjoins existing grass areas, align top surfaces.
- E. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch below top of hard surface.
- F. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.
- G. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

5.5 ESTABLISHMENT

- A. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition **but not less than 30 days from date of Planting Completion.**
 - 1. At the end of the establishment period, an inspection will be made to determine if the sod is alive and growing. If this cannot be determined, the Contractor shall have the option of maintaining the sod until it can be determined or replacing the sod. Such maintenance or replacement shall be at the expense of the Contractor. Replaced sod shall be watered as required for original sod at the expense of the Contractor. If it is determined at the end of the maintenance period the sod is well rooted, alive and growing, the Contractor shall be relieved of the responsibility for extended maintenance.
- B. 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 single mowing.
- C. Neatly trim edges and hand clip where necessary.
- D. Immediately remove clippings after mowing and trimming.
- E. Water to prevent grass and soil from drying out. Where an irrigation system will be installed, maintain the irrigation program to keep turf uniformly moist to a depth of 4 inches. The Contractor may obtain water from Owner's existing water system for use without metering and without payment of use charges.
 - 1. Schedule irrigation to prevent wilting, puddling, or erosion.
 - 2. Adjust irrigation schedule to reduce watering as turf is established.
- F. Roll surface to remove irregularities.
- G. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- H. Immediately replace sod in areas that show deterioration or bare spots.
- I. Protect sodded areas with warning signs during maintenance period.

END OF SECTION

SECTION 32 93 00 - PLANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Topsoil bedding.
- C. New trees, plants, and ground cover.
- D. Mulch and Fertilizer.
- E. Plant establishment.
- F. Tree Pruning.

1.2 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Growing Season: A growing season is considered to be May 1 to October 1.
- D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- E. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil or imported topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- G. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

1.3 REFERENCE STANDARDS

- A. ANSI/AHIA Z60.1 - American National Standard for Nursery Stock 2014.
- B. ANSI A300 Part 1 - American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning) 2017.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Mulch
 - 2. Weed Barrier
- B. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
 - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to project site.
 - 2. Pesticide Applicator: State licensed, commercial.
- C. Planting Schedule: Submit anticipated planting schedule, indicating dates for each type of landscape work.
- D. Maintenance Agreement: Statement of required maintenance period, duties to be performed, name and contact information of individual responsible for overseeing maintenance services.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

- F. Statement of Warranty. Describing an understanding of the required warranty. Provide name and phone number for responsible contact.
- G. Plant Stock Documentation: Submit the following plant stock documentation for Approval prior to delivery of plant material to site and start of planting operations.
 - 1. List of plant life sources: Include quantities, sizes, quality, and sources for plant materials. Provide Copy of a valid nursery stock (dealer or grower) certificate registered with the State Department of Agriculture or equal department for all sources of plant life.

1.5 QUALITY ASSURANCE

- A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
- C. Pre-installation Conference: Schedule a pre-planting meeting to review preparation and planting requirements with the Landscape Architect and Contractor prior to planting. All plants, trees and shrubs shall be planted in accordance with all the drawings and specifications included in the plans.
- D. Installer Qualifications: Company specializing in installing and planting the plants with 3 years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- B. Protect and maintain plant life until planted.
 - 1. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
 - 2. Handle planting stock by root ball.
 - 3. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 4. Trees may not be stored on site for more than 24 hours prior to planting without prior approval and installation of moisture retaining cover or bedding around all root balls.

1.7 WARRANTY

- A. Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship or growth within the specified warranty period.
- B. Failures include, but are not limited to: death and unsatisfactory growth, lack of adequate maintenance and damage from falling or blowing over. The Contractor will be responsible to remove all dead plantings and trees immediately upon notification from the Landscape Architect, even if the replacement is not immediate. This requirement applies during the warranty period as well.
- C. All plants, trees and shrubs shall be **warrantied for ONE YEAR from date of Project Substantial Completion**. At the end of the warranty period the Landscape Architect shall make an inspection of the project and dead, unhealthy, or otherwise not acceptable plants, trees, and shrubs shall be replaced by the Contractor at no additional cost to the Owner.
 - 1. Notify the Owner and Landscape Architect in writing immediately upon completion of any warranty replacement plantings. For replacements after the initial establishment period has expired the Contractor shall water replacement plants for one week, after which the

Owner assumes responsibility for watering replacement plants. If written notice is not provided the Contractor shall continue to water replacement plants until notice requirements are fulfilled.

2. An intermediate warranty inspection may occur prior to the one year warranty expiration. Replacement is required within 60 days of the intermediate warranty inspection.
 - a. If a plant replaced during the intermediate warranty period dies prior to the final warranty the contractor is not required to install a second replacement without additional compensation. Requests for additional compensation must be approved prior to proceeding with the work.
3. Notify the Landscape Architect in writing with any concerns regarding Owner Maintenance of plant material during the warranty period.

PART 2 PRODUCTS

3.1 PLANTS

- A. Plants: Species and size identified in plant schedule, grown in climatic conditions similar to those in locality of the work.
- B. General: All plants, trees and shrubs shall conform to or exceed minimum quality standards as defined by the American Nursery and Landscaping Association, current edition of ANSI Z60.1, and shall be purchased from a licensed Landscape Nursery. Plants, trees and shrubs furnished shall be of the same genus, species, cultivar and size as specified in the plans. Species and variety may be substituted only by the approval of the Landscape Architect. Each plant, tree and shrub shall have an identification label, removed after the Substantial Completion inspection.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

3.2 SOIL AMENDMENT MATERIALS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition.
 1. Composition: 18-24-12.
 2. Application rate: 7.0 lb/1000 SF

3.3 MULCH MATERIALS

- A. Organic Mulch: Shredded Hardwood Cedar mulch.
 1. Color: Natural
 2. Particle size and consistency: a general mixture of fibers 4 inches in length or less.
 3. Remove any large mulch chunks that do not meet the requirements above.
- B. Weed Barriers
 1. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric.
 2. Available Products:
 - a. DeWitt Pro 5
 - b. SRW Products Pro Plus V
 - c. Or approved equal.

3.4 PESTICIDES

- A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

- B. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.
- C. Pre-Emergent Herbicide: Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

PART 3 EXECUTION

5.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

5.2 PREPARATION OF SUBSOIL

- A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.
- C. Scarify subsoil to a depth of 3 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.
- D. Dig pits and beds 6 inches larger than plant root system.

5.3 PLACING TOPSOIL

- A. Spread topsoil to a minimum depth of 18 inches over area to be planted. Rake smooth.
- B. Spread topsoil to a minimum depth of 24 inches in area with Trees.
- C. Place topsoil during dry weather and on dry unfrozen subgrade.
- D. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- E. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

5.4 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Prepare surface soil:
 - 1. Kill existing weed growth with non-selective herbicide a minimum of two weeks prior to planting date. Apply a second application as necessary a minimum of 24 hours prior to planting.
 - a. Apply at rate recommended by manufacturer.
 - 2. Loosen surface soil to a depth of at least 6 inches.

3. Remove stones larger than 1-1/2 inches. in any dimension and sticks, roots, trash, and other extraneous matter.
 - a. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- E. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

5.5 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after initial raking of topsoil.
- C. Mix thoroughly into upper 2 inches of topsoil.

5.6 TREE AND SHRUB PLANTING

- A. Place plants as indicated.
- B. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1.
 1. Expose root flare; root flare may have been buried in the root ball during growing or tree harvesting operations.
- C. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- D. Excavate planting pits with sides sloping inward at a 30-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 1. Excavate approximately five times as wide as ball diameter.
 2. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 3. Hand dig tree planting pits when in close proximity to existing utilities.
- E. Set stock plumb and in center of planting pit or trench with **root flare 1 inch above adjacent finish grades.**
 1. Use planting soil for backfill.
 2. Balled and Burlapped: After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 3. Container-Grown: Carefully remove root ball from container without damaging root ball or plant.
 4. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- F. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.
- G. Set plants vertical.
- H. Remove non-biodegradable root containers.

5.7 PLANT SUPPORT

- A. Trunk stabilization is not required unless deemed necessary by the Landscape Architect to maintain the tree in an upright position. Tree staking may be requested at any time between planting and expiration of the plant warranty period.
 - 1. Upright Staking and Tying: Use three stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend one-third of trunk height above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
 - 2. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

5.8 TREE PRUNING

- A. Prune trees as recommended in ANSI A300 Part 1.
- B. Prune newly planted trees as required to remove dead, broken, and split branches.

5.9 PERENNIAL AND ORNAMENTAL GRASS PLANTING

- A. Set out and space perennial plants and ornamental grasses according to plan and in even rows with triangular spacing.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots. Minimum of 3 times the size of the root ball.
- D. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- E. Water thoroughly within two hours after planting, taking care not to cover plant crowns with wet soil.
- F. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

5.10 PLANTING AREA MULCHING

- A. Weed barrier fabric shall be placed at the areas specified in the plans. Weed barrier fabric shall be anchored to the ground with 6" U shaped staples. The staples shall be placed at a 4' spacing along all edges, overlaps, and throughout the area of weed barrier fabric. The weed barrier fabric shall be overlapped 4" between rolls.
- B. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Trees in Turf Areas: Apply organic mulch ring of 4-inch average thickness, with 5 foot minimum diameter around trunks or stems or 12-inches outside dripline of evergreen trees. Do not place mulch within 3 inches of trunks or stems.
 - 2. Organic Mulch in Planting Areas: Apply 4-inch average thickness of organic mulch over whole surface of planting area. Finish level with adjacent finish grades.
 - a. Do not place mulch within 3 inches of trunks or stems.
 - 3. Apply pre-emergent herbicide according to manufacturer's written instruction.

5.11 ESTABLISHMENT

- A. One year Warranty.
- B. Provide maintenance during maintenance period at no extra cost to Owner; Owner will pay for water.
- C. Maintenance Period: Maintain plant life for 12 Months from date of Project Substantial Completion.
 - 1. **During the establishment period the Contractor shall be on site a minimum of one hour per week throughout the maintenance period to monitor plants, water, adjust irrigation, and weed as necessary.**
 - 2. When maintenance period has not elapsed before the end of the growing season continue maintenance during the next growing season.
 - 3. Notify the Landscape Architect in writing upon termination of the required maintenance services. The Contractor shall continue maintenance services until written notification is provided.

- D. Irrigate sufficiently to saturate root system and prevent soil from drying out.
- E. Remove dead or broken branches and treat pruned areas or other wounds.
- F. Neatly trim plants where necessary.
- G. Immediately remove clippings after trimming.
- H. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions.
- I. Control insect damage and disease. Apply pesticides in accordance with manufacturers instructions. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- J. Remedy damage from use of herbicides and pesticides.
- K. Replace mulch when deteriorated or displaced.
- L. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

END OF SECTION

SPECIAL PROVISIONS – CIVIL

The 2020 Edition of the Minnesota Department of Transportation “Standard Specifications for Construction” and the “Supplemental Specifications” from Tech Memo 22-06-TS-01 shall govern except where superseded by other project specification sections, and as modified in these special provisions.

All traffic control devices and signing shall conform and be constructed in accordance with the latest edition of the “Minnesota Manual of Uniform Traffic Control Devices” (MN MUTCD) and Part IV, “Field Manual for Temporary Traffic Control Zone Layouts”.

S-1 (2301) CONCRETE PAVEMENT 2

S-2 (2502) SUBSURFACE DRAINS 2

S-3 (2531) PEDESTRIAN CURB RAMP – TRUNCATED DOME SYSTEMS 3

S-1 (2301) CONCRETE PAVEMENT

S-1.1 MnDOT 2301 is or supplemented with the following:

Colored Concrete shall be concrete Mix No. 3F52CO with approved color additive for colored concrete driveway construction. For color verifications, provide sample chip of specified color indicating color additive number and required dosage rate to match existing concrete driveway pavement.

One week prior to first placement of the colored concrete on the project, hold a preconstruction meeting with the Engineer, Prime Contractor, Concrete Contractor, Ready-Mix Concrete Representative, Testing Agency and Colored Admixture Manufacturer Representative to discuss the proposed colored concrete placement and application materials.

Colored Concrete Contractor/Installer shall meet the following requirements:

- A Minimum of five (5) years of experience with work of similar scope and quality.
- B A minimum of five (5) projects including references completed in the last five (5) years by Contractor/Installer.
- C Listed on the MnDOT Pre-qualified colored concrete contractor/installers vendor list available from the MnDOT website.

Prior to placing any colored concrete, demonstrate workmanship by constructing test panels of the colored concrete in accordance with the following:

- D At a location approved by the Engineer.
- E Using the same processes, techniques, personnel, materials, concrete supplier and concrete plant intended for use on permanent work, including stamping and curing/ sealing procedures.
- F The minimum size of the test panel shall be 4' x 4' x 4" unless otherwise directed by the Engineer.
- G Retain and protect Engineer accepted test panels as the visual standard for the work of this section and quality standard for permanent work.

Construct colored concrete in accordance with products processes and techniques used on approved test panel. Do not add water at any time to the slab surface while finishing. Do not over finish the concrete edges. After completing final finishing operations, cure and seal all exposed concrete surfaces meeting the following requirements and methods:

- A Use a curing/sealing compound conforming to ASTM C1315, "Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete," Type 1, Class A, 100% acrylate polymer.
- B Apply the curing/sealing compound within 30 minutes of concrete placement/form removal or once the bleed water has dissipated, unless the Engineer directs otherwise in accordance with 2521.3.E.1.a, "Membrane Curing Method."
- C Ensure that the curing/sealing compound is applied homogeneously to provide a uniform coverage on all exposed colored concrete surfaces including the edges.
- D Apply an additional application of curing/sealing compound a minimum of 30 days after placement of the colored concrete.

Cover adjacent finished surfaces to protect from splatters and excess materials during colored concrete installation and curing/sealing.

S-2 (2502) SUBSURFACE DRAINS

S-2.1 The provisions of MnDOT 2502 are supplemented and/or modified with the following:

MATERIALS

Granular material: Fine Filter Aggregate: MnDOT 3149.2.J.2.

Cleanouts: PVC with metal casting marked "STORM".

S-3 (2531) PEDESTRIAN CURB RAMP – TRUNCATED DOME SYSTEMS

- S-3.1 This work consists of constructing pedestrian curb ramps with Truncated Dome Systems (detectable warning surfaces) in compliance with the ADA Accessibility Guidelines (ADAAG).

This work must be performed in accordance with the applicable MNDOT Standard Specification, the details in the Plan, and the following:

It will be the Contractor's option as to the product used. See the approved product list at:

<http://www.mrr.dot.state.mn.us/materials/materials.asp>

Only approved products are allowed. Stamped concrete is not allowed.

All truncated dome systems must be installed in strict accordance with the recommendations of the manufacturer. The installation protocol must include details regarding product specific construction requirements and how the system will be sealed to mitigate freeze/thaw damage through moisture intrusion. The Contractor must provide this information to the Engineer for approval two weeks prior to commencement of work.

The entire truncated dome area must contrast visually from the adjacent walking surfaces. The entire truncated dome areas must be a light color (light gray or buff typically) when the adjacent sidewalk is a dark color. The entire truncated dome area must be a dark color (red or dark gray typically) when the adjacent sidewalk is a "white" or light gray cement color. The Engineer will determine the colors when the pavement is dry. Other colors may also provide a dark on light or light on dark contrast and may be used with the approval of the Engineer.

At the time of construction, all Truncated Dome Systems are specified to be in dimensional and alignment compliance with the requirements of the ADAAG as detailed in the Plan.

The ADA Compliance Supervisor shall be supplied by the contractor to make certain that all pedestrian facilities constructed with the project meet current MnDOT and PROWAG requirements. Any improvements that are not installed to standard shall be removed and replaced at no cost to the City.