

PROJECT MANUAL

Addendum 2

01 September 2026

Margaret Ann Crigler Park

Jackson, Mississippi

Perkins&Will Project Number: 802119.000

Perkins&Will

1315 Peachtree Street NE, Atlanta, GA 30309 | 404.873.2300

Margaret Ann Crigler Park
Jackson, Mississippi
Addendum 2

Perkins & Will, PLLC, d/b/a Perkins&Will
Allen Pratt, Landscape Architect
802119.000
01 September 2026

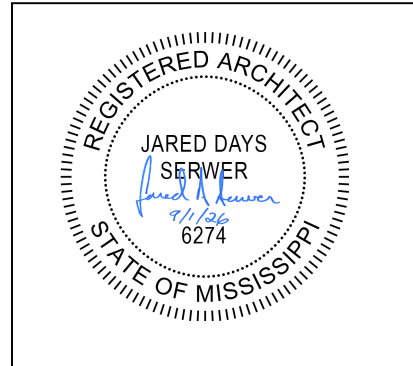
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PROFESSIONAL SEALS PAGE

The following Documents and Specification Sections have been prepared by or under the direct supervision of the Architect:

ARCHITECT

Perkins & Will, PLLC, d/b/a Perkins&Will
Jared Days Serwer, Architect
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**DIVISION 07 – THERMAL AND MOISTURE
PROTECTION**

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DIVISION 09 – FINISHES

09 29 00 Gypsum Board
09 97 23 Concrete and Masonry Coatings

DIVISION 11 – EQUIPMENT

11 31 00 Appliances

DIVISION 13 – SPECIAL CONSTRUCTION

13 31 00 ETFE Tensile Membrane System

END OF DOCUMENT

Margaret Ann Crigler Park
Jackson, Mississippi
Addendum 2

Perkins & Will, PLLC, d/b/a Perkins&Will
Allen Pratt, Landscape Architect
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01 September 2026

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The following Specification Sections have been prepared by or under the direct supervision of the Irrigation Designer:

Irrigation Designer

Hines, Inc.
1640 Riverside Avenue, Suite 200
Fort Collins, CO 80524
970-282-1800

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 84 00 Landscape Irrigation



END OF DOCUMENT

Margaret Ann Crigler Park
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01 September 2026

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The following Documents and Specification Sections have been prepared by or under the direct supervision of the Landscape Architect:

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DIVISION 11 – EQUIPMENT

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ADDENDUM 2

PART 1 - GENERAL

1.1 SCOPE

- A. This Addendum is issued pursuant to Article 1.1.1 of the AIA General Conditions of the Contract for Construction (A201) in connection with revision of plans and specifications which have been previously issued.
- B. When construction is not under contract, all instructions contained herein shall be reflected in the contract sum and this Addendum will be made a part of the Contract Documents, if, as, and when a Contract is awarded.
- C. This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated 24 July 2026 and Addendum no. 1 dated 14 August 2026, as noted below. Receipt of this Addendum must be acknowledged in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.
- D. This Addendum consists of 63 pages and 18 drawings.

1.2 CHANGES TO THE PRIOR ADDENDA

- A. N/A

1.3 CHANGES TO THE BIDDING REQUIREMENTS

- A. N/A

1.4 CHANGES TO THE CONDITIONS OF THE CONTRACT

- A. Add the following new Addenda dated 01 September 2026 to the Project Manual:
 - 1. 00 91 13.02 - Addendum 2

1.5 CHANGES TO THE PROJECT SPECIFICATIONS

- A. Replace the following Sections with Revised Sections dated 01 September 2026:
 - 1. 07 27 26 – Fluid-Applied Membrane Air Barriers
 - 2. 09 29 00- Gypsum Board
 - 3. 11 31 00 – Appliances
 - 4. 13 31 00 – ETFE Tensile Membrane System

- B. Add the following new Sections dated 01 September 2026 to the Project Manual:
 - 1. 09 97 23 – Concrete and Masonry Coatings
- C. Delete the following Sections from the Project Manual:
 - 1. N/A

1.6 CHANGES TO THE PROJECT DRAWINGS

- A. Replace the following Drawings with Revised Drawings dated 01 September 2026:
 - 1. G01-01 - CODE COMPLIANCE EGRESS PLAN -LEVEL 01
 - 2. A00-01 - GENERAL INFORMATION
 - 3. A11-01 - OVERALL FLOOR PLAN -PAVILION & BANDSHELL
 - 4. A11-02 - ENLARGED PLAN -PAVILION AND BANDSHELL
 - 5. A20-01 - ELEVATIONS & SECTIONS
 - 6. A20-02 - ELEVATIONS & SECTIONS
 - 7. A20-03 - INTERIOR ELEVATIONS AND DETAILS
 - 8. A31-01 - EXTERIOR ASSEMBLIES & DETAILS
 - 9. L01-00 - LAYOUT PLAN
 - 10. L01-01 - MATERIALS PLAN
 - 11. L02-01 - PLAN ENLARGEMENTS
 - 12. L04-01 - SITE DETAILS
 - 13. BA1-L01-00 - LAYOUT PLAN
 - 14. BA1-L01-01 - MATERIALS PLAN
 - 15. BA1-L02-01 - PLAN ENLARGEMENTS
- B. Add the following new Drawings dated 01 September 2026:
 - 1. L04-04 - SITE DETAILS
 - 2. L04-05 - SITE DETAILS
 - 3. L04-06 - SITE DETAILS

1.7 CLARIFICATIONS AND CONTRACTOR QUESTIONS

- A. Question: N/A
 - 1. Response: N/A
- B. Question: N/A
 - 1. Response: N/A

END OF SECTION

SECTION 07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Medium-build air barriers, vapor retarding.
~~Medium-build air barriers, vapor permeable.~~

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants for joint sealants, joint fillers, and joint preparation.
- B. Section 09 97 23 - Concrete and Masonry Coatings for finish coating to be applied over fluid-applied air/water resistive barrier.

1.3 DEFINITIONS

- A. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- B. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.
- C. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Schedule conference, two weeks prior to start of air barrier installation. Attendees shall include Contractor, certified installer, and air barrier manufacturer's representative. Optional attendees Owner's representative and Architect.
 - 2. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.5 SUBMITTALS

- A. Action Submittals:

1. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products.
 - a. ~~Medium-build air barriers, vapor permeable.~~
Medium-build air barriers, vapor retarding.
 2. Shop Drawings: For air-barrier assemblies.
 - a. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.
 - b. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - c. Include details of interfaces with other materials that form part of air barrier coating; including but not limited to the following:
 - 1) Foundation and walls, including penetrations, ties and anchors.
 - 2) Walls, windows, curtain walls, storefronts, louvers or doors.
 - 3) Different wall assemblies, and fixed openings within those assemblies.
 - 4) Wall and roof connections and penetrations.
 - 5) Walls, floor and roof across construction, control and expansion joints.
 - 6) Walls, floors and roof to utility, pipe and duct penetrations.
 - 7) Seismic and expansion joints.
 - 8) All other leakage pathways in the building envelope.
- B. Informational Submittals:
1. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by Installer, who work on Project.
 2. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
 3. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.
 4. Field quality-control reports.
- 1.6 QUALITY ASSURANCE
- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by the manufacturer.
1. Installer to be licensed by ABAA in accordance with ABAA's Quality Assurance Program and to employ ABAA-certified installers and supervisors on Project.
- B. Mockups: Build mockups to set quality standards for materials and execution.
1. Provide mock-up in accordance with provisions of Section 01 43 39 - Mockup Requirements.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage, weather, excessive temperatures, freezing or extreme heat, and construction operations. Remove damaged material from site and dispose of in accordance with applicable regulations.
- B. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- C. Protect stored materials from direct sunlight.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.
 1. Protect substrates from environmental conditions that affect air-barrier performance.
 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.9 WARRANTY

- A. System Warranty: Manufacturer's shall warrant system including the primary air barrier and installed accessories, sealants and sheet materials to be free from defects in material and workmanship and agreeing to replace defective materials and components.
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain primary air-barrier materials and air-barrier accessories from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Performance:
 1. Air-barrier assembly and seals with adjacent construction to be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration.

2. Air-barrier assemblies to be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
 - B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa), when tested in accordance with ASTM E2357.
 1. Assembly shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air and vapor seal materials at such locations, changes in substrate and perimeter conditions.
 - a. Assembly shall be capable of withstanding combined positive and negative design wind, fan and stack pressures on the envelope without damage or displacement and shall transfer the load to the structure.
 - b. Assembly shall not displace adjacent materials under full load.
 - c. Assembly shall be joined in an airtight and flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of assemblies due to thermal and moisture variations and creep, and anticipated seismic movement.
 - C. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75 Pa) pressure difference; ASTM E2178.
 - D. Ultimate Elongation: Minimum 500 percent; ASTM D412, Die C.
 - E. Adhesion to Substrate: Minimum 16 lbf/sq. in. (110 kPa) when tested in accordance with ASTM D4541.
 - F. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - G. Fire Performance: Class A per ASTM E 84.
 1. Flame Spread Index: 25 or less.
 2. Smoke Developed Spread Index: 450 or less.
 - H. UV Resistance: Can be exposed to sunlight for 90 days in accordance with manufacturer's written instructions.
- 2.3 MEDIUM-BUILD AIR BARRIERS, VAPOR RETARDING
- A. Medium-Build, Vapor-Retarding Air Barrier: Synthetic polymer material with an installed dry film thickness, according to manufacturer's written instructions, of 16 to 34 mils (0.41 to 0.86 mm) over smooth, void-free substrates.
 1. Basis of Design: Subject to compliance with requirements, provide Sika Corporation; Sika Sikagard AWB 660 I, or a comparable product by one of the other named manufacturers:
 - a. Meadows, W. R., Inc.
 - b. PROSOCO, Inc.
 - c. Sto Corp.
 - d. Tremco Incorporated.

- B. Vapor Permeance: Maximum 0.1 perm (5.8 ng/Pa x s x sq. m); ASTM E96/E96M, Procedure A, Desiccant Method.

~~MEDIUM-BUILD AIR BARRIERS, VAPOR-PERMEABLE~~

~~Medium-Build, Vapor-Permeable Air Barrier: Synthetic polymer material with an installed dry film thickness, according to manufacturer's written instructions, of 16 to 34 mils (0.41 to 0.86 mm) over smooth, void-free substrates.~~

~~Carlisle Coatings & Waterproofing Inc.; Barritech VP.~~

~~DuPont Tyvek Fluid-Applied WB.~~

~~Hohmann & Barnard; Enviro-Barrier VP.~~

~~Meadows, W. R., Inc.; Air-Shield LMP.~~

~~Sto Corp.; Gold-Coat.~~

~~Tremco Incorporated, an RPM company; ExoAir 230.~~

~~Basis-of-Design Product: Carlisle Coatings & Waterproofing Inc.; Barritech VP.~~

~~Vapor Permeance: Minimum 5 perms (290 ng/Pa x s x sq. m); ASTM E96/E96M, Procedure B, Water Method.~~

2.4 ACCESSORY MATERIALS

- A. Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Primer (If required by air barrier Manufacturer): Liquid waterborne or solvent-borne primer recommended for substrate by air-barrier material manufacturer.
- C. Stainless Steel Sheet (If required by air barrier Manufacturer): ASTM A240/A240M, Type 304, 0.0250 inch (0.64 mm) thick, and Series 300 stainless steel fasteners.
- D. Joint Reinforcing Strip (If required by air barrier Manufacturer): Air-barrier manufacturer's standard joint reinforcing material(s) or sealants.
- E. Substrate-Patching Material: Substrate fillers for preparation of cracks and overdriven fasteners, as recommended by air barrier manufacturer.
- F. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- G. Sprayed Polyurethane Foam Sealant (If approved by air barrier Manufacturer): One-or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft (24- to 32-kg/cu. m) density; flame-spread index of 25 or less according to ASTM E162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

- H. Elastomeric Flashing Sheet: ASTM D2000, minimum 50- to 65-mil- (1.3- to 1.6-mm-) thick, cured sheet neoprene with manufacturer-recommended contact adhesives and lap sealant with aluminum termination bars and stainless-steel fasteners.
- I. Joint Sealant: Single or multi-component, moisture curing, low-modulus, high-movement polyether / silicone joint sealant compatible with joint substrates and other materials, recommended by air barrier manufacturer for application indicated.
 - 1. Comply with ASTM C920 and other requirements for each liquid-applied chemically curing sealant, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
 - 3. Verify that substrates are visibly dry and free of moisture. Test concrete substrates for capillary moisture by plastic sheet method in accordance with ASTM D4263.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate in accordance with manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- H. Bridge isolation joints, discontinuous wall-to-wall, and deck-to-wall joints with air-barrier accessory material that accommodates joint movement in accordance with manufacturer's written instructions and details.

3.3 INSTALLATION OF ACCESSORIES

- A. Install accessory materials in accordance with air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
 - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate.
 - 3. Unless the manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 - 4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on the same day. Reprime areas exposed for more than 24 hours.
- B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- E. Wall Openings: Prime concealed, perimeter frame surfaces of storefronts and doors. Apply transition strip so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames, with not less than 1 inch (25 mm) of full contact.
 - 1. Transition Strip: Roll firmly to enhance adhesion.
- F. Fill gaps in perimeter frame surfaces of storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- H. Seal top of through-wall flashings to air barrier with an additional 6-inch- (150-mm-) wide, transition strip.
- I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

- J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.4 INSTALLATION OF PRIMARY AIR-BARRIER MATERIAL

- A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier in accordance with air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.
 1. Unless the manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 2. Limit priming to areas that will be covered by air-barrier material on the same day. Reprime areas exposed for more than 24 hours.
 3. Where multiple prime coats are needed to achieve the required bond, allow adequate drying time between coats.
- B. Medium-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply an increased thickness of air-barrier material in full contact around protrusions.
 1. Vapor-Retarding, Medium-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements not less than 34 mils (0.86 mm), applied in two equal coats. Apply additional material as needed to achieve void- and pinhole-free surface.
~~Vapor-Permeable, Medium-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements not less than 34 mils (0.86 mm), applied in one or more equal coats. Apply additional material as needed to achieve void- and pinhole-free surface, but do not exceed thickness on which required vapor permeability is based.~~
- C. Do not cover air barrier until it has been tested and inspected by testing agency.
- D. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.5 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 2. Air-barrier dry film thickness.
 3. Continuous structural support of air-barrier system has been provided.

4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 5. Site conditions for application temperature and dryness of substrates have been maintained.
 6. Maximum exposure time of materials to UV deterioration has not been exceeded.
 7. Surfaces have been primed, if applicable.
 8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
 9. Termination mastic has been applied on cut edges.
 10. Strips and transition strips have been firmly adhered to the substrate.
 11. Compatible materials have been used.
 12. Transitions at changes in direction and structural support at gaps have been provided.
 13. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 14. All penetrations have been sealed.
- D. Tests: As determined by testing agency from among the following tests:
1. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage in accordance with ASTM E1186, chamber pressurization or depressurization with smoke tracers.
 2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate in accordance with ASTM E783 or ASTM E2357.
 3. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate in accordance with ASTM D4541 for each 600 sq. ft. (56 sq. m) of installed air barrier or part thereof.
- E. Air barriers will be considered defective if they do not pass tests and inspections.
1. Apply additional air-barrier material, in accordance with manufacturer's written instructions, where inspection results indicate insufficient thickness.
 2. Remove and replace deficient air-barrier components for retesting as specified above.
- F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- G. Prepare test and inspection reports.
- 3.6 CLEANING AND PROTECTION
- A. Protect air-barrier system from damage during application and remainder of construction period, in accordance with manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials in accordance with air-barrier manufacturer's written instructions.
 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction, that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.
- C. Remove masking materials after installation.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior gypsum board.
- B. Tile backing panels.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: Submit manufacturer's technical data for each type of gypsum board product, including related accessories. Furnish a material list with technical data documenting the location and primary function, quality, and performance of each material component or system to be used in the Work, or other such primary characteristics as required by the Drawings or Specifications.
 - a. Submit manufacturer's technical data for each gypsum drywall partition and each ceiling system.
 - 2. Shop Drawings: Show locations, fabrication, and installation of control joints including plans, elevations, sections, details of components, and attachments to other units of Work.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 PRODUCTS

2.1 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers:
 1. American Gypsum.
 2. CertainTeed Corporation.
 3. Georgia-Pacific Building Products.
 4. National Gypsum Company.
 5. USG (EcoSmart gypsum board products are acceptable).
- B. Gypsum Board, Type X: ASTM C1396/C1396M.
 1. Thickness: 5/8 inch (15.9 mm).
 2. Long Edges: Tapered.
- C. Mold Resistant Gypsum Board: Non-combustible moisture and mold resistant core encased in moisture and mold resistant paper or fiberglass faces or with paperless faces, complying with ASTM C 1396, tapered with beveled or radial edge for finished joints, thickness as shown on the Drawings.
 1. Thickness: 5/8 inch (15.9 mm).
 2. Mold Resistance: ASTM D 3273, score of not less than 10.
 3. Products: Subject to compliance with the specified requirements provide one of the following:
 - a. Fire Rated:
 - 1) Gold Bond XP Fire-Shield Gypsum Board (National Gypsum).
 - 2) Sheetrock Brand Mold Tough Panels Firecode X (USG).
 - 3) M-BLOC Type X Gypsum Board (American Gypsum).
 - 4) M2Tech Mold and Moisture Resistant Type X Gypsum Board (CertainTeed).
 - 5) DensArmor Plus Fireguard X (Georgia-Pacific).
 - b. Regular:
 - 1) Sheetrock Mold Tough (USG).
 - 2) Gold Bond XP (National Gypsum).
 - 3) M2Tech Mold and Moisture Resistant Gypsum Board (CertainTeed).
 - 4) DensArmor Plus (Georgia-Pacific).
 - c. Fire Rated Flexible:
 - 1) Gold Bond XP Fire-Shield Radius Gypsum Board (National Gypsum).
 - D. Gypsum Ceiling Board: ASTM C1396/C1396M.

1. Thickness: 1/2 inch (12.7 mm).
2. Long Edges: Tapered.

2.3 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
 1. Manufacturers:
 - a. CertainTeed Corp.; Diamondback GlasRoc Tile Backer.
 - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
 - c. National Gypsum; eXP Tile Backer.
 - d. USG Corporation; Durock Glass-Mat Tile Backer Boards.
 2. Core: 5/8 inch (15.9 mm), Type X.
 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
- B. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.
 1. Manufacturers:
 - a. C-Cure; C-Cure Board 990.
 - b. CertainTeed Corp.; FiberCement BackerBoard.
 - c. James Hardie Building Products, Inc.; Hardiebacker 500.
 - d. National Gypsum Company, PermaBase Cement Board.
 - e. USG Corporation; DUROCK Cement Board.
 2. Thickness: 5/8 inch (15.9 mm).
 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 2. Shapes:
 - a. Cornerbead.
 - b. L-Bead: L-shaped; exposed long flange receives joint compound.
 - c. Expansion (control) joint.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
 1. Interior Gypsum Board: Paper.
 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.

2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
- D. Joint Compound for Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.6 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Moisture Barrier Membrane:
1. Material Quality Standard: ANSI A108 Series, A-2.1.8.
 2. Acceptable Products:
 - a. Reinforced Asphalt Paper: ASTM C171, duplex type.
 - b. Polyethylene Vapor Retarder: ASTM D4397, 4 mils thick, 0.19 maximum permeance rating.
 3. Tape: Moisture resistant, pressure sensitive tape suitable for sealing membrane to plumbing pipes penetrating wallboard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: Vertical surfaces unless otherwise indicated.
 - 2. Mold Resistant Gypsum Board: Vertical surfaces at Concession space unless otherwise indicated.
 - 3. Ceiling Type: Ceiling surfaces, except at fire rated ceilings, then use Type X.
 - 4. Tile Backer-Glass-Mat Type:
 - a. Tiled walls in restrooms.
 - 5. Cementitious Backer Type:
 - a. At the following locations:

1) Exterior walls of tiled walls in restrooms.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLATION OF GYPSUM PANELS FOR CEILINGS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
 2. Fasten with corrosion-resistant screws.

3.5 INSTALLATION OF TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
1. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.
- B. Cementitious Backer Units: ANSI A108.11.
1. Moisture Barrier Membrane: Install membrane over area to be covered with cementitious wallboards.
 - a. Use tape to temporarily hold membrane in place until covered with additional wallboards.
 - b. Shingle upper course over lower course.
 - c. Lap not less than 3 inches.
 - d. Where plumbing pipes penetrate membrane, seal membrane to pipe with tape.
 2. Backer Units: Install cementitious board vertically.
 - a. Cut as directed by manufacturer without damaging edges. Treat edges per manufacturer's recommendations.
 - b. Anchor with screws, spaced according to fastening sequence as recommended by manufacturer.
 - c. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect, unless otherwise indicated.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners unless otherwise indicated.
 - 2. L-Bead: Use where indicated.

3.7 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: Mechanical Rooms, Electrical Rooms, and similar spaces.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 - Interior Painting.
 - 5. Level 5:
 - a. At exposed locations utilizing glass mat interior gypsum board products and where required by another specification Section as preparation of wall.
 - b. At all exposed drywall surfaces within main entrance hallways, and areas scheduled to receive accent lighting or semi-gloss finishes, refer to room finish schedules for locations.
 - c. Where indicated on Drawings.
 - d. Primer and its application to surfaces are specified in Section 09 91 23 - Interior Painting.
- E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before installing gypsum board ceilings, conduct an above-ceiling inspection, and report and correct deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
- B. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for Contractor's above-ceiling inspection. Provide Architect with copy of deficiencies report.
 - 1. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air-duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control-air tubing.
 - f. Installation of ceiling support framing.
 - g. Installation of seismic restraints (sway bracing and compression struts).

3.9 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 97 23

CONCRETE AND MASONRY COATINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Application of water-based, high-build, 100 percent acrylic, waterproof coating.
- B. Related Sections:
 - 1. Section 04 20 00 – Unit Masonry Assemblies.
 - 2. Section 07 27 26 - Fluid-Applied Membrane Air Barriers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Schedule conference, two weeks prior to start of masonry coating installation. Attendees shall include Contractor, certified installer, and masonry coating manufacturer's representative. Optional attendees Owner's representative and Architect.
 - 2. Review masonry coating requirements and installation, special details, mockups, bond testing, masonry coating protection, and work scheduling that covers masonry coatings.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products.
 - 2. Shop Drawings: For masonry coatings assemblies.
 - a. Show locations and extent of masonry coating materials, accessories, and assemblies specific to Project conditions.
 - b. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - c. Include details of interfaces with other materials that form part of masonry coating; including but not limited to the following:
 - 1) Different wall assemblies, and fixed openings within those assemblies.
 - 3. Samples: Submit two samples 8 by 8 inch (203 by 203 mm) in size illustrating colors available for selection.
- B. Informational Submittals:

1. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
2. Maintenance Data: Include cleaning procedures and repair and patching techniques.

1.4 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document that applies to application on site.
- B. Qualifications:
 1. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 10 years documented experience.
 2. Applicator Qualifications: Company with minimum of 5 years experience in application of specified products on projects of similar size and scope and is acceptable to product manufacturer.
 - a. Successful completion of a minimum of 5 projects of similar size and complexity to specified work.
- C. Mockups: Build mockups to set quality standards for materials and execution including aesthetics, color, texture and appearance.
 1. Provide mock-up in accordance with provisions of Section 01 43 39 - Mockup Requirements.
 2. Install at project site or another pre-selected area of the building, minimum 4 feet (121.92 cm) by 4 feet (121.92 cm), using specified material.
 3. Perform adhesion test in accordance with ASTM D3359, Method A. Minimum adhesion rating of 4A required on 0 to 5 scale.
 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat and freezing temperatures.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements:

1. Do not apply material when substrate or ambient temperature is 40 degrees Fahrenheit (4.44 degrees Celsius) or below or is expected to fall below 40 degrees Fahrenheit (4.44 degrees Celsius) within 24 hours after application.
2. Do not apply material if rain is expected within 24 hours of application.
3. Do not apply over moving cracks, control joints, or expansion joints.
4. Restrict traffic from area where coating is being applied or is curing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Subject to compliance with requirements, provide Sika Corporation; Sika Thorocoat-400, or a comparable product by one of the other named manufacturers:
 1. Meadows, W. R., Inc.
 2. PROSOCO, Inc.
 3. Sto Corp.
 4. Textured Coatings of America, Inc.
 5. Tremco Incorporated.
- B. Substitutions: Comply with Section 01 60 00 - Product Requirements.

2.2 MATERIALS

- A. Water-based, high-build, 100 percent acrylic, waterproof coating.
 1. Coatings - General: Provide complete systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated.
- B. Water Based Weather Resistant Smooth Coating: Single component acrylic coating, color pigments, and acrylic polymer.
 1. Density, ASTM D1475: 11.4 to 12.4 lbs per gal (1.37 to 1.49 kg/L).
 2. Solids Content, ASTM D5201:
 - a. By Weight: 53.4 – 56.4 percent.
 - b. By Volume: 37.0 – 39.0 percent.
 - c. Viscosity, ASTM D562: 105 to 120 KU.
 3. VOC Content, ASTM D3960: 0.83 lbs per gal (100 g/L), less water and exempt solvents.
- C. Performance Requirements:
 1. Resistance to Wind-Driven Rain, Federal Specification ASTM D6904: Meets requirement. No water penetration.
 2. Accelerated Weathering, ASTM G152, 5,000 hours: Passes.
 3. Visual Color Change, ASTM D1729, 5,000 hours: Passes.
 4. Chalking, ASTM D4214, 5,000 hours: Passes.
 5. Freeze/Thaw Resistance, DOT Methods A and B, 50 cycles: Passes.
 6. Water-Vapor Permeance, ASTM D1653: 23 perms.
 7. Moisture Resistance, Federal Specification TT-C-555B: Meets requirement. No blistering, loss of adhesion, or discoloration.

8. Salt Spray (Fog) Resistance, ASTM B117, 300 hours: Passes.
 9. Carbon-Dioxide Diffusion, PR EN 1062-6:
 - a. R (equivalent air-layer thickness): 1,318 feet (401.72 m).
 - b. Sc (equivalent concrete thickness): 39 inches (990.6 mm).
 10. Flexibility, ASTM D1737, 1-inch mandrel: No cracking.
 11. Dirt Pick-Up, ASTM D3719, after 6 months exposure: 92 percent. Passes.
 12. Sand Abrasion Resistance, ASTM D968, Method A, at 3,000 L: Passes.
 13. Impact Resistance, ASTM D2794, at 30 inch (762 mm)-lbs: Passes.
 14. Fungus Resistance, ASTM D3273: No growth. Meets requirement.
 15. Mildew Resistance, Federal Specification TT-P-29 (Federal Standard 141, Method 6152 and 6271.1):
 - a. Aspergillus Oryzae, 7 days: No growth.
 - b. Aspergillus Niger, 21 days: No growth.
 16. Surface Burning Characteristics, ASTM E84:
 - a. Flame Spread: 1.
 - b. Smoke: 4.
 - c. Fuel Contribution: 7.
 17. Flash point, Greater than 200 degrees Fahrenheit (93.33 degrees Celsius)
ASTM D56 Tag Closed Tester
- D. Wet Film Thickness (WFT):
1. Smooth: 16 to 22 mils (0.5588 mm).
- E. Dry Film Thickness (DFT):
1. Smooth: 6 to 8 mils (0.2032 mm).
- F. Colors: Stark White - 9152-P.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer and masonry coatings manufacturer.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Protection: Protect adjacent work areas and finish surfaces from damage during coating application.
- B. Prepare surfaces in accordance with manufacturer's instructions.

- C. Ensure that substrate is sound, clean, dry, and free of dust, dirt, oils, grease, laitance, efflorescence, mildew, fungus, biological residues, and other contaminants that could prevent proper adhesion.
- D. When chemical cleaners are used, neutralize compounds and fully rinse surface with clean water. Allow surface to dry before proceeding.
- E. Treat cracks greater than 1/32 inch (0.79 mm) with knife-grade or brush-grade patching compound.
- F. Treat cracks greater than 1/4 inch (6.35 mm) as expansion joints and fill with sealant approved by coating manufacturer.
- G. Prepare and treat cracks in accordance with manufacturer's instructions.

3.3 PRIMING

- A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
- B. Concrete and Masonry: Prior to priming, patch holes and indentations and fill cracks with manufacturer's recommended crack repair material.

3.4 MIXING

- A. Mix coating in accordance with manufacturer's instructions to ensure uniform color and aggregate disbursement and to minimize air entrapment.
- B. In multi-pail applications, mix contents of each new pail into partially used pail to ensure color consistency and smooth transitions from pail to pail.

3.5 APPLICATION

- A. Apply coatings in accordance with manufacturer's instructions, to thicknesses specified.
- B. Apply coating as a two-coat system.
- C. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.
- D. Apply coating using consistent application techniques to achieve uniform color and texture.

3.6 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.

- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.7 PROTECTION

- A. Protect applied coating from damage during construction until Substantial Completion.

END OF SECTION

SECTION 11 31 00

APPLIANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Refrigeration and Ice Making appliances.

1.2 RELATED REQUIREMENTS

- A. Division-22 for plumbing and venting requirements
- B. Division-26 for electrical requirements

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, dimensions, furnished accessories, and finishes for each appliance.
- B. Product Schedule: For appliances. Use same designations indicated on Drawings.
- C. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 INFORMATIONAL SUBMITTALS

- A. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each appliance to include in operation and maintenance manuals.

1.6 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 employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.
- C. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

1.7 WARRANTY

- A. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.
- B. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace appliances or components that fail in materials or workmanship within specified warranty period.
- C. Refrigerator, Sealed System: Full warranty including parts and labor for on-site service on the product.
 - 1. Warranty Period for Sealed Refrigeration System: Two years from date of Substantial Completion.
 - 2. Warranty Period for Other Components: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 KITCHEN APPLIANCES

- A. Refrigerator, Type REF-1: Free-standing, and two sections with glass doors.
 - 1. Capacity: Total ~~minimum~~ storage range of ~~50~~38 to 53 cubic ft (~~1.08 to 1.50~~1.42 cu m).
 - 2. Compressor Location: Bottom.
 - 3. Features: Include (4) heavy-duty epoxy-coated adjustable wire shelves per section, self-closing lockable doors remain open at 90 degrees, external LED temperature display, electronic thermostat, temperature range (33 F to 40 F), clip-on shelf tag holders, and 4-inch front-locking casters.
 - 4. Exterior and Interior Finish: Stainless steel.
 - 5. Manufacturers:
 - ~~Frigidaire Home Products.~~
 - ~~GE Appliances.~~
 - ~~KitchenAid; a division of Whirlpool Corporation.~~
 - ~~Sub-Zero, Inc.~~
 - ~~Whirlpool Corp.~~
 - a. Arctic Air.
 - b. Empura Refrigeration.
 - c. ICECASA.
 - d. Nexel.
 - e. PeakCold.
 - f. True.
 - 6. Basis of Design Product: Empura Refrigeration; E-KB Series Commercial Glass Door Refrigerator - Model #E-KB54RG
- B. Icemaker, Type IM-1:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Scotsman; Model #N0922 Prodigy Plus, or comparable product by one of the following:

- a. KitchenAid; a division of Whirlpool Corporation.
 - b. Sears Brands LLC (Kenmore).
 - c. Sub-Zero, Inc.
 - d. Viking Range Corporation.
 - e. Whirlpool Corporation.
- 2. Dimensions:
 - a. Width: 22 inches.
 - b. Depth: 24 inches.
 - c. Height: 27 inches.
- 3. Ice Capacity:
 - a. Production: 320 lb per day.
- C. Ice Bin/Storage:
 - 1. Basis-of-Design Product: Scotsman; Model #B322S.
 - 2. Dimensions:
 - a. Width: 22 inches.
 - b. Depth: 34 inches.
 - c. Height: 44 inches.
 - 3. Ice Capacity:
 - a. Production: 370 lb.

2.2 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of appliances.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.
- C. Verify utility rough-ins are provided and correctly located.
- D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- C. Utilities: Comply with plumbing and electrical requirements.

3.3 ADJUSTING

- A. Adjust equipment to provide efficient operation.

3.4 CLEANING

- A. Remove packing materials from equipment and properly discard.
- B. Wash and clean equipment.

END OF SECTION

SECTION 11 68 13
PLAYGROUND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes playground equipment as follows:
 - 1. Playground equipment.

1.2 RELATED REQUIREMENTS

- A. 32 18 16 "Engineered Wood Fiber" for playground surfacing.
- B. Where differences exist between Codes, Standards, Authorities Having Jurisdiction, and the Documents, the one affording the greatest protection and/or more stringent condition shall apply.

1.3 DEFINITIONS

- A. Definitions in ASTM F1487 apply to Work of this Section.
- B. IPEMA: International Play Equipment Manufacturers Association.

1.4 REFERENCE STANDARDS

- A. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use.
- B. US Consumer Product Safety Commission (CPSC) Handbook for Playground Safety.
- C. IPEMA Certified.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 DESIGN INTENT

- A. Playground equipment products specified herein have been selected and configured as an integrated system to satisfy the design intent, site layout, play value, accessibility requirements, age-group separation, fall zones, and spatial relationships indicated on the Drawings.

- B. Equipment locations, component arrangements, dimensions, use zones, and clearances shown on the Drawings are based upon the specific manufacturer and model numbers identified in this Section.
- C. Proposed substitutions shall be considered only when the Contractor demonstrates that the substituted products:
 - 1. Meet or exceed all specified performance, safety, accessibility, durability, and warranty requirements.
 - 2. Maintain the design intent and aesthetic character of the playground.
 - 3. Fit within the designated play area without modification to the approved site layout.
 - 4. Maintain all required safety use zones, fall clearances, and accessibility provisions.
 - 5. Do not require changes to grading, surfacing, utilities, foundations, drainage, or other site improvements.
- D. Requests for substitution shall include complete product data, dimensions, layout drawings, accessibility compliance information, safety compliance documentation, and any impacts to the Contract Documents.
- E. No substitution shall be made without written review and approval by both the Owner and Landscape Architect. Approval of a substitution is at the sole discretion of the Owner and Landscape Architect.
- F. Any redesign, coordination, or revisions to the Work resulting from a proposed substitution shall be the responsibility of the Contractor at no additional cost to the Owner.

1.7 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of playground equipment.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include fall heights and use zones for playground equipment, coordinated with the critical-height values of engineered wood chips specified in 'Part 2: Products'.
- C. Samples for Initial Selection: For each type of exposed finish.
 - 1. Manufacturer's color charts.
 - 2. Include Samples of accessories involving color selection.

1.8 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
 - 2. Chain-of-Custody Qualification Data: For manufacturer and vendor.
- B. Product Certificates: For each type of playground equipment.

- C. Material Certificates: For the following items:
 - 1. Shop finishes.
 - 2. Wood-Preservative Treatment: Include certification by treating plant that states type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
- D. Sample Warranty: For manufacturer's special warranties.

1.9 SHOP DRAWINGS

- A. Submit manufacturer's shop drawings for all playground equipment specified under this Section.
- B. Shop drawings shall be prepared specifically for this Project and shall indicate the complete playground layout as shown on the Contract Drawings.
- C. Include the following information:
 - 1. Equipment plans, elevations, and component identification.
 - 2. Overall dimensions and clearances.
 - 3. Footing and foundation requirements.
 - 4. Safety use zones and fall zones for each play structure and component.
 - 5. Accessible routes and accessibility compliance information.
 - 6. Fall heights and protective surfacing requirements.
 - 7. Equipment anchorage and connection details.
 - 8. Color selections and finish schedules.
 - 9. Relationship of equipment to adjacent site improvements, including walks, curbs, fences, walls, trees, utilities, and other site elements.
 - 10. Verification that all equipment locations, clearances, and use zones conform to the Contract Drawings and applicable safety standards.
- D. Shop drawings shall clearly identify all specified products and model numbers. Any proposed substitutions or modifications to the specified equipment, layout, or component configuration shall be clearly identified and submitted as a separate substitution request.
- E. Playground equipment is part of an integrated design. Equipment configurations, use zones, accessibility requirements, and spatial relationships shown on the Drawings are based on the specified manufacturer and model numbers. Substitutions affecting layout, dimensions, play value, accessibility, safety clearances, aesthetics, or design intent shall not be incorporated into the shop drawings without prior written approval from the Owner and Landscape Architect/Architect.
- F. Approval of shop drawings does not authorize deviations from the Contract Documents unless specifically identified and approved in writing by the Owner and Landscape Architect/Architect.

1.10 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For playground equipment and finishes to include in maintenance manuals.

1.11 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm whose playground equipment components have been certified by IPEMA's third-party product certification service.
- B. Manufacturer Qualifications: Manufacturer must possess a minimum of ten (10) consecutive years of documented experience in engineering and manufacturing public play structures of similar scale, complexity, and materials.
- C. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- D. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.
- E. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.12 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of playground equipment that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Minimum of 5 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain playground equipment from single source from single manufacturer.
- B. Playground equipment and components shall have the IPEMA Certification Seal.

2.2 PERFORMANCE REQUIREMENTS

- A. Safety Standard: Provide playground equipment according to ASTM F1487 and CPSC #325.

2.3 PLAYGROUND EQUIPMENT

- A. Play Structure: Integral play assembly that provides more than one play activity; manufactured as a system or assembled from manufacturer's standard modular-sized units.
 - 1. Basis-of-Design Product: Dodec Climbing Frame No. 7 by Duncan & Grove USA.
 - a. Website: Dodec Climbing Frame No.7
 - b. Product Code: CF.DO.07.1.ADA
 - 1) Ground level accessibility with transfer platforms and belting section at ground level.
 - c. Included features per manufacturer website: climbing frame, tower, platform, bridge, net climb, slide, fireman's pole, and ladder.
- B. Log Cluster:
 - 1. Basis-of-Design Product: Log Climbing Frame No. 3 by Duncan & Grove USA.
 - a. Website: Log Climbing Frame No. 3
 - b. Product Code: CF.LO.03.2
- C. Wood Stumps:
 - 1. Type 01: Basis-of-Design Product: Stepping Stumps 220RD Robinia by Duncan & Grove USA.
 - a. Website: 220RD Robinia
 - b. Product Code: TT.PO.01.2
 - 2. Type 02: Basis-of-Design Product: Stepping Stumps 320RD Robinia by Duncan & Grove USA.
 - a. Website: 320RD Robinia
 - b. Product Code: TT.PO.01.2
- D. Slide:
 - 1. Basis-of-Design Product: Wide Slide 1.0M by Duncan & Grove USA.
 - a. Website: Wide Slide 1.0M
 - b. Product Code: SL.WD.GR.100
 - c. Mounting: Surface mount as indicated on the Drawings.
- E. Log Steps and Logs in Sand (at Play Area)
 - 1. Provide log steps and loose/embedded play logs as indicated on the Drawings.
 - a. Logs shall be Black Locust (Robinia pseudoacacia), sound, structurally stable, and suitable for exterior playground applications.
 - b. Finish shall be debarked with all surfaces sanded smooth and free of splinters, sharp edges, and projections.
 - c. Provide a 1/2-inch chamfer at all exposed corners and edges, typical.
 - d. Mount logs using steel reinforcing bars (rebar) as detailed on the Drawings.
 - 1) Rebar shall be recessed a minimum of 1/2 inch into the log surface and the recess filled and plugged flush with a matching wood plug or approved filler to provide a smooth finished surface with no exposed metal.

- e. Install logs plumb, level, and securely anchored. Refer to Drawings for dimensions, layout, elevations, anchorage requirements, and installation details.
- f. Ensure log steps are cut flat and scored as indicated on the Drawings.

~~Climbing Logs:~~

~~Basis of Design Product: Log Steps Robinia by Duncan & Grove USA.
Website: Log Steps Robinia
Product Code: TT.SP.02.2~~

2.4 CLIMBING HOLDS

- A. Basis of Design Manufacturer: Rock Candy Holds or Atomic Climbing Holds
~~Basis of Design Product: Granite Screw On Climbing Holds by Atomik Climbing Holds or Landscape Architect approved equal.
Product: 64 Pack Granite Screw On Climbing Holds
Website: Granite Screw On Climbing Holds~~
- B. Materials:
 - 1. Molded polyurethane climbing holds.
 - 2. Texture and shape designed for recreational climbing applications.
 - 3. Assorted hold sizes and profiles as provided by manufacturer.
- C. Color:
 - 1. Manufacturer's standard granite color mix. Submit color sample for landscape architect review and approval.
- D. ~~D.~~ Fasteners:
 - 1. Tamper-resistant stainless steel or corrosion-resistant screws as recommended by the manufacturer.
 - 2. Fasteners shall be of sufficient length and capacity for installation into cast-in-place concrete.
 - 3. Provide all anchors, washers, and accessories required for a complete installation.
- E. Color: Submit samples for landscape architect review and approval.
- F. Performance Requirements:
 - 1. Provide climbing holds free of defects, cracks, chips, or damage.
 - 2. Climbing holds shall be suitable for exterior installation and resistant to weathering, UV exposure, and vandalism.
 - 3. Installed system shall provide a secure, stable climbing surface without movement, rotation, or loosening of holds.
- G. Installation Surface:
 - 1. Climbing holds shall be mounted to cast-in-place concrete climbing wall as indicated on the Drawings.
 - 2. Coordinate hold locations and mounting requirements with concrete wall construction.

3. Locate holds in the configuration shown on the Drawings or as approved by the Landscape Architect.

~~Equal product manufacturer:~~

2.5 FABRICATION

- A. Provide sizes, strengths, thicknesses, wall thickness, and weights of components as required to comply with requirements in ASTM F1487. Factory drill components for field assembly. Unnecessary holes in components, not required for field assembly, are not permitted. Provide complete play structures, including supporting members and connections, means of access and egress, designated play surfaces, barriers, guardrails, handrails, handholds, and other components indicated or required for equipment indicated.

2.6 CAST-IN-PLACE CONCRETE

- A. Concrete Materials and Properties: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with minimum 28-day compressive strength of 3000 psi (20684.28 kPa), 3-inch (76-mm) slump, and 1-inch- (25-mm-) maximum-size aggregate.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for earthwork, subgrade elevations, surface and subgrade drainage, and other conditions affecting performance of the Work.
 1. Do not begin installation before final grading required for placing playground equipment and protective surfacing is completed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written installation instructions for each equipment type unless more stringent requirements are indicated. Anchor playground equipment securely, positioned at locations and elevations indicated.
 1. Maximum Equipment Height: Coordinate installed fall heights of equipment with finished elevations and critical-height values of protective surfacing. Set equipment so fall heights and elevation requirements for age group use and accessibility are within required limits. Verify that playground equipment elevations comply with requirements for each type and component of equipment.
- B. Post and Footing Excavation: Excavate holes for posts and footings as indicated in firm, undisturbed or compacted subgrade soil.

- C. Post Set on Subgrade: Level bearing surfaces with drainage fill to required elevation.
- D. Post Set with Concrete Footing: Comply with Section 03 30 00 "Cast-in-Place Concrete" for measuring, batching, mixing, transporting, forming, and placing concrete.
 - 1. Set equipment posts on concrete footing. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at the correct angle, alignment, height, and spacing.
 - a. Place concrete around posts and vibrate or tamp for consolidation. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
 - 2. Embedded Items: Follow equipment manufacturer's written instructions and drawings to ensure correct installation of anchorages for equipment.
 - 3. Finishing Footings: Smooth top, and shape to shed water.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections with the supplier service representative.
 - 1. Perform inspection and testing for each type of installed playground equipment according to ASTM F1487.
- C. Playground equipment items will be considered defective if they do not pass tests and inspections.
 - 1. It is the responsibility of the Contractor to provide testing of playground post installation.
- D. Prepare test and inspection reports.
- E. Notify Architect 48 hours in advance of date(s) and time(s) of testing and inspection.

END OF SECTION

SECTION 13 31 00

ETFE TENSILE MEMBRANE SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. ETFE tensile membrane system and its supporting steel and/or cable structure.
- B. The ETFE tensile membrane system provider will be a single-source entity with responsibility for the detailing, fabrication, supply, and installation of the work specified..
- C. Structural design, supply, fabrication, shipment, and erection of the following principal items :
 - 1. The ETFE system as indicated on the drawings and in these specifications.
 - 2. Cables and end fittings.
 - 3. Perimeter, catenary, and sectionalized aluminum clamping system.
 - 4. Structural steel, including masts, trusses, struts, beams, and/or weldments, as indicated on the drawings.
 - 5. Fasteners and gasketing.
- D. The ETFE system used in these structures shall be a composite system consisting of ETFE (Ethylenetetrafluoroethylene) film, aluminum attachment, perimeter flashings and if necessary cables. All references to "ETFE system" in this Section, without exception, and whether singular, plural, or capitalized or not, are to such architectural systems.

1.2 RELATED REQUIREMENTS

- A. Section 01 13 00 - Delegated Design Requirements.
- B. Section 03 30 00-Cast-in-Place Concrete.
- C. Section 05 12 00-Structural Steel Framing.

1.3 REFERENCES

- A. General: Except as otherwise shown or noted, all Work shall comply with the requirements of the following codes and standards:
 - 1. IBC (International Building Code), 2018 edition.
 - 2. American Architectural Manufacturers Association (AAMA).
 - 3. American Institute of Steel Construction (AISC).
 - a. AISC/ANSI 360-05 Specifications for Structural Steel Buildings
 - b. AISC 303-05 Code of Standard Practice for Steel Buildings and Bridges
 - c. AISC/ANSI 341-05 Seismic Provisions for Structural Steel Buildings

4. American Society of Civil Engineers (ASCE).
 - a. ASCE 19: Structural Applications of Steel Cables for Buildings
5. American Society for Testing and Materials (ASTM) International.
 - a. ASTM A586: Standard Specification for Zinc-Coated Steel Structural Strand
 - b. ASTM A603: Standard Specification for Zinc-Coated Steel Structural Wire Rope
 - c. ASTM C518: Standard Test Method for steady-state heat flux measurements and thermal transmission properties by means of the heat flow meter apparatus
 - d. ASTM C1363: Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
 - e. ASTM D4851: Standard Test Methods for Coated and Laminated Fabrics for Architectural Use
 - f. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
 - g. ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials (dry cup method)
 - h. ASTM E108: Standard Test Methods for Fire Tests of Roof Coverings
 - i. ASTM E424: Standard Test Method for Solar Energy Transmittance
 - j. ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
6. American Welding Society (AWS).
 - a. AWS D1.1: Structural Welding Code
 - b. AWS 2.4: Symbols for Welding and Nondestructive Testing
7. Aluminum Association.
 - a. Specifications for Aluminum Structures
8. National Fire Protection Association (NFPA).
 - a. NFPA 701: Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
9. Society for Protective Coatings (SSPC).
 - a. Steel Structures Painting Manual, Volumes 1 and 2

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site prior to commencing work of this section.
 1. Require attendance of parties directly affecting work of this section, including:
 - a. Applicable subcontractors.
 - b. Contractor.
 - c. Membrane manufacturer field representative.
 - d. Architect.
 - e. Structural engineer.
 - f. Inspection and testing agency representative.

2. Review erection drawings, sequence, schedule, and procedures; tensile membrane handling, preparation, installation, adjusting, cleaning, and protection requirements, and coordination with related structural work.

1.5 SUBMITTALS

A. Action Submittals:

1. Product Data: Include manufacturer's specifications for materials, fabrication, installation, and recommendations for maintenance. Include test reports showing compliance with project requirements where test method is indicated.
2. Samples: Submit selection and verification samples.
3. Shop Drawings: For tensile membrane system. Include plans, elevations, sections, full-size details, and attachments to other work.
 - a. ETFE system drawings defining the completed structure, anchorage and connection details, interfaces with building construction, and general membrane seam arrangements.
 - b. Drawings to show all shop and erection details including cuts, copes, connection holes, threaded fasteners, bolts, studs and spacing, etc.
 - c. Drawings to show all welds, both shop and field, by the currently recommended symbols of the AWS.
 - d. A welding procedure must be submitted to the Professional Structural Engineer for approval of welds that are not prequalified.
 - e. The fabricator shall not fabricate any material until after receipt of approved shop drawings.
 - f. Certification of material conformance that includes chemical and physical properties for all structural elements shall be submitted for review.
4. Delegated Design Submittal: Tensile membrane systems, including support framing, connections, and related hardware shall be designed under the direct supervision of a Professional Structural Engineer experienced in the design of the work and licensed in the State of Mississippi, using performance and design criteria, and requirements specified in this Section.
5. Design Calculations: Submit complete calculations for the tensile membrane structure, as one package with the design drawings, signed and sealed by a Professional Structural Engineer licensed in the State of Mississippi. Structural calculations to include all required loading cases and load combinations used in the design and resulting member forces, reactions, deflections, and drift. The magnitude of maximum reactions on the supporting structures from all critical load combinations are to be separately tabulated. Critical load conditions used in the final sizing of the members shall be emphasized.

B. Informational Submittals:

1. Qualification Data:
 - a. For Installer and field testing agency.
 - b. For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the state in which Project is located.

- c. For Steel Fabricator: Not less than five (5) years' continuous experience in the fabrication of structural steel.
 - 2. Test Reports: Provide test reports from a qualified testing laboratory that show compliance of the ETFE system with specification requirements.
 - 3. Certificates: Product certificates signed by the ETFE system fabricator certifying materials comply with specified characteristics, criteria, and physical requirements.
 - 4. Source quality-control reports.
 - 5. Sample Warranties: For special warranties.
- C. Closeout Submittals:
- 1. Record Documents: Project record documents for installed materials in accordance with Section 01 78 39 - Project Record Documents.
 - 2. Maintenance Manual: Submit two (2) copies of a maintenance manual for the ETFE system to the Owner. Include a schedule for routine inspection, an inspection checklist, instructions for emergency repair and use of emergency repair materials, and warranty. During the system erection period, the Owner shall provide maintenance personnel to be trained in the use of the repair materials.
 - 3. Samples: Submit samples for proposed ETFE and aluminum extrusion connection finishes. Minimum 12" x 12" in dimension.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design under direct supervision of Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located; with at least fifteen (15) years of documented experience.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least fifteen (15) years of documented experience.
- C. Fabricator/Installer Qualifications: Company specializing in fabricating products specified in this section, have at least fifteen (15) years experience in the successful fabrication and erection of permanent, custom tensile membrane structures.
 - 1. Fabricator to have fabricated and erected at least fifty (50) tensile membrane structures.
- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least fifteen (15) years of documented experience and approved by manufacturer.

1.7 PRODUCT DELIVERY, HANDLING, AND STORAGE

- A. Materials shall be packed, loaded, shipped, unloaded, stored, and protected in a manner that will avoid abuse, damage, and defacement.
- B. Deliver materials to project site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

- C. Store products under cover, elevated above grade, and in dry, well-ventilated areas not exposed to heat or sunlight.
- D. Handle fabric in accordance with manufacturer's instructions.

1.8 WARRANTY

- A. ETFE Base Material Warranty: The ETFE system, its perimeter attachment system, and the structural support system as supplied have been installed in accordance with the project specifications free from defects in materials and workmanship that will impair their normal use or service.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. ETFE Support Structure Warranty: The ETFE support structure and its perimeter attachment system have been installed in accordance with the project specifications and will be free from defects in materials and workmanship that will impair their normal use or service.
 - 1. Warranty Period: 2 years from date of Substantial Completion.
- C. The warranty shall not cover defects caused by the following:
 - 1. Acts of God or other casualty.
 - 2. Damage to the Fabric caused by application of cleaners, solvents, and/or penetrations not otherwise approved in writing by Manufacturer/Installer.
 - 3. Damage occurring due to the failure to mitigate damages.
 - 4. Damage due to inappropriate repairs and maintenance.
 - a. Acts of vandalism or terrorism.
 - b. Improper modification, servicing, or operation.
 - c. Negligence or default of the Owner, or the negligence or default of any third party.
 - d. Outside interference with the System
 - e. Actions of rodents and animals.
 - f. Exceptional meteorological events
 - g. Excessive settlement or movement of the supporting structure.
 - h. Perils for which the System was not designed.
 - i. Modification or addition to the ETFE system performed without the express written consent of the subcontractor.
- D. Maintenance/Extended Warranty:
 - 1. Include a separate price for regular inspection and maintenance agreement of the ETFE system to begin 1 year after Substantial Completion of the Project in order to meet warranty requirements. The maintenance contract will be directly with the Owner.
 - 2. The ETFE subcontractor will visit the site on a yearly basis for inspection and maintenance of the system upon Owners acceptance of the regular inspection and maintenance agreement. The exact schedule shall be as determined between the Owner and the subcontractor.

3. The Owner agrees to furnish access to the installation. Repair and replacement of materials and components covered by warranty shall be performed at no additional cost to the Owner. The maintenance contract shall include a schedule of prices for replacement of major components not covered by the warranty.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a Professional Structural Engineer licensed in the State of Mississippi, as defined in Section 01 40 00 - Quality Requirements, to design tensile membrane systems.
- B. General Performance: Comply with performance requirements specified, as determined by testing of tensile membrane systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- C. System Requirements:
 1. General: Provide an ETFE system that complies with requirements specified herein. Submit a copy of test results for all tests listed in this section.
 2. Building Code Criteria: The ETFE system will comply with the 2018 IBC (International Building Code) edition with Amendments, and the State of Mississippi authorities having jurisdiction. Controlling code and design criteria insertions below to be provided and verified by the Project Engineer.
 - a. Ground Snow Load: As indicated on Drawings.
 - b. Snow Load Importance Factor: As indicated on Drawings.
 - c. Roof Live Load: As indicated on Drawings.
 - d. Basic Wind Speed: As indicated on Drawings.
 - e. Wind Load Importance Factor: As indicated on Drawings.
 - f. Wind Exposure Category: As indicated on Drawings.
 - g. Design Mean Roof Height(s): As indicated on Drawings.
 3. Life Safety: All ETFE systems shall be designed so that no life safety issue is created in the event of a loss of a part of the ETFE film. The ETFE system supporting structure shall not rely on the ETFE film for structural stability.
 4. Fire Performance:
 - a. Burning Characteristics (ASTM E84): Class A

2.2 MANUFACTURERS

- A. The ETFE system provider is responsible for the detailing, fabrication, supply, and installation of the work specified herein.
- B. Tensile Membrane Structures:
 1. Basis of Design: Provide ETS - Enclos Tensile Structures Inc.; ETFE System or a comparable product by one of the follow manufacturers / fabricators / installers:

- a. Birdair, Inc.
- b. Fabritecture.
- c. Lightspan.
- d. NOVUM Structures.

2.3 ETFE SYSTEM

- A. General: The ETFE System used in these structures shall be made of a (Single) Layer colored (translucent) / printed ETFE (tensioned) system. The number and thickness of layers shall be determined by delegated design Professional Structural Engineer according to the below thermal and structural specifications. The color and/or printing of the ETFE shall be applied as to respond to the required solar specifications.

2.4 ETFE FILM

- A. General: The ETFE Film used in these structures shall be based on building conditions. ETFE Films shall be manufactured by one of the following:
 - 1. AGC Chemicals Americas, Inc., Exton, PA, USA
 - 2. Nowofol GmbH, Siegsdorf, Germany
 - 3. PATI, Italy
- B. Basis of Design: 250WT White Film, as manufactured by AGC Chemicals Americas, Inc., Exton, PA, USA.
- C. The ETFE Film General Requirements:
 - 1. Source Quality Control: The primary materials are to be obtained from a single manufacturer. Secondary materials shall be those recommended by the primary manufacturer.
 - 2. Physical Characteristics: The following indicates a range of physical properties typical of ETFE films. The determination of specific characteristics and selection of a film shall be derived from analysis and calculations carried out by the Professional Structural Engineer for this project.
 - a. Specific Gravity: 1.70 – 1.76 (ASTM D792)
 - b. Thickness (mils): 0.5 - 40. (ASTM 4851)
 - c. Light Transmission: 36 percent.
~~Print:~~
~~The overall printing area shall be ____%~~
~~The Light transmission through the printed film shall be ____%~~
~~Solar Transmission of clear film: ____% (ASTM E424)~~
 - 3. Refractive Index: 1.4% (ASTM D542)
 - 4. Water absorption: <0.03% (24 hrs)

2.5 CABLES AND END FITTINGS

- A. Materials:
 - 1. All structural wire rope cables, except stainless steel, shall conform to the latest revision of ASTM A603.

2. All structural strand cables, except stainless steel, shall conform to the latest revision of ASTM A586.
3. All cables, except stainless steel, shall be coated to "Class A" zinc coating throughout.
4. All cables in contact with the membrane shall be white PVC coated
5. Reinforcement cable for the single layer ETFE system shall be made of stainless steel, AISI 304 or AISI 316.

B. Fabrication:

1. Cable fabricator to provide quality control over all fabrication activities. Inspection of the place of fabrication may occur at any time to verify proper quality control. This inspection does not relieve the fabricator from meeting the requirements of this specification.
2. Cables that are designated to be pre-stretched shall be pre-stretched per ASTM A603 for wire rope and ASTM A586 for structural strand. Cables of the same type shall have the same modulus of elasticity.
3. All cables shall be manufactured to the following length tolerances at 70 degrees Fahrenheit (23 degrees Celsius):

a.	Length < 70 feet (2133.6 cm)	1/4 inch (0.25 inch (6.4 mm))
b.	Length 70 to 270 feet (8229.6 cm)	0.03% of length
c.	Length > 270 feet (8229.6 cm)	1 inch (25.4 mm)

4. Cables shall have a continuous longitudinal paint stripe (1/4-inch wide max) along their top surface unless noted otherwise.
5. Index markings shown shall be a circumferential paint stripe (1/4-inch wide max).
6. All cables and end fittings shall be delivered clean and dry.
7. All swaged and speltered fittings shall be designed and attached to develop the full breaking strength of the cable. Thimble end fittings shall develop a minimum of 90 percent of the cable breaking strength.
8. Swaged end fittings, pins, nuts, and washers shall be hot dip galvanized per ASTM A153. Any damage to the zinc coating shall be cleaned and painted with a gray zinc-rich paint per ASTM A780.
9. Speltered end fittings shall be hot dip galvanized per ASTM A153. Any damage to the zinc coating shall be cleaned and painted with a gray zinc-rich paint per ASTM A780.

2.6 ALUMINUM CLAMPING SYSTEM

A. Materials:

1. All structural aluminum clamping systems to be Aluminum Association alloy 6061-T6 or alloy 6063-T6, or shall be EN AW-6060-T66.
2. Bent plates to be formed and then heat-treated to T6 or T66, as applicable.
3. All structural "U Straps" to be stainless steel, type AISI 316.
4. All structural aluminum clamping to have the following finish :

- a. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1) Color: White..
 5. Structural sheet aluminum to be ASTM alloy 5052-H32.
 6. Non-structural sheet aluminum to be ASTM alloy 1100 series.
- B. Fabrication:
1. Aluminum fabricator will provide quality control over all fabrication activities. Inspection of the place of fabrication may occur at any time to verify proper quality control. This inspection does not relieve the fabricator from meeting the requirements of this specification.
 2. Fabricated aluminum will have no sharp edges.
 3. Stamp all parts with the appropriate mark number.
 4. All fabricated aluminum will be free of oil, grease, and machining chips.
 5. Tolerances shall be as follows:
~~Cross Sectional Dimensions: +/- 10%, 0.03 inch (0.8 mm) max.~~
~~Bolt Hold Locations: +/- 1/32 inch (0.79 mm)~~
~~Overall Length: +/- 1/16 inch (1.59 mm)~~
- | | | |
|----|-----------------------------|-------------------------------------|
| a. | Cross Sectional Dimensions: | +/- 10%, [0.03] inch ([0.8] mm) max |
| b. | Bolt Hold Locations: | +/- [1/32] inch ([0.79] mm) |
| c. | Overall Length: | +/- [1/16] inch ([1.59] mm) |
6. All welded joints to conform to AWS D1.2.

2.7 STRUCTURAL STEEL

- A. General: The structural steel fabrication to comply with the latest revision of all applicable codes, standards, and regulations including the following:
 1. AISC: "Specification for Structural Steel Buildings" and "Code of Standard Practice for Steel Buildings and Bridges."
 2. SSPC: "Steel Structures Painting Manual, Volumes 1 and 2."
 3. Research Council on Riveted and Bolted Structural Joints: "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
 4. AWS D1.1 and AWS A2.4.
- B. In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or these specifications, the provisions of the more stringent shall govern.
- C. Materials:
 1. Structural steel for plates and bars to conform to the requirements of ASTM A36 or ASTM A572, Grade 50, unless noted otherwise.
 2. Structural pipe to conform to ASTM A53, Types E or S, Grade B.
 3. Structural tubing to conform to ASTM A500 Grade B.
 4. Structural bolts.
 - a. High Strength Bolts: ASTM A325, unless noted otherwise.

- b. Common Bolts and Nuts: ASTM A307.
 - c. Threaded Rods: ASTM A36, unless noted otherwise.
 - 5. Other materials: Provide all other materials, not specifically described but required for a complete and proper installation of structural steel .
- D. Accessories:
 - 1. Base Plates and Anchor Bolts:
 - a. Base plates supported on concrete, whether shop attached or shipped loose, are to be furnished and set on shims, leveling plates or leveling nuts. Grouting as required per delegated design.
 - b. Anchor bolt locations to be furnished to set the bolts in concrete prior to pour. Anchor bolts to have two (2) nuts and washers. Damaged threads shall be repaired or be cut to permit full tightening of nuts.
- E. Fabrication:
 - 1. Workmanship: All members, when finished, to be true and free of twists, bends, and open joints between the component parts. Members to be straightened in the shop by methods that will not damage them, before being worked on in any way.
 - a. Properly mark materials, and match-mark for field assembly where required.
 - b. Grind all edges and corners that could contact membrane to a minimum 1/16 inch (1.6mm) radius.
 - 2. Connections:
 - a. Connections shall be as indicated on the drawings. When details are not shown the connections shall conform to the requirements of the AISC.
 - b. Provide high-strength threaded fasteners for all structural steel bolted connections, unless noted otherwise.
 - c. Combination of bolts and welds in the same connection are not permitted, unless otherwise detailed.
 - d. Welded Connections.
 - 1) Definitions: All terms herein relating to the welds, welding and oxygen cutting to be construed in accordance with the latest revision of "Standard Definitions of Welding Terms and Master Chart of Welding Processes" of the AWS.
 - 2) No welding to begin until joint elements are clamped in proper alignment and adjusted to dimensions shown on the drawings with allowance for any weld shrinkage that is expected. No members are to be spliced without prior approval.
 - 3) All welding shall be done in accordance with the reference specifications, with the following modifications and additions:
 - (a) All field welding will be done by manual shielded metal-arc welding.
 - (b) All groove welds to have complete penetration, unless otherwise specified on the drawings.
 - (c) The minimum preheat and interpass temperature requirements to be as required per AWS D1.1.

- 4) Welding Sequence: Heavy sections and those having a high degree of restraint must be welded in a sequence with the proper preheat and post-weld heat treatment such that no permanent distortion occurs. Submit a welding sequence for approval for these types of connections.
 - (a) Oxygen Cutting: Manual oxygen cutting to be done only with a mechanically guided torch. Alternatively, an unguided torch may be used provided the cut is not within 1/2 inch (12.7 mm) of the finished dimension and the final removal is completed by chipping or grinding to produce a surface quality equal to that of the base metal edges. The use of oxygen-cut holes for bolted connections will under no circumstances be permitted.
3. Tolerances: All tolerances are per the AISC "Code of Standard Practice for Steel Buildings and Bridges."
4. Paint System, Two-Coat; Zinc Polyurethane:
 - a. Source Quality Control: Primary materials to be obtained from a single manufacturer. Secondary materials to be those recommended by the primary manufacturer.
 - b. Surface Preparation and Prime Coat:
 - 1) Commercial blast cleaning SSPC-SP-6, after all fabrication operations such as machining and welding are complete. There shall be a maximum of eight hours elapsed time between surface preparation and application of the prime coat.
 - 2) Protect all drilled and tapped holes and/or threaded studs prior to painting such that all bolted connections can be made by erector without first cleaning threads.
 - 3) Primer: International Paint Interzinc 315 or approved equal, @ 2.5 - 3.0 mils DFT.
 - (a) Comply with the composition and performance requirements of SSPC paint specification No. 20.
 - c. Finish Coat:
 - 1) Finish Coat: International Paint Interthane 870 series or approved equal, @ 4.0 - 5.0 mils DFT..
 - (a) Comply with the composition and performance requirements of SSPC paint specification No. 36
 - 2) Color and Gloss: As selected by Architect from manufacturer's full range.
 - d. Finish Quality:
 - 1) Dry paint shall be uniform and continuous with no voids or puddles and shall not be broken by scratches or nicks.

2.8 FASTENERS

- A. General: Provide fasteners used to secure clamp systems to curbs and cables, assemblage of clamp systems, and other fasteners as required to complete the work specified herein.

B. Materials:

1. All work to comply with the latest edition of ASTM standards and American Iron and Steel Institute (AISI), as referenced herein.
2. Fasteners used in membrane clamping systems to be stainless steel. Bolts and studs will conform to ASTM F593, Type 304, or to be grade A2-70 per DIN/ISO. Nuts shall conform to ASTM F594, Type 316, or shall be grade A4-70 per DIN/ISO. Washers to be plain, narrow, and conform to AISI Type 18-8.
3. All clamping systems subjected to relative movement between clamping and curb shall receive a split-ring lock washer conforming to AISI Type 18-8.
4. Unless otherwise specified on the drawings, all other bolts and nuts shall conform to ASTM A307-76B, zinc plated to conform to ASTM B633 Class Fe/Zn 8 type III.

2.9 GASKETING

A. Sponge Neoprene Gasketing:

1. Material:
 - a. All sponge neoprene shall be of a cellular elastomeric compound of a firm grade, which has been manufactured in pre-formed shapes for use as gasket and sealing material, as specified in ASTM C509.
 - b. Cellular elastomeric materials furnished to this specification will be manufactured from natural or synthetic rubber, or mixtures of these, with added compounds of such nature and quality that, with proper curing, the finished product will comply with this specification.
 - c. The cured compounds shall be suitable for use where resistance to sunlight, weathering oxidation, and permanent deformation under load are of prime importance.
 - d. The manufacturing process to ensure a homogeneous cellular material free of defects that may affect serviceability.
 - e. The physical characteristics of the neoprene must meet or exceed ASTM C509, "Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Materials."
 - f. Certification of material to be provided that conforms to ASTM C509.

B. EPDM Gasketing:

1. All EPDM Material shall be of a grade which has been manufactured for use as gasket and sealing material.
2. The cured compounds to be suitable for use where resistance to sunlight and weathering oxidation are of prime importance.
3. The manufacturing process to ensure a material free of defects that may affect serviceability.
4. The physical characteristics must meet or exceed the following physical test requirements when tested using the latest standard ASTM test slab can compression set plug (or approved equal):

	PROPERTY	ASTM TEST METHOD	LIMITS
a.	Shore A Durometer	D 2240	60 – 70
b.	Tensile Strength (Min.)	D 412	[1,305] psi ([8997.66] kPa)
c.	Percent Elongation (Min.)	D 412	350%
d.	Tear Resistance (min.)	D 624	175 lbs./in
e.	Resistance to Heat Aging:	D 573	
	Tensile Strength (Min.)	D 412	[1,200] psi ([8273.71] kPa)
	Elongation, Ultimate (Min)	D 412	225%
	Tear Resistance (min.)	D 624	150 lbs./in
	Linear dim. change (Max)	D 1204	2%
f.	Ozone Resistance	D 1149	no cracks
g.	Low temp. brittleness	D 746	-75 F
h.	Water absorption (Max)	D 471	4%
i.	Water Vapor permeability	E 96	2.0 (Max)
j.	Ultra Violet Weathering:		
	Tensile Strength (Min.)	D 412	[1,200] psi ([8273.71] kPa)
	Elongation, (Min)	D 412	225%
k.	Sheet Composition	D 297	30% Min
	Weight % Sheet of EPDM		
	Polymer		

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine area to receive flexible structural elements and tensile membrane; notify Architect if area is not acceptable and do not begin installation until unacceptable conditions have been corrected.
- B. Examine foundations and anchor bolts for location and elevation; notify Architect of inaccuracies, and do not begin installation until unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Prepare a clear, flat, smooth, and clean layout area on ground of sufficient size for assembly of tensile membrane panels; prepare area adjacent to location of structure installation.

- B. Check contact surfaces to remove sharp objects, dirt, grease, oil, and other causes for rips, scratching, or other damage to tensile membrane panels during installation.

3.3 FABRICATION MEMBRANE PANELS

- A. General:
 - 1. Installer shall take necessary care to plan and assemble the fabricated sections such that the assembly has no shop patches. Splices, if any, shall be patterned into a symmetrical and repetitive geometric arrangement within the assembly, shown on the shop drawings and, where feasible, hidden by structural members.
 - 2. Uniaxial Test: At least one (1) representative sample of the ETFE film shall be uniaxially test loaded.

3.4 ERECTION OF ETFE SYSTEM

- A. Erect tensile membrane structures and flexible structural elements in accordance with erection requirements of ASCE 55.
- B. Comply with approved erection plan.
- C. Do not undertake erection of tensile membranes during inclement weather conditions; Installer has sole responsibility to determine when conditions are safe for erection.
- D. Install tensile membranes and flexible structural elements in accordance with manufacturer's instructions.
 - 1. Install to avoid damage to tensile membranes.
 - 2. Ensure tensile membranes surfaces are smooth, uniform, and clean, with even-curved edges and interfaces, and with no cuts, scratches, abrasions, stains, marks, blemishes, or welding irregularities.
- E. Erection of Structural Steel:
 - 1. All precautions shall be taken to ensure an accurately located and completely safe and stable structure at all times. Adequate guy cables shall be used throughout the work and all erection bolts shall be drawn up tight.
 - 2. All steel to be accurately aligned before permanent connections are made.
 - 3. Temporary bracing is to be left in place as long as may be required for safety. The bracing shall be located so it does not interfere with the erection of the tensile membrane structure, and can be removed as required during construction.
 - a. The structure is to be self-supporting and stable after the installation is fully completed.
 - 4. Erection tolerances shall be specified in the AISC "Code of Standard Practice for Steel Buildings and Bridges," including those related to placement of anchor bolts, unless otherwise indicated.

- a. Tensile membrane structures (including individual membrane panels, insulated and/or uninsulated) are pre-engineered and pre-fabricated to fit a specific theoretical dimension. For those primary and secondary structural elements to which the membrane structure (including an individual membrane panel) is connected, the erected position of member working points, including those of cantilevered members, shall not vary from the theoretical model by more than 1-inch (25mm) in any direction, either individually, or cumulatively across a shipping piece. This includes but is not limited to: cable connection points, membrane panel edges, membrane bearing locations, intermediate splice points of field-spliced members, hardware connections, weldments and their anchorages. For arched members, include the three-dimensional location of the member midpoint as a working point for tolerance measurement.
- b. The cumulative effect of dimensional steel discrepancies shall be such that the distance between membrane panel support points does not vary more than 1-inch (25mm) from the theoretical dimension within each membrane panel.
- c. All steel structures that support tensioned membrane must maintain an uninterrupted drainage path and a minimum constant slope of 5 degrees from all points of the membrane.

3.5 FIELD QUALITY CONTROL

A. Testing:

1. Owner to engage an independent testing laboratory to perform testing and inspection of the structural steel and welding. All welds to be tested by visual, dye penetrant, magnetic particle methods, or ultrasonic methods.
2. The fabricator/installer and the testing laboratory inspector shall be permitted to inspect the work in the shop or field throughout fabrication and erection.
3. The inspector will check for workmanship of steel, both in the shop and field, and check general compliance with the Contract Documents and steel shop drawings. The inspector will record types and locations of all defects found in the work and measures required and performed to correct such defects.
4. The steel fabricator will make all repairs to defective work to the satisfaction of the inspector.
5. The inspector will submit reports of inspection and test findings to the Architect. Record all defects found with subsequent repair operations and submit reports to the Architect.
6. The work of the independent inspector will in no way relieve the steel fabricator of responsibility to comply with all requirements of the Contract Documents.

3.6 ADJUSTING

- A. Make final adjustments to tensile membranes and flexible structural elements as required for structural integrity, and in accordance with shapes and configuration indicated on drawings.

3.7 PROTECTION AND CLEANING

- A. Protect work from damage and deterioration during installation.
- B. Product Handling and Protection: Use all means necessary to protect structural steel before, during, and after installation and to protect the installed work and materials of all other trades.
- C. Upon completion of the ETFE system installation:
 - 1. Installer to clean all surfaces of the system's components in conformance with the membrane manufacturer's recommendations.
 - 2. Inspect the system and repair membrane panels that have become damaged. Repairs are to be executed in such a way that they are visually acceptable to Architect.
 - 3. Inspect the system and repair membrane panels that have become damaged per manufacturer's requirements.
- D. Steel Cleaning:
 - 1. Cleaning and touchup steel finishes field welds, bolted connections and abraded areas are to be completed per the manufacturer's field repair recommendations.

END OF SECTION