SECTION 071326

SELF-ADHERED SHEET WATERPROOFING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

1.02 RELATED DOCUMENTS

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

B. Refer to other Divisions of these Specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

C. Reference Drawings: The Work of this Section is shown on the Contract Drawings titled “Physical Education Building Exterior Renovations, Montgomery College, Germantown Campus, Germantown, MD”.

D. Provide a copy of applicable Drawings including Shop Drawings and Specifications at the site during work.

1.03 SUMMARY

A. Provide labor, materials, equipment services and accessories necessary to furnish and install work on this Section, complete and functional as indicated in the Contract Documents and as specified herein.

B. The work of this section includes, but is not limited to, the following:

1. Rubberized asphalt sheet membrane foundation wall waterproofing system (for over-excavated construction near grade). Refer to the demolition requirements for information regarding removal of the existing grade.

2. Prefabricated drainage composite

3. Below-grade insulation

4. Accessories

1.04 RELATED SECTIONS:

A. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 033000 – Cast-In-Place Concrete

2. Section 042000 – Unit Masonry

3. Section 042200 – Concrete Unit Masonry

4. Section 072700 – Air and Water Barriers

5. Section 076000 – Flashing and Sheet Metal

1.05 REFERENCE STANDARDS

A. The following standards and publications are applicable to the extent referenced in the text.

B. American Society for Testing and Materials (ASTM)

1. ASTM C836 – Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course

2. ASTM D412 – Standard Test Methods for Rubber Properties in Tension

3. ASTM D570 – Standard Test Method for Water Absorption of Plastics

4. ASTM D882 – Standard Test Methods for Tensile Properties of Thin Plastic Sheeting

5. ASTM D903 – Standard Test Method for Peel or Stripping Strength of Adhesive Bonds

6. ASTM D1876 – Standard Test Method for Peel Release of Adhesives (T-Peel)

7. ASTM D1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection

8. ASTM D3767 – Standard Practice for Rubber - Measurements of Dimensions

9. ASTM D4541 – Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers

10. ASTM D5385 – Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes

11. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials

12. ASTM E154 – Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.03 PERFORMANCE REQUIREMENTS

A. Sheet waterproofing assemblies shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed at the bottom of the wall and

integrated with the above-grade air barrier membrane. Sheet waterproofing assemblies shall be detailed in a manner that accommodates substrate movement and is continuous across substrate expansion and control joints, construction material changes, and transitions at perimeter conditions (e.g., to windows) without deterioration or air leakage exceeding specified limits.

C. Install sheet membrane waterproofing materials in shingle fashion to avoid “bucking” of water at seams.

1.06 SUBMITTALS

A. See Section 013300 for general submittal procedures.

B. Submit the following items in time to allow for review by the Engineer and resubmittals, if needed, without delaying the work. Do not order materials or start work before receiving the Engineer's written approval.

1. Product Data: Submit manufacturer’s product data, installation instructions, use limitations and recommendations. Include certification of data indicating VOC (Volatile Organic Compound) content of all components of waterproofing system and primer.

2. Shop Drawings: Participate in the preparation of Shop Drawings, coordinated among all participatory trades, which establish and accommodate existing constraints and the variance in existing conditions.

3. Submit manufacturer’s approval of compatibility with above-grade air/water barrier on exterior walls.

4. Field Testing Reports: Submit written and illustrated reports of adhesion testing results for the Engineer’s information.

1.07 MOCKUPS

A. Build an in-situ mockup of foundation wall waterproofing to verify quality of materials, sequencing, and execution. Mockups should include all typical exterior wall components, including air/weather barrier, insulation, through-wall flashing, cladding and other wall components. Refer to Section 014500 – Mockups.

1.08 QUALITY ASSURANCE

A. Engage experienced waterproofing personnel to perform work of this Section. The Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least 5 yrs. The contractor shall staff the work of this Section with only qualified personnel experienced in the application of this system.

B. Manufacturer: Sheet membrane waterproofing system shall be manufactured and marketed by a firm with a minimum of 20 yrs’ experience in the production and sales of self-adhesive sheet membrane waterproofing.

C. Materials: Obtain all waterproofing materials and accessories from a single manufacturer for the duration of the project.

D. Conduct a quality control program that includes, but is not limited to, the following:

1. Inspection of materials to assure conformity with contract requirements, and that materials are new and undamaged.

2. Establishment of procedures for executing the work.

3. Inspecting surface preparation prior to material application.

4. Inspection of work in progress to ensure work is being done in accordance with established procedures, manufacturer's instructions, and specific Engineer instructions.

5. Inspection of work completed and prompt correction of defective work.

E. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so the intent of the Drawings and Specifications is carried out. Coordinate with other trades to maximize efficient use of scaffolding, to minimize disruption to the building, and to avoid unnecessary traffic over areas of completed work or existing to remain materials.

F. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.

1.09 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer’s instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations.

B. All materials to be new. Handle all materials to prevent damage. Place materials on pallets. Use waterproof and fireproof canvas tarpaulins (not plastic) to cover all stored materials top to bottom. Do not double-stack pallets of membrane on the job site. Provide cover on top and all sides, allowing for adequate ventilation.

C. Protect mastic and adhesive from moisture and potential sources of ignition.

D. Store drainage composite or protection board flat and off the ground. Provide cover on top and all sides.

E. Protect surface conditioner from freezing.

F. Do not stockpile materials or equipment to overload any building or site component.

G. Sequence deliveries to avoid delays, but minimize on-site storage.

H. Promptly remove from the site all materials rejected by the Engineer or exposed to any harmful moisture anywhere, at any time, during transportation, storage, handling, or installation.

I. Materials shall be marked with the manufacture and shelf life. Do not use products beyond the expiration of their shelf life. Store flammable materials in a cool, dry, protected area away from sparks and open flames.

1.10 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Field Measurements: Verify all site conditions and dimensions by field measurements before material fabrication or delivery and indicate measurements on Shop Drawings. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the contract drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Consider the special conditions associated with repairs to existing construction when measuring for shop drawings.

C. Coordination requirements: Coordinate installation with other trades, to help ensure proper installation sequencing for assemblies.

D. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing. Coordinate installation with other trades, to help ensure proper installation sequencing for assemblies.

E. Protection

1. Protect the building and its contents, including interior finishes not part of the work area, from risks associated with the work in this Section. Schedule and execute work without exposing adjacent building areas to water, dust, and debris, or materials used by this Contractor. Protect adjacent areas from damage and stains with appropriate barriers and masking. Repair damage as a result of the work of this Section to its condition at the start of work, or if such cannot be determined, to its original condition. Clean stains by approved means.

2. Do not damage existing materials scheduled to remain. Provide adequate protection of all mechanical equipment to prevent breakage, scratches, staining, and any other damage during work associated with this Section.

3. Apply protection board and/or drainage composite as soon as possible after installation of membrane, and secure to backup wall to prevent debris from collecting against membrane.

4. Clean the work areas free of all debris including fasteners, scrap metal, and metal shards, on a daily basis. Notify the Engineer immediately if any damage

to the existing or new waterproofing and roofing system is observed, regardless of the source of the damage. Ensure that all adjacent roofing is covered with plywood protection board with taped joints prior to commencing work in the area.

1.11 WARRANTY

A. Applicator Warranty: Guarantee work under this section in a document stating that if, within 2 yrs after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective, including sources found to be the cause of water intrusion into interior space, or not in accordance with the Contract Documents, the Applicator shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Applicator a written acceptance of such condition. Also, state that the Applicator shall bear costs incurred by the Owner, including reasonable attorney's fees, court costs, and expert witness and consultant fees, to enforce Applicator's compliance with the obligations of this Guarantee. The obligations of this Guarantee shall run directly to the Owner and its successors and assigns, and may be enforced by the Owner and its successors and assigns against the Applicator, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

B. Sheet Membrane Waterproofing: Provide written 5 year material warranty issued by the membrane manufacturer upon completion of the work.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Waterproofing membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity. If an alternate system is used, all accessory materials are subject to review and approval by the Engineer.

1. Basis-of-Design System: Blueskin WP200
   Henry Company.
   909 N Sepulveda Blvd, Suite 650
   El Segundo, CA 90245
2. Alternate System: Bituthene System 4000 Membrane
   W.R. Grace & Co.
   62 Whittemore Avenue,
   Cambridge, MA 02140

2.02 WATERPROOFING MEMBRANE (BASIS-OF-DESIGN):

A. Blueskin® WP200 manufactured by Henry, 1.5mm (60 mils) SBS modified bitumen, self-adhering sheet membrane with a cross-laminated polyethylene film, and having the following physical properties:

1. Thickness: 1.5 mm (60 mils) min.,

2. Flexibility: Pass @ -40 degrees C to ASTM D1970,

3. Vapor permeance: 2.8 ng/Pa.s.m² (0.05 perms) to ASTM E96,

4. Tensile strength (membrane): 2.24 MPa to ASTM D412,

5. Tensile strength (film): 34.5 MPa to ASTM D882,

6. Elongation: 300% to ASTM D412,

7. Puncture resistance: 222 N min. to ASTM E154.

2.03 DRAINAGE COMPOSITE

A. Henry DB 200 by Henry: Two part prefabricated geocomposite drain board consisting of a formed polystyrene or PVC core covered on one side with a woven or non-woven polypropylene filter fabric.

B. Drainage Composite Accessories:

1. Securement Bars: Continuous 1/4 in. x 3/4 in. HDPE bar for screw attachment.

2. Molding Strip: Continuous 3 1/2 in. wide 'Z' flashing strip to fit over exposed top edge of drain board.

3. Stick Pin Anchors: as determined by manufacturer.

4. Weeping Tile System (Base Drain): A modular composite drainage and collection system at the base of the drainage composite that is integrated with the stormwater management system. Basis-of-Design system J-Drain SWD by JDR Enterprises, Inc. Provide the following components:

a. Weeping tiles: 3-dimensional, high-flow, drainage core that connects with the base of the drainage composite, is 6 in. wide, and is wrapped with a non-woven filter fabric.

b. Outlet fittings: Integral connections between the weeping tile system and the storm water plumbing.

c. Splices: PVC connections to join segments of the weeping tiles at corners and butt-joints.

d. Connection Tape: Adhesive tape to attach fittings and splices to weeping tile.

5. Perimeter Drain: A 4 in. diameter solid PVC pipe connected to the drainage composite and sloped to drain into the storm water management system.

2.04 BELOW-GRADE INSULATION

A. Exterior Cavity Insulation (at foundation walls): Extruded Polystyrene (XPS) insulation board with 0.1% maximum absorption per ASTM C272 and a minimum compressive

strength of 25 psi, thickness as shown on the drawings: FOAMULAR 250 by Owens Corning

1. Acceptable Alternative: Cavitymate by Dow, or approved similar.

2.05 ACCESSORIES

A. Primer: Blueskin Primer by Henry, a quick drying, rubber-based adhesive.

B. Liquid Membrane & Termination Sealant: HE925 BES Sealant by Henry, a moisture cure, medium modulus polymer modified sealing compound.

C. Protection Board: A multi-ply, semi-rigid core composed of a mineral-fortified asphalt core formed between two outside layers of asphalt-impregnated reinforced mats, manufactured in accordance with ASTM D6506 with a nominal thickness of 1/4 in.

D. Termination Bars: Continuous stainless steel 1/8 in. x 1 in., pre-punched or pre-drilled for non-corrosive attachment at a maximum distance of 8 in. o.c.

1. Fasteners: 1/4 in. dia. Nylon Nailin with stainless steel nail and mushroom head by Rawl Powers Inc., New Rochelle, New York, with length to provide a minimum of 1-1/4 in. embedment, or as specified in Section 076200 – Sheet Metal Flashing.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify all site conditions and dimensions by field measurements in consideration of the special conditions associated with alteration of existing construction and reconstruction. Notify the Engineer immediately of any inconsistency between field conditions found during demolition and those shown in the Contract Drawings. The Engineer will determine what modifications or additional repairs are necessary.

B. Examine all surfaces and conditions to receive waterproofing for substrate roughness, contaminants, unsound structural substrates, and other conditions under which this work is to be performed and notify the Contractor and Engineer, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 SUBSTRATE PREPARATION

A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove areas of existing loose, damaged or deteriorated stucco, and contaminants such as grease, oil and wax from exposed surfaces.

B. Remove dust, dirt, loose CMU and debris from all new and existing substrates. Removal of dirt from existing below-grade substrates may involve power washing and/or mechanical abrasion, as determined by the Contractor's means and methods.

C. New concrete or mortar should be cured for a minimum of 7 days and must be dry before waterproofing membranes are applied.

D. Sound CMU and concrete and repair substrate where necessary prior to installing waterproofing. Treat cracks according to the manufacturer's recommendations. Fill holes, voids and spalls with repair mortar that is acceptable to manufacturer of sheet membrane waterproofing to provide a smooth substrate. Let mortar cure for sufficient time as determined by manufacturer. Ensure all Work relating to the backup wall substrate, including repairs to the existing direct-applied stucco, is complete and properly cured prior to applying the primary waterproofing membrane.

E. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

3.03 INSTALLATION

A. Primer

1. Prime all surfaces to receive air/water barrier. Apply primer for self-adhered membrane by roller or brush at rate recommended by manufacturer.

2. Allow minimum 30 min. open time. Primed surfaces not covered by waterproofing membrane during the same working day must be re-primed. When working in temperatures below 40°F, apply waterproofing over the primer within 1 hour, as recommended by the manufacturer.

3. Follow all manufacturer's recommended safety precautions and installation instructions when applying the primer and membrane, including no smoking, open flame or sparks in the work area during installation. Notify Engineer if safety precautions cannot be reasonably met at specific locations on the building.

B. Footing/foundation walls, junctures, cracks in slab and protrusions

1. Coat penetrations, such as brackets, clips, braces, etc. that are set into the concrete with a 90 mil coating of liquid membrane to the height of the wearing course and around projections to ensure a complete seal prior to coating the entire area.

2. To all cracks and cold joints less than 1/16 in., apply a coat of liquid membrane at a minimum thickness of 30 mils extending 3 in. on either side of joint, embed a 6 in. wide strip of primary self-adhered waterproofing membrane over.

3. To all cracks greater than 1/8 in., fill void with non-shrink cementitious patching material and allow to cure dry. Prime area and install self-adhered waterproofing membrane, extend 3 in. on either side of crack. Overlap end joint of sheet a minimum 3 in.

4. At monolithic and non-monolithic wall/slab junctures, prime area, trowel-in fillet bead of liquid membrane to inside corners and install self-adhered waterproofing membrane sheet to the required height on the wall and at least

4 in. on the slab. Lap primary waterproofing membrane over a minimum of 2 in.

5. Horizontal to vertical inside corner transition areas are to be pre-treated with a liquid membrane fillet extending 3/4 in. vertically and horizontally from the corner. Apply a minimum 10 in. strip of self-adhered waterproofing membrane centred at the joint.

6. All outside corners are to be pre-treated with a minimum 10 in. strip of waterproofing membrane centred at the joint.

7. Where three or more planes come into contact, reinforce with cut sections of waterproofing membrane reinforcing sheet as per manufacturer's instructions.

C. Projections

1. Extend waterproofing membrane tight to projection and seal with liquid membrane, extending 3 in. along projection and 3 in. onto waterproofing membrane.

D. Waterproofing membrane – vertical applications

1. Apply waterproofing membrane to prepared and primed substrate in lengths of 6 feet or less.

2. Provide 3 in. laps at both sides and ends. Position for alignment and remove protective film. Press firmly into place. Promptly roll all laps with a counter top roller to affect seal. If more than one length is required on a vertical surface, apply in a shingle fashion.

3. Terminate membrane using termination bar and mastic; provide reglet or counter flashing as indicated on the Drawings. Refer to manufacturers standard details.

4. All laps are to be sealed with termination sealant.

5. At end of each working day, seal top edge of waterproofing membrane to substrate with termination mastic.

6. Repair punctures, voids, and deficient lapped seams in waterproofing membrane. Slit and flatten fishmouths and blisters. Patch with waterproofing membrane extending 3 in. beyond repaired areas in all directions; orient patches in a diamond-shape to help prevent water from collecting along a top edge.

7. Integrate with self-adhered air/water barrier membrane 12 in. minimum above exterior grade as shown in the Drawings to form a shingle lap configuration. Integrate with metal through-wall flashing assembly and cladding as shown on the drawings; see Section 072700 – Air and Water Barrier for additional requirements.

E. Protection board

1. Protection Boards shall be installed over the waterproofing membrane that is not covered with cladding to prevent damage from materials and equipment used in backfilling.

2. Apply protection board adhesive in 1 in. wide strips spaced at 16 in. o/c to cure waterproofing membrane. Immediately embed protection board and press into adhesive to ensure full contact.

3. Do not backfill until adhesive has cure dried. Do not use excessive levels of adhesive.

F. Insulation and Grout

1. Place insulation over membrane and protection board in the wall cavity.

2. Coordinate insulation placement with veneer ties and brick masonry installation. Secure insulation with veneer tie wedge anchors, or similar method.

3. After brick masonry is installed, fill the air space between the insulation and the brick masonry with grout – see Section 04 20 00.

G. Drainage Composite

1. Place the perimeter drain outboard of the footing and slope to drain into the storm water management system using a graded bed of No. 57 stone.

2. Align and hang drainage up to foundation wall. Position bottom edge of drainage composite to be in moderate contact with weeping tile system.

3. Secure drainage composite to foundation wall with stick pins adhered over the protection board. Reattach any loose or dislodged drainage composite just prior to backfilling.

4. Align and install termination strip along top edge with nails spaced 12 in. o/c fastened into the base of the brick cladding below grade and seal with termination sealant.

5. Align and install moulding strip over completed top edge detail.

6. Overlap end laps, pull back loose fabric to expose drain core and position core of second panel over the overlap flange of first panel.

7. Bend drain board to create inside corners and cut board to create outside corners, provide 4 in. of extra fabric to wrap corner.

8. Stagger or offset joints of drain board sheets.

9. Place all subsequent sheets in an overlapping single fashion.

10. Backfill bottom edge in conjunction with weeping tile system.

3.04 CLEANING AND PROTECTION

A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.

B. Promptly clean up and remove from site all rubbish and surplus materials resulting from the foregoing work as the work proceeds and on completion of the work.

C. Protect completed membrane waterproofing from subsequent construction activities, including backfilling, as recommended by manufacturer.

D. Provide protection of installed materials from water infiltration into or behind them.

E. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.

3.05 SITE QUALITY CONTROL

A. Adhesion Testing: Contractor shall test for membrane adhesion in compliance with ASTM D4541.

1. Perform all testing prior to applying the protection board. Coordinate all testing with other trades to ensure adequate time is provided to remediate test area and address deficiencies in installation or surface preparation, if necessary.

2. Perform a minimum of one test for every 250 LF of building footprint where the waterproofing system is applied, with a minimum of one test per primary building elevation. Test shall be evenly distributed throughout the construction area and schedule.

3. In addition to the testing protocol described above, one test shall be conducted on the in-situ mockup and observed by the Engineer.

4. Conduct an additional test, not included in the testing described above, at each area of surface preparation or primer that differs from the mockup construction.

5. The test shall be considered failed if the adhesion is less than 9 psi or if the backup wall substrate delaminates prior to the membrane debonding from the substrate. Remediate all failed test areas and retest the membrane in that area; repeat in this manner until the area passes the test.

6. Repairs or remediation measures conducted shall pass testing, if they constitute a change to design, change shall be implemented throughout Work as determined by the Engineer.

7. Installer shall patch and repair all test areas according to the Contract Documents.

8. Contractor shall submit written and illustrated reports of testing results for the Engineer’s information.

9. All testing costs shall be paid by the Contractor.

END OF SECTION

SECTION 07 24 19

DRAINABLE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

1.02 RELATED DOCUMENTS

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

B. Refer to other Divisions of these Specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

C. Reference Drawings: The Work of this Section is shown on the Contract Drawings titled “Physical Education Building Exterior Renovations, Montgomery College, Germantown Campus, Germantown, MD”.

D. Provide a copy of applicable Drawings including Shop Drawings and Specifications at the site during work.

1.03 SUMMARY

A. Provide labor, materials, equipment services and accessories necessary to furnish and install work on this Section, complete and functional as indicated in the Contract Documents and as specified herein.

B. The scope of work specified herein includes, but is not limited to, the following:

1. Provide drainable EIFS cladding assembly, including insulation, base coat, reinforcing, lamina, and all attendant accessories, over the existing stucco coating applied to the CMU exterior walls where shown on the Drawings.

2. Provide drainable EIFS cladding assembly, including insulation, base coat, reinforcing, lamina, and all attendant accessories, over new exterior sheathing and metal framing at areas where the existing system was removed under Section 02 41 19 – Selective Demolition, including the upper and lower soffits, exterior beams, Weight Room addition, and other wall areas around the building as shown on the Drawings.

3. Provide drainable EIFS cladding assembly with reduced insulation thickness, including insulation, base coat, reinforcing, lamina, and all accessories, over new exterior sheathing and metal framing at ventilated soffit areas as shown on the Drawings.

4. Construct an in-situ mockup of the work specified herein in coordination with mockups described in Section 01 45 00 – Mockups and related material Sections.

1.04 RELATED SECTIONS

A. Coordinate the work of this Section with the work of other trades under this Contract, including, but not limited to, the following:

1. Section 02 41 19 – Selective Demolition
2. Section 04 20 00 – Unit Masonry
3. Section 04 22 00 – Concrete Unit Masonry
4. Section 04 72 00 – Cast Stone
5. Section 05 40 00 – Cold-Formed Metal Framing
6. Section 07 13 26 – Self-Adhered Sheet Waterproofing
7. Section 07 27 00 – Air and Water Barrier
8. Section 07 62 00 – Sheet Metal Flashing and Trim
9. Section 07 92 00 – Joint Sealants

1.05 REFERENCED DOCUMENTS

A. ASTM Standards

1. ASTM B117 – Test Method for Salt Spray (Fog) Testing
2. ASTM C150 – Specification for Portland Cement
3. ASTM C297 – Test Method for Tensile Strength of Flat Sandwich Constructions in Flatwise Plane
4. ASTM C578 – Specification for Preformed, Cellular Polystyrene Thermal Insulation
5. ASTM D968 – Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive
6. ASTM D1784 – Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds
7. ASTM D 2247 – Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
8. ASTM D3273 – Test for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

9. ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials

10. ASTM E2430 – Standard Specification for Expanded Polystyrene (EPS) Thermal Insulation Boards for use in Exterior Insulation and Finish Systems (EIFS)

11. ASTM E2568 – Standard Specification for PB Exterior Insulation and Finish Systems

B. EIMA (EIFS Industry Members Association) Standards and Publications

1. 101.01 Standard Test Method for Freeze Thaw Resistance of Exterior Insulation and Finish Systems (EIFS), Class PB (Modified ASTM C67)

2. 101.02 Standard Test Method for Resistance to Water Penetration of Exterior Insulation and Finish Systems (EIFS), Class PB (Modified ASTM E331)

3. 101.03 Standard Test Method for Determining Tensile Adhesion Strength of Exterior Insulation and Finish System (EIFS), and Components, Class PB (Modified ASTM C297)

4. 101.86 Standard Test Method for Resistance of Exterior Insulation and Finish Systems (EIFS), Class PB, to the Effects of Rapid Deformation (Impact) (Modified ASTM E2486)

5. 105.01 Standard Test Method for Alkali Resistance of Glass Fiber Reinforcing Mesh for Use in Exterior Insulation and Finishing Systems (EIFS), Class PB

6. 300.01 Standard Test Method for Determining Tensile Adhesion Properties of Sealants when used with Exterior Insulation and Finish Systems (EIFS), Class PB

7. EIMA Guide for use of Sealants With Exterior Insulation and Finish Systems (EIFS), Class PB

8. EIMA Guideline Specification for Exterior Insulation and Finish Systems (EIFS), Class PB

9. EIMA Guideline Specification for Expanded Polystyrene (EPS) Insulation Board

1.06 PERFORMANCE REQUIREMENTS

A. EIFS cladding assembly must be designed to resist code-required wind loads. The structural attachment of these systems must be carefully detailed in conjunction with the air/water barrier membrane and integral through-wall flashing assemblies. Maintain a continuous drainage plane over the air/water barrier. Mechanically attach the drainage plane to the backup wall through air/water barrier with the specified fasteners and seal all penetrations watertight. Adhesive ribbons used to secure

insulation to the drainage plane must be oriented vertically and must be open at the bottom to allow drainage.

B. EIFS assembly shall comply with all structural requirements of all applicable building codes. Refer to the Drawings for project-specific wind loads.

1.07 SUBMITTALS

A. See Section 01 33 00 – Submittals for general submittal procedures.

B. Submit the following items in time to allow for review by the Engineer and resubmittals, if needed, without delaying the work. Do not order materials or start work before receiving the Engineer's written approval.

1. Product Data: For each component, submit information on the component materials, information on the construction and application details, information on the manufacturer's recommendations for application and use, test data substantiating that products comply with requirements, and material safety data sheets.

2. Shop Drawings: After field measurement and documentation of all existing conditions, participate in the preparation of Shop Drawings, coordinated among all participatory trades, which establish and accommodate existing constraints and the variance in existing conditions. Provide complete shop drawings for each assembly indicated, including components, flashing, materials, dimensions, etc. and the specific requirements listed.

   a. Show EIFS and flashing, together with fasteners, air/water barrier membrane, insulation, and other embedded items by related trades, to help ensure proper coordination of the work.

   b. Shop drawings shall show all EIFS features including the location of building joints, articulations in the cladding and color.

   c. Shop drawings shall show all fenestration systems and include details for integrating the EIFS assembly with the fenestration frames, flashing, and perimeter sealant joints.

3. Samples: Submit samples of all components listed in Part 2 that will become part of the final assembly. Sample panels (min. 12 in x 12 in) of each color of EIFS finish coat. Contractor to coordinate color matching services with EIFS manufacturer.

4. Product Test Reports: Submit test reports performed and prepared by a qualified testing agency that demonstrate the EIFS assembly fulfils the performance characteristics listed herein.

5. Maintenance Data: For EIFS, to include in maintenance manuals.

6. Calculations or Standard Layout of fasteners and or adhesive ribbon spacing for insulation and/or metal lath attachment meeting the design wind loads shown on the Drawings.

1.08 MOCKUPS:

A. Build in situ mockup of typical wall assembly with EIFS to demonstrate aesthetic effects, quality of materials, sequencing, and execution. Mockups shall include all typical exterior wall components, including air/water barrier, insulation, through-wall flashing, and other wall components.

1. Notify the Engineer at least 7 days before construction of the sample so that the Engineer may have a representative present during the construction of the sample. Do not start work until the Engineer has approved the mockup.

2. Rebuild samples as many times as required to meet the Engineer's approval at no additional cost to the Owner or delay in the project schedule.

3. Keep approved sample areas in a cleaned and finished condition throughout the duration of the project. Reproduce samples accurately in construction using identical materials and quality of workmanship. Mockups will be used to measure standards of workmanship, finish, color, and appearance. Approved samples will be used as a standard for completed work and can remain as part of the finished work.

1.09 QUALITY ASSURANCE

A. Engage experienced EIFS installers to perform work of this Section. The Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least 5 yrs. The contractor shall staff the work of this Section with only qualified personnel experienced in the application of this system.

B. Obtain each type of material from a single manufacturer for the duration of the project.

C. Conduct a quality control program that includes, but is not limited to, the following:

1. Inspection of materials to assure conformity with contract requirements, and that materials are new and undamaged.

2. Establishment of procedures for executing the work.

3. Inspecting surface preparation prior to material application.

4. Inspection of work in progress to ensure work is being done in accordance with established procedures, manufacturer's instructions, and specific Engineer instructions.

5. Inspection of work completed and prompt correction of defective work.

D. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so the intent of the Drawings and Specifications is carried out. Coordinate with other trades to maximize efficient use of scaffolding, to minimize disruption to the building, and to avoid unnecessary traffic over areas of completed work or existing to remain building components.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site only in manufacturer's original containers, clearly marked with legible, intact labels with manufacturer's name and brand name and identifying contents of containers.

B. All materials to be new. Do not use products beyond the expiration of their shelf life. Handle all materials to prevent damage. Place materials on pallets. Use waterproof and fireproof canvas tarpaulins (not plastic) to cover all stored materials top to bottom.

C. Protect and store all materials in original, unopened, labeled containers and packaging and in compliance with manufacturer's directions. Comply with manufacturer's recommendations for minimum and maximum time and temperature limits for storage.

D. Promptly remove from the site all materials rejected by the Engineer or exposed to any moisture anywhere, at any time, during transportation, storage, handling, or installation.

E. Do not stockpile materials or equipment to overload any building or site component.

F. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life. Store flammable materials in a cool, dry, protected area away from sparks and open flames.

1.11 PROJECT CONDITIONS

A. Field Measurements: Verify site conditions and dimensions by field measurements before material installation and indicate measurements on Shop Drawings. Notify the Engineer immediately of inconsistency between the conditions found and those shown in the Contract Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Consider the special conditions associated with repairs to existing construction when measuring for shop drawings.

B. Protect the building and its contents from risks associated with the work in this Section. Schedule and execute work without exposing adjacent building areas to water, dust, and debris, or materials used by this Contractor. Protect adjacent areas from damage and stains with appropriate barriers and masking. Repair damage as a result of the work of this Section to its condition at the start of work, or if such cannot be determined, to its original condition. Clean stains by approved means.

C. Protect the work from damage such as impact, marring of the surfaces and other damage.

D. Materials may be skin irritants or sensitizers. Accordingly, advise applicator to avoid contact with eyes and skin, inhalation of vapors, and ingestion. Use protective and safety equipment on site. Heed label warnings by manufacturers. Make application in accordance with applicable safety laws.

E. Compliance with OSHA and other safety laws and regulations is the exclusive responsibility of the contractor, his subcontractor(s), consultants and servants.

F. Coordination requirements: Coordinate sheet metal flashing installation with other trades, such as waterproofing and sealant, to help ensure proper installation sequencing for assemblies.

1.12 WARRANTY

A. Applicator Warranty: Guarantee work under this section in a document stating that if, within 2 yrs after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents, the Applicator shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Applicator a written acceptance of such condition. Also, state that the Applicator shall bear costs incurred by the Owner, including reasonable attorney's fees, court costs, and expert witness and consultant fees, to enforce Applicator's compliance with the obligations of this Guarantee. The obligations of this Guarantee shall run directly to the Owner and its successors and assigns, and may be enforced by the Owner and its successors and assigns against the Applicator, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

B. Manufacturer's Warranty: Provide EIFS manufacturer's standard warranty for EIFS assembly and accessory components.

PART 2 – PRODUCTS

2.01 MANUFACTUER

A. EIFS components and accessories must be obtained as a single-source from the manufacturer to ensure total system compatibility and integrity. If an alternate system is used, all accessory materials are subject to review and approval by the Engineer. Alternate components must meet or exceed the performance requirements of the basis-of-design, include a dedicated lath drainage plane, and incorporate an approved air/water barrier membrane.

1. Basis-of-Design System: StoTherm Rainsceen II
   Sto Corporation

2. Alternate Manufacturer: Dryvit
   Parex

2.02 DRAINABLE EIFS CLADDING ASSEMBLY

A. Drainable EIFS cladding system: Provide a complete, drainable, exterior insulation and finish system (drainable EIFS), consisting of the design and system components listed below. Obtain materials from the same manufacturer and as required by the EIFS manufacturer to provide a complete warrantable system. System shall be consist of the following components and design, listed from interior to exterior:

1. Lath mechanically fastened through air/water barrier membrane and exterior sheathing to steel stud backup wall framing

2. EPS insulation board adhered to lath with vertical ribbons of adhesive and mechanically fastened at salient building corners to steel stud framing (with “Wind-lock” fasteners)

3. Reinforced EIFS basecoat

4. Colored EIFS finish coat

B. Adhesive Installed in Vertical “Ribbons”: Sto BTS Plus, one-component, polymer modified, cement-based adhesive.

C. EPS Insulation Board: Polystyrene, ASTM C578 Type II, extruded or expanded type; minimum average density 1.5 pcf; hot wire cut to special shapes indicated, maintaining tolerances necessary to achieve tolerances specified for finished installation. Insulation shall have the following thicknesses, as shown in the drawings:

1. 4 in. thick: To be used on typical exterior building walls and upper soffits, as shown on the Drawings

2. 1 in. thick: To be used on soffits vented to the exterior, as shown on the Drawings

D. EIFS Base Coat: Sto RFP, one component non-cementitious, fiber reinforced acrylic base coat.

E. EIFS Embedded Reinforcing Mesh: All mesh to be manufactured by Sto, interwoven, open-weave glass fiber fabric with alkaline resistant coating.

1. Field Application Mesh (for use within the field of the wall): Sto Intermediate Mesh (High-Impact mesh) -- nominal 11.2 oz/sq yd (380 g/m2), high impact, interwoven, open weave glass fiber fabric with alkaline resistant coating for compatibility with Sto materials.

2. Detail Mesh (for use at trims, reveals, or other architectural features): Sto Detail Mesh, 4.5 oz/sq yd.

3. Corner Mat Mesh (for use at inside and outside corners): Sto pre-creased, heavy-duty corner mesh, 6.25 oz/sq yd.

4. Ultra-High Impact Mesh – nominal 15 oz/yd^2, ultra-high impact, double strand, interwoven, open-weave glass fiber fabric with alkaline resistant coating.

F. EIFS Primer: Sto Primer, acrylic based primer, for use with Sto acrylic-based finish coat.

G. EIFS Finish Coat: Stolit acrylic-based textured wall coating. Color to match existing stucco at Equipment Yard or as approved by Owner.

H. Mechanical Fasteners for Insulation (at locations determined by the manufacturer to achieve wind resistance): Wind-Devil 2 fastener with 2-in. dia. plate. Use type ST-5 screw for anchoring into steel studs.

2.03 AIR/WATER BARRIER MEMBRANE

A. Refer to Section 07 27 00 – Air and Water Barriers. EIFS manufacturer's proprietary vapor impermeable air barrier(s) are not appropriate.

2.04 DRAINAGE PLANE

A. Expanded Metal Lath: Small diamond mesh size (10,000 meshes per sq yd) cut from copper bearing steel sheets. Approximate size of mesh in long direction, 0.675 in. center-to-center. Approximate size of mesh in short direction, 0.2 to 0.3 in. center-to-center.

1. Self-furring: Dimples at 1-1/2 in. o.c. each way with 1/4 in. indentations.

2. Weight: 3.4 lbs/sq yd.

3. Material: SS304, stainless steel

a. Add alternate: provide add alternate pricing for G90, hot-dipped galvanized.

4. Acceptable products and manufacturers:

a. Alabama Metal Industries Corporation (AMICO)

b. CEMCO

c. Diamond Mesh, Western

2.05 ACCESSORIES

A. Fasteners for Lath: All fasteners and fastener accessories shall be stainless steel; electroplated galvanized fasteners are unacceptable. Fasteners used with galvanized lath alternates shall be galvanized. All fasteners products shall be reviewed by the EIFS manufacturer and all fastener spacing shall be determined by the manufacturer.

1. Screws (used for attachment to metal framing): Self-drilling and self-tapping with a 0.120-in. dia. shank, with either Philips pan or flat head profile. Coordinate head profile with EIFS insulation board adhesion requirements.

2. Expansion anchors (used for attachment to concrete and CMU): Nylon Nailin, manufactured by Powers Fasteners, pin drive anchor with a body formed from engineered nylon and stainless steel nails.

3. Washers: At each fastener, install a stainless steel washer, minimum 1 in. outside diameter, on each side of the lath to provide a gasket seal around the penetration through the air/water barrier; lath fasteners with protruding teeth are not acceptable.

4. Tie wire: Stainless steel, as recommended by manufacturer.

B. Soffit vents: EIFS Soffit Vent by Alabama Metal Industries Corporation (AMICO), continuous rigid pvc (polyvinyl chloride) vent with 3 in. wide opening, insect screen, and attachment flange, for use in lower soffits as shown on the Drawings.

C. EIFS Accessories and Trim (where required): stainless steel, or as approved by Engineer.

D. Backer rod and sealant: Refer to Section 07 92 00 – Joint Sealants.

1. Provide control joints in the EIFS assembly with backer rod and sealant at spacing not to exceed the manufacturer's recommended limit or as shown on the drawings, whichever is less.

2. Sealant joints must be applied to the base coat prior to installing the finish coat over EIFS.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify all site conditions and dimensions by field measurement in consideration of the special conditions associated with repairs to existing construction. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the Contract Drawings.

B. Report deviations from the requirements of project specifications or other conditions that might adversely affect the EIFS installation to the General Contractor and the Engineer.

3.02 GENERAL EIFS INSTALLATION

A. EIFS workmanship is to comply with all applicable recommendations provided by EIMA, details and recommendations provided by the manufacturer, and as prescribed in these Specifications; where the documents conflict, the Drawings and Specification shall control and where not enough information is provided, assume the more stringent of recommendations shall govern. Do not proceed with EIFS installation until all associated backup waterproofing and flashings are installed. Coordinate work to incorporate all upturned legs and ends of flashing into EIFS work.

B. Mix all EIFS components according to manufacturer's recommended quantities, proportions, consistencies, and mixing times.

C. Air/Water Barrier: See Section 07 27 00 – Air and Water Barrier.

D. Lath

1. Coordinate installation of lath with installation of exterior sheathing and wall waterproofing membrane. Mechanically fasten expanded metal lath through waterproofing membrane to existing steel stud framing and CMU backup wall. Apply metal lath taut with long dimensions of diamonds perpendicular to supports.

2. Attach all fasteners through a stainless steel washer set directly against the air/water barrier, through the expanded lath, and through a stainless steel washer set against the outside face of the lath. Inboard washer shall sit flush against the air/water barrier to create a gasket seal. Apply mastic or an approved sealant over all abandoned fastener penetrations (shiners) and all fastener attachments that do not gasket against the membrane.

3. Install fasteners into metal wall studs at 16 in. o.c. in the field of the wall, or as required by the manufacturer, whichever is less. Ensure that fasteners engage framing.

4. DO NOT LAP ENDS OR SIDES OF LATH. Butt ends and sides of consecutive sheets of lath and secure with 18 ga tie wire at 6 in. o.c.

E. Starter Track

1. Strike a level line at the base of the wall to mark where the top of the starter track terminates.

2. Attach the starter track even with the line into the structure at a maximum of 16 in. o.c. or as determined by the manufacturer, whichever is less.

3. Butt sections of starter track together. Miter cut outside corners and abut. Snip front flange of one inside corner piece (to allow EPS Board to be seated inside of track) and abut.

4. Install Starter Track at other EIFS terminations as designated on detail drawings: beneath window sills with concealed flashing.

F. Splice Strips for Starter Track and Flashing

1. Starter Track, Window/Door Head Flashing: install 2 in. wide diagonal splice strips of detail mesh at ends of head flashings. Install minimum of 4 in. wide splice strips of detail mesh between back flange of starter track and head flashings. Center the mesh so it spans evenly between the back flange of the Starter Track or flashing and the sheathing. Embed the mesh in the wet joint compound and trowel smooth.

2. Apply waterproof coating over the splice strip when the joint compound is dry.

G. Backwrapping

1. “Back wrap” all insulation board edges with detail mesh at bases of walls and at all EIFS terminations prior to installation of insulation on building walls. Mesh must be wide enough to adhere a 4 in. strip of mesh to the back of insulation board, fully wrap board edge, and extend a min. 4 in. onto the exterior face of the insulation board.

H. Adhesive Application and Installation of Insulation Board

1. Rasp the interior lower face of insulation boards to provide a snug friction fit into the Starter Track.

2. Apply adhesive to back of insulation board with a stainless steel trowel; fully coat back of board. Strike back of board with a 5/8 in. x 5/8 in. square-notched, stainless steel trowel to obtain uniform ribbons of adhesive. Ribbons of adhesive must be uniform and parallel to the short dimension of the board, so ribbons are vertical when boards are set in place. Adhesive ribbons shall be continuous and aligned between insulation boards for increased drainage.

3. Immediately place insulation boards into mesh in a running bond pattern with the long dimension of the board horizontal. Apply firm, constant pressure over the entire board surface to ensure uniform contact of the adhesive with the substrate, or keying of the adhesive with the metal lath.

4. If adhesive develops a “skin” before insulation is applied over substrate, immediately remove adhesive and replace with fresh material. Do not install any insulation board with cured or semi-cured adhesive.

5. Bridge joints in drainage mat and substrate by a minimum of 8 in. Interlock insulation board at all inside and outside corners. Cut insulation board in an L-shaped pattern to fit snugly around openings – do not align board joints with corners of openings.

6. Butt all board joints tightly; holidays are not allowed. Prevent adhesive from entering board joints. Fill any open joints solid with slivers of insulation board.

7. Remove individual boards periodically while the adhesive is still wet to check for satisfactory contract with the substrate and the back of the insulation board, and for spacing between ribbons of adhesive. An equal amount of adhesive must be on the substrate and the board when they are removed, as an indication of adequate adhesion.

I. Slivering and Rasping of Insulation Board Surface

1. After insulation boards are firmly adhered to the substrate, fill any open joints in the insulation board layer with slivers of insulation or spray foam. Use spray foam that is identified by the spray foam manufacturer as suitable for this use.

2. Rasp the insulation board surface to achieve a smooth, even surface and to remove any UV-damaged insulation.

J. Completion of Backwrapping

1. Complete the backwrapping procedure by applying base coat to exposed edges of insulation board and approximately 4 in. onto the face of the insulation board. Pull mesh tight around the board and embed it in the base coat with a stainless steel trowel. Use a corner trowel for clean, straight lines. Smooth any wrinkles or gaps in the mesh.

K. Base Coat and Reinforcing Mesh Application

1. At corners of all penetrations in EIFS, install minimum 9 in. x 12 in. diagonal strips of detail mesh. Embed strips in wet base coat adhesive and trowel from center to edges to avoid wrinkles in the mesh.

2. Apply base coat over insulation board to a thickness of approximately 1/8 in., or thick enough to fully embed mesh. Work horizontally or vertically in strips of 40 in. and immediately embed mesh in wet base coat by troweling from center to edge of mesh. Allow base coat to dry. Mesh must be fully embedded in base coat so that mesh color is not visible. Re-skim with additional base coat if mesh color is visible.

   a. Armor Mat Ultra-High Mesh: Butt mesh at seams

   b. Standard and Intermediate Mesh Application: Overlap mesh minimum 2-1/2 in. at mesh seams and at overlaps of detail mesh. Feather seams and edges. Double-wrap all inside and outside corners with minimum 2-1/2 in. overlap in each direction. Alternate corner treatment – embed corner mat in base coat, allow to dry, then overlap up to corner with field mesh.

3. Complete back wrapping procedure by applying base coat to exposed board edges and 4 in. onto face of insulation board. Pull mesh tight around board edge and embed in base coat with stainless steel trowel. Use a corner trowel for clean, straight lines. Smooth any gaps or wrinkles in mesh.

4. Allow base coat to dry thoroughly before applying primer or finish.

L. Primer Application

1. Apply primer evenly with brush, roller or proper spray equipment over the clean, dry base coat and allow to dry thoroughly before applying finish.

M. Finish Coat Application

1. Apply finish directly over the base coat or primed base coat when dry. Apply finish by spraying or troweling with a stainless steel trowel, depending on the finish specified. Follow these general rules for application of finish:

a. Avoid application in direct sunlight.

b. Apply finish in a continuous application, and work to an architectural break in the wall.

c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results; cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.

d. Do not install separate batches of finish side-by-side

e. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.

f. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

N. Protection

1. Provide protection of installed materials from water infiltration into or behind them.

2. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.

3.03 CLEAN-UP

A. At the time of Substantial Completion, thoroughly clean all items of work (newly installed, repaired, or painted components). Clean the building and site of all dust, dirt, and debris related to the work.

3.04 MAINTENANCE

A. Provide the Owner with a detailed manual of the required wall system maintenance, including information regarding the necessary frequency of inspections and common visual evidence of system defects.

END OF SECTION

SECTION 07 27 00

AIR AND WATER BARRIER

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

B. Refer to other Divisions of these specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

1.02 SUMMARY

A. Reference Drawings: The Work of this Section is shown on the Contract Drawings titled “Physical Education Building Exterior Renovations, Montgomery College, Germantown Campus Germantown, MD”.

B. The scope of work specified herein includes, but is not limited to, the following:

1. Existing direct applied stucco cladding over CMU backup walls will remain. Remove and dispose of loose or damaged existing stucco cladding; patch and repair damaged or removed stucco as required, see referenced Sections.

2. Provide new self-adhered membrane air/water barrier membrane and membrane flashing, and all related accessories for proper installation, as shown on the drawings.

3. Perform mockups of the work specified herein in coordination with mockups described in related Sections.

C. The work shown in the Contract Documents includes the work of all trades required and all labor, equipment, and materials and supervision necessary and incidental to the work indicated. The following description of the work represents a summary and should be considered in conjunction with the Drawings and all other Specifications.

D. All work is to be done in accordance with applicable codes and regulations.

1.03 RELATED SECTIONS

A. Coordinate the work of this Section with the work of other trades under this Contract, including, but not limited to, the following:

1. Section 02 41 19 – Selective Demolition

2. Section 04 20 00 – Unit Masonry

3. Section 04 22 00 – Concrete Unit Masonry

4. Section 04 72 00 – Cast Stone

5. Section 07 13 26 – Self-Adhered Sheet Waterproofing

6. Section 07 24 19 – Water-Drainage Exterior Insulation Finish System (EIFS)

7. Section 07 52 16 – Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing

8. Section 07 62 00 – Sheet Metal Flashing and Trim

9. Section 07 92 00 – Joint Sealants

10. Section 08 42 13 – Aluminum Framed Entrances and Storefronts

11. Section 08 44 13 – Glazed Aluminum Curtain Walls

1.04 PERFORMANCE REQUIREMENTS

A. Air/water barrier (AWB) assemblies shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed at the bottom of the wall and each lintel and shelf angle to discharge water penetration to the exterior at floor lines and above penetrations (e.g., windows). AWB assemblies shall be detailed in a manner that accommodates substrate movement and is continuous across substrate expansion and control joints, construction material changes, and transitions at perimeter conditions (e.g., to windows) without deterioration or air leakage exceeding specified limits.

B. Install air/water barrier materials in shingle fashion to avoid “bucking” of water at seams.

1.05 SUBMITTALS

A. See Section 01 30 00 – Submittals for general submittal procedures.

B. Submit the following items in time to allow for review by the Engineer and resubmittals, if needed, without delaying the work. Do not order materials or start work before receiving the Engineer's written approval.

1. Product Data: For each item, submit information on the component materials, information on the construction and application details, information on the manufacturer’s recommendations for application and use, test data substantiating that products comply with requirements, and material safety data sheets.

2. Shop Drawings: After field measurement and documentation of all existing conditions, participate in the preparation of Shop Drawings, coordinated among all participatory trades, which establish and accommodate existing constraints and the variance in existing conditions. Provide complete drawings for each assembly and fabrication required for the project, showing exact profile, lengths, locations of joints, terminations, and methods of

attachment. Coordinate Shop Drawings with all relevant work of other trades specified in other Specification Sections.

3. Samples: Provide samples of the components listed in part two that will become part of the final assembly. Flashing samples shall be made to the exact profiles used for the project, 12 in. minimum length.

4. Certificates (in time to prevent delay of the work) by the producers of the materials that all materials supplied comply with all the requirements of these Specifications and the appropriate standards, and that all materials are compatible with the materials that they will be in contact with, and are suitable for the intended purpose.

5. Reports for tests performed by the manufacturer of the pre-manufactured membrane sheet flashing/air-barrier tie-in certifying compatibility with, and proper adhesion to, the membrane substrate.

1.06 MOCKUPS

A. Build in situ mockup of typical wall assembly with brick masonry, EIFS cladding, curtain wall, and roofing to demonstrate aesthetic effects, quality of materials, sequencing, transitions between materials and cladding, and execution. Mockups should include all typical exterior wall components, including air/water barrier, insulation, through-wall flashing, sealants, and other wall components. Refer to Section 01 45 00 – Mockups.

1.07 QUALITY ASSURANCE

A. Engage experienced waterproofing personnel to perform work of this Section. The Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least 5 yrs. The contractor shall staff the work of this Section with only qualified personnel experienced in the application of this system.

B. Conduct a quality control program that includes, but is not limited to, the following:

1. Inspection of materials to assure conformity with contract requirements, and that materials are new and undamaged.

2. Establishment of procedures for executing the work.

3. Inspecting surface preparation prior to material application.

4. Inspection of work in progress to ensure work is being done in accordance with established procedures, manufacturer's instructions, and specific Engineer instructions.

5. Inspection of work completed and prompt correction of defective work.

C. Obtain each type of material from a single manufacturer for the duration of the project.

D. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so the intent of the Drawings and Specifications is carried out. Coordinate with other trades to maximize efficient use of scaffolding, to minimize disruption to the building, and to avoid unnecessary traffic over areas of completed work or existing to remain materials.

E. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site only in manufacturer’s original containers, clearly marked with legible, intact labels with manufacturer's name and brand name and identifying contents of containers.

B. All materials to be new. Handle all materials to prevent damage. Place materials on pallets. Use waterproof and fireproof canvas tarpaulins (not plastic) to cover all stored materials top to bottom.

C. Protect all materials in original, unopened, labeled containers and packaging and in compliance with manufacturer’s directions. Comply with manufacturer’s recommendations for minimum and maximum time and temperature limits for storage.

D. Promptly remove from the site all materials rejected by the Engineer or exposed to any moisture anywhere, at any time, during transportation, storage, handling, or installation.

E. Do not stockpile materials or equipment to overload any building or site component.

F. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life. Store flammable materials in a cool, dry, protected area away from sparks and open flames.

1.09 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Field Measurements: Verify all site conditions and dimensions by field measurements before material fabrication or delivery and indicate measurements on Shop Drawings. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the contract drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Consider the special conditions associated with repairs to existing construction when measuring for shop drawings.

C. Coordination requirements: Coordinate installation with other trades, to help ensure proper installation sequencing for assemblies.

D. Protection

1. Protect the building and its contents, including interior finishes not part of the work area, from risks associated with the work in this Section. Schedule and execute work without exposing adjacent building areas to water, dust, and debris, or materials used by this Contractor. Protect adjacent areas from damage and stains with appropriate barriers and masking. Repair damage as a result of the work of this Section to its condition at the start of work, or if such cannot be determined, to its original condition. Clean stains by approved means.

2. Do not damage existing materials scheduled to remain. Provide adequate protection of all mechanical equipment to prevent breakage, scratches, staining, and any other damage during work associated with this Section.

3. Where work is performed above or near roofing surfaces, clean the work areas free of all debris including fasteners, scrap metal, and metal shards, on a daily basis. Notify the Engineer immediately if any damage to the existing or new waterproofing and roofing system is observed, regardless of the source of the damage. Ensure that all adjacent roofing is covered with plywood protection board with taped joints prior to commencing work in the area.

E. Schedule and execute all work to avoid exposing the building and its contents to inclement weather. Keep water out of the building at all times.

1.10 WARRANTY

A. Applicator Warranty: Guarantee work under this section in a document stating that if, within 2 yrs after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective, including sources found to be the cause of water intrusion into interior space, or not in accordance with the Contract Documents, the Applicator shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Applicator a written acceptance of such condition. Also, state that the Applicator shall bear costs incurred by the Owner, including reasonable attorney's fees, court costs, and expert witness and consultant fees, to enforce Applicator’s compliance with the obligations of this Guarantee. The obligations of this Guarantee shall run directly to the Owner and its successors and assigns, and may be enforced by the Owner and its successors and assigns against the Applicator, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

B. Manufacturer’s Warranty: Provide air/water barrier manufacturer’s standard warranty for the air/water barrier system.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Air and water barrier components and accessories must be obtained as a single-source from the manufacturer to ensure total system compatibility and integrity. If an alternate system is used, all accessory materials are subject to review and approval by the Engineer. Alternate components must meet or exceed the performance requirements of the basis-of-design. No other alternates or substitutions will be accepted.

1.	Basis-of-Design System:	Blueskin SA By Henry Company.
2.	Acceptable Alternatives:	Perm-A-Barrier Wall Membrane W.R. Grace & Co. CCW-705 Carlisle Coatings & Waterproofing Inc.

2.02 AIR AND WATER BARRIER MEMBRANE (BASIS-OF-DESIGN)

A. Sheet air/vapor barrier membrane: Blueskin SA manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a blue engineered thermoplastic film. Membrane shall have the following physical properties:

1. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies,

2. Air leakage: <0.0001 CFM/sq ft @1.6 lbs/sq ft to ASTM E2178 and ASTM E283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/sq ft for 1 hr and gust wind load pressure of 62.8 lbs/sq ft for 10 sec when tested at 1.6 lbs/sq ft to ASTM E331,

3. Vapor permeance: 0.03 perms to ASTM E96 (Desiccant Method),

4. Membrane Thickness: 0.0394 in. (40 mils),

5. Low temperature flexibility: -22ºF to CGSB 37-GP-56M,

6. Elongation: 200% to ASTM D412-modifed,

B. Low temperature air/vapor barrier membrane: Blueskin SA LT by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a blue engineered thermoplastic film for application temperatures between 40°F down to 10°F.

C. Membrane flashing at exposed areas: Foilskin by Henry; a SBS modified bitumen, self-adhering sheet membrane complete with surface layer of metallic aluminum film that many sealants adhere well to.

2.03 POLYURETHANE FOAM AIR BARRIER

A. Spray Foam Insulation (to form air barrier between top of CMU walls and underside of steep-slope roof deck): Two-component polyurethane foam system dispensed as a spray or stream, Handi-Foam Spray Foam by Fomo Products, Inc, or approved equal. The system shall comply with the following:

1. Class 1 foam.

2. Density: 1.75 lbs pcf, min.

3. Lath: Diamond Mesh Lath, galvanized, by AMICO Building Products or approved equal

B. Thermal Barrier Coating (for placement over spray foam insulation in concealed construction spaces): Polyurethane foam manufacturer recommended spray applied thermal barrier product for installation over spray foam, Handi-Foam Ignition Barrier by Fomo Products, Inc, or approved equal.

2.04 METAL FLASHING

A. See Section 07 62 00 – Sheet Metal Flashings and Trim

2.05 ACCESSORIES

A. Through-wall flashing Membrane: Blueskin TWF by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a yellow engineered thermoplastic film.

B. Primer for self-adhering membrane: Blueskin Adhesive by Henry; a synthetic rubber based adhesive, quick setting, having the following physical properties. Water-based primers are not permitted:

1. Color: Blue,

2. Weight: 6 lbs/gal,

3. Solids by weight: 35%,

4. Drying time (initial set): 30 min.

5. Application temperatures: 10°F and rising

C. Penetration, Termination, and Lap Sealant: HE925 BES Sealant by Henry; a moisture-curing medium modulus polymer modified STPe sealant compatible with self-adhered air/water barrier membranes.

D. Termination Bar: Continuous aluminum termination bar, pre-punched at 6 in. o.c.

E. Fasteners for Termination Bar: 1/4 in. dia. Nylon Nailin with stainless steel nail and mushroom head by Rawl Powers Inc., New Rochelle, New York, with length to

provide a minimum of 1-1/4 in. embedment, or as specified in Section 07 62 00 – Sheet Metal Flashing and Trim.

F. Termination and Lap Sealant at Rough Openings: Air-Bloc LF by Henry; a moisture-curing single component STPe liquid-applied flashing compatible with self-adhered air/water barrier membranes and fenestration perimeter sealant.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify all site conditions and dimensions by field measurement in consideration of the special conditions associated with repairs to existing construction. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the Contract Drawings.

B. Examine all surfaces to receive air/water barrier for roughness, contaminants, unsound structural substrates, or other conditions that may impair the application. Notify the General Contractor and Engineer in writing of any such conditions; do not commence work until all defects are remedied.

3.02 SUBSTRATE PREPARATION

A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces.

B. Remove dust, dirt, loose stucco and debris from all new and existing substrates. Substrate preparation may involve power washing and/or mechanical abrasion, as determined by the Contractor's means and methods. Refer to Section 02 41 19 – Selective Demolition.

C. Ensure all Work relating to the backup wall substrate, including repairs to the existing direct-applied stucco, is complete and properly cured prior to applying the primary air/water barrier membrane.

D. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

3.03 GENERAL SELF-ADHERED MEMBRANE INSTALLATION

A. Primer

1. Prime all surfaces to receive air/water barrier. Apply primer only to the area to be covered with membrane during the current working day. Apply primer with a roller or brush at the rate recommended by the manufacturer. Do not spray.

2. Primed surfaces not covered by waterproofing membrane during the same working day must be re-primed.

3. Follow all manufacturer's recommended safety precautions and installation instructions when applying the primer and membrane, including no smoking, open flame or sparks in the work area during installation. Notify Engineer if safety precautions cannot be reasonably met at specific locations on the building.

B. Membrane Installation

1. Install air/water barrier as shown on the drawings. Apply sheets in longest lengths practical, and ensure minimum 2 in. overlap at all end and side laps of membrane, or as required by the membrane manufacturer. Shingle laps so they do not "buck" water. Stagger all vertical joints.

2. Roll membrane onto primed surfaces, pulling release paper in front of roll such that once release paper is removed, membrane is immediately set onto surface. Place sheets without fishmouths or wrinkles. Do not stretch the membrane.

3. If fishmouths or wrinkles appear, cut out and flatten the affected area, and cover with membrane extending at least 6 in. beyond the cut on all sides; orient patch in a diamond-shape to limit water from bucking along the top edge.

4. Immediately after applying membrane sheet, hand press into contact with the substrate and roll entire membrane toward the lap seams with a hand-held neoprene roller.

5. Seal all membrane seams, laps, perimeter edges, termination bars, fasteners, and miscellaneous membrane penetration or termination details with manufacturer's specified sealant.

C. Transitions

1. At transition areas such as curbs, and through-wall flashings, etc. prime surfaces per the manufacturer's instructions. Align and position self-adhered membrane; remove protective film and press flashing firmly into place. Ensure membrane laps 3 in. onto all substrates, 2 in. overlap at all side laps, and 3 in. overlap at all end laps of the membrane. Roll all laps and membrane with a counter top roller.

D. Windows and Rough Openings

1. Extend air/water barrier membrane into all rough openings beyond the interior fenestration air seal, as shown in the Drawings.

2. Provide membrane patches at all three-way corners in the substrate to eliminate pinholes in the membrane assembly.

3. Seal all membrane edges and seams with the termination and lap sealant that is compatible with the silicone sealant that will be installed around the window perimeters.

E. Through-wall Flashing Membrane

1. Apply through-wall flashing membrane along the base of masonry veneer walls and where shown in the Drawings.

2. Prime surfaces and allow to dry, press membrane firmly into place, overlap minimum 2 in. at all end and side laps. Promptly roll all laps and membrane to ensure the seal.

3. Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 in. up the backup wall.

4. Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.

5. Shingle-lap the primary air/water barrier membrane over the top edge of the through-wall flashing.

6. Install through-wall flashing membrane and extend 1/2 in. inboard from outside edge of veneer. Provide end dam flashing at all rough openings, changes in substrate, and where shown in the Drawings.

F. Coordinate membrane installation with insulation installation, installation of EIFS accessories specified in Section 07 24 19 – Drainable Exterior Insulation and Finish System, and flashing installation specified in Section 07 62 00 – Sheet Metal Flashing and Trim.

3.04 INSTALL FOAM INSULATION/FILLER TO SEAL TOP OF CMU WALLS

A. Provide foam insulation/filler between top of partition wall and sheet metal transition strip on underside of metal deck.

B. Provide foam insulation/filler in top and bottom flutes of metal deck above partition wall. Encapsulate foam insulation/filler with sheet metal transition strips.

C. Perform all required surface preparation and provide all manufacturer accessories to adhere or attach foam insulation/filler to the metal deck and/or sheet metal transition strips.

3.05 CLEANING AND PROTECTION

A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.

B. Promptly as the work proceeds and on completion clean up and remove from site all rubbish and surplus materials resulting from the foregoing work.

C. Protect completed membrane waterproofing from subsequent construction activities, including backfilling, as recommended by manufacturer.

D. Provide protection of installed materials from water infiltration into or behind them.

E. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.

3.06 SITE QUALITY CONTROL

A. Adhesion Testing: Contractor shall test for membrane adhesion in compliance with ASTM D4541.

1. Perform all testing prior to applying the metal lath and EIFS assembly. Coordinate all testing with other trades to ensure adequate time is provided to remediate test area and address deficiencies in installation or surface preparation, if necessary.

2. Perform a minimum of one test for every 250 lf of building footprint where the air/water barrier system is applied, with a minimum of one test per primary building elevation. Test shall be evenly distributed throughout the construction area, substrate materials, and construction schedule.

3. In addition to the testing protocol described above, one test shall be conducted on the in-situ mockup and observed by the Engineer.

4. Conduct an additional test, not included in the testing described above, at each area where surface preparation or primer differs from the tested and approved mockup construction.

5. The test shall be considered failed if the adhesion is less than 9 psi or if the backup wall substrate delaminates prior to the membrane debonding from the substrate. Remediate all failed test areas and retest the membrane in that area; repeat in this manner until the area passes the test.

6. Repairs or remediation measures conducted shall pass testing, and if they constitute a change to design, the change shall be implemented throughout Work as determined by the Engineer.

7. Installer shall patch and repair all test areas according to the Contract Documents.

8. Contractor shall submit written and illustrated reports of testing results for the Engineer’s information.

9. All testing costs shall be paid by the Contractor.

END OF SECTION

SECTION 07 31 26

SLATE SHINGLES

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

B. Reference Drawings: The Work of this Section is shown on the Contract Drawings titled “Physical Education Building Exterior Renovations, Montgomery College, Germantown Campus Germantown, MD”.

1.02 SUMMARY

A. The scope of work specified herein includes, but is not limited to, the following:

1. Provide a new synthetic slate roofing system on all steep-sloped roofs shown in the Drawings to replace the existing clay tile roofing assembly. Provide the following slate roofing assembly, from interior to exterior:

    a. Existing fiberglass batt insulation; repair as described in the Contract Documents.

    b. Existing cold-formed metal framing beams; repair as described in the Contract Documents.

    c. Existing tongue and grove plywood deck; repair as described in the Contract Documents.

    d. Self-adhered membrane vapor retarder.

    e. Ventilated structural insulated panel (SIP).

    f. Self-adhered roofing underlayment.

    g. Asphalt-saturated felt.

    h. Synthetic slate tiles.

2. Provide all flashings, sealants, and accessories required for a complete installation.

3. Provide sufficient attic stock slate to cover approximately 1.5% of the steep-sloped roof areas and store in a location designated by the Owner.

B. The work shown in the Contract Documents includes the work of all trades required and all labor, equipment, and materials and supervision necessary and incidental to

the work indicated. The following description of the work represents a summary and should be considered in conjunction with the Drawings and all other Specifications.

C. All work is to be done in accordance with applicable codes and regulations.

D. Document all existing conditions prior to start of construction. Prepare measured shop drawings of roofing and flashing systems to be replaced as indicated on the Drawings.

1.03 RELATED SECTIONS

A. Coordinate the work of this Section with the work of other trades under this Contract, including, but not limited to, the following:

1. Section 02 41 19 – Selective Demolition

2. Section 07 24 19 – Water-Drainage Exterior Insulation Finish System (EIFS)

3. Section 07 27 00 – Air and Water Barrier

4. Section 07 52 16 – Styrene-Butadiene-Styrene (SBS) Modified Bituminous Roofing

5. Section 07 62 00 – Sheet Metal Flashing and Trim

6. Section 07 92 00 – Joint Sealants

1.04 PERFORMANCE REQUIREMENTS

A. The roofing system, in combination with adjacent construction, shall provide a fully watertight system.

B. Installed roofing membrane and components shall withstand the wind uplift pressures determined by ASCE 7-10, thermally induced movement, and exposure to weather without failure and shall remain watertight.

1. Wind Uplift Pressures: Refer to the Drawings.

C. Follow recommendations and procedures of the following standards and publications, except where these Contract Documents (project specifications and drawings) are more stringent:

1. National Roofing Contractors Association:

a. NRCA Roofing Manual.

2. National Slate Association

a. “Slate Roofs” Design and Installation Manual – 2010 Edition

3. Sheet Metal and Air Conditioning Contractors’ National Association (SMACNA):

a. Standard Practice in Sheet Metal Work.

4. Other Industry Standards

a. “The Slate Roof Bible” by Joseph Jenkins – Second Edition

1.05 SUBMITTALS

A. See Section 01 33 00 – Submittals for general submittal procedures.

B. Submit the following items in time to allow for review by the Engineer and resubmittals, if needed, without delaying the work. Do not order materials or start work before receiving the Engineer's written approval.

1. Product Data: For each item, submit information on the component materials, information on the construction and application details, information on the manufacturer’s recommendations for application and use, test data substantiating that products comply with requirements, and material safety data sheets.

2. Shop Drawings: After field measurement and documentation of all existing conditions, participate in the preparation of Shop Drawings, coordinated among all participatory and related trades, which establish and accommodate existing constraints and the variance in existing conditions. Provide complete shop drawings for each assembly indicated, including components, flashing, materials, dimensions, drainage system, etc. and the specific requirements listed. Show layout, joining, profiles, terminations, anchorages and attachment pattern of SIP panels and wood blocking, sheet metal flashing and gutter liner, membrane flashing, and synthetic slate shingles. Include membrane manufacturer's standard details where they apply to this project.

a. Plans shall show the layout and slope of the tapered wood blocking, including location of drains and expansion joints, at the roof gutters. Show thickness of the tapered wood blocking at gutter high and low points.

b. Shop drawings of all metal flashing conditions showing exact profiles, lengths, joints, and terminations; include isometric corner and intersection details and exploded views of all complex intersections. Coordinate Shop Drawings with all relevant work of other trades specified in other Sections.

C. Informational Submittals

1. Samples: Samples for all materials specified or proposed for use on the project, properly labeled and referenced to the appropriate specification section.

2. Material Safety Data Sheets (MSDS): For each material where appropriate.

3. Certifications: By the producers of the materials that all materials supplied comply with all the requirements of the appropriate referenced standards, that

all materials are compatible with adjacent materials, and that all materials are suitable for their intended purpose.

4. Description of any materials or methods the Contractor proposes to use that are different from that described herein, including manufacturer's literature, samples, sketches, and mockups as necessary.

5. Maintenance Data: For steep-sloped roofing to include in maintenance manuals.

6. Confirmation: From the manufacturer of the slate roofing system that the roofing contractor is an approved applicator for the specified system.

7. List of Projects: By the contractor showing at least five years of successful experience with the specified or an equivalent slate roofing system. List building name and address, Engineer, owner, and general contractor with phone numbers and contact person.

1.06 MOCKUPS:

A. Notify the Engineer at least 48 hrs before installation of the roof vapor retarder and roofing materials begins so that a representative may be present during construction. Each initial installation will serve as a mockup. Mockup must be large enough to show all typical conditions.

B. Build in situ mockup(s) of typical steep-sloped roofing assembly with structural repairs, vapor retarder, SIP panels, membrane underlayments, and slate roofing to demonstrate aesthetic effects, quality of materials, sequencing, transitions between materials and cladding, and execution. Mockups shall include the typical steep-sloped roofing assembly, base flashings, metal copings, sealants, gutter assembly, and other roof components. Refer to Section 01 45 00 – Mockups.

1.07 COORDINATION AND SEQUENCING WITH RELATED WORK

A. Refer to other Divisions of these Specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

B. The exterior wall, soffit, and cladding work must be completed prior to beginning any roofing installation work.

1.08 QUALITY ASSURANCE

A. Engage experienced slate roofer installers to perform work of this Section. The Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least 5 yrs. The contractor shall staff the work of this Section with only qualified personnel experienced in the application of this system.

B. Conduct a quality control program that includes, but is not limited to, the following:

1. Inspection of materials to assure conformity with contract requirements, and that materials are new and undamaged.

2. Establishment of procedures for executing the work.

3. Inspecting surface preparation prior to material application.

4. Inspection of work in progress to ensure work is being done in accordance with established procedures, manufacturer's instructions, and specific Engineer instructions.

5. Inspection of work completed and prompt correction of defective work.

C. Obtain each type of material from a single manufacturer for the duration of the project.

D. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so the intent of the Drawings and Specifications is carried out. Coordinate with other trades to maximize efficient use of scaffolding, to minimize disruption to the building, and to avoid unnecessary traffic over areas of completed work.

E. Pre-Installation Conference: A pre-installation conference shall be held with representatives of the Owner, Engineer, and all involved trades prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing. Attend job meetings during the course of the work as required by the Owner.

F. The synthetic slate and roofing membrane underlayment manufacturers shall review all details for compliance with guarantee requirements.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site only in manufacturer’s original containers, clearly marked with legible, intact labels with manufacturer's name and brand name and identifying contents of containers.

B. Keep all materials dry while they are transported, stored, and delivered. Deliver materials to the site only in manufacturer’s unbroken original containers, clearly marked with legible, intact labels with manufacturer’s name and brand name and identifying contents on containers. Materials shall be marked with the date of manufacture and shelf life shall be stated. Do not use products beyond the expiration of their shelf life.

C. Store all materials on pallets and cover with fire-resistant canvas tarpaulins (materials covered with other tarpaulins are subject to rejection), top to bottom. Store materials in a secure area designated by the Owner, with adequate tie-downs against wind gusting.

D. Protect materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers as necessary. Keep containers tightly closed when not in use. Store flammable materials in a cool, dry, protected area away from sparks and open flames. Protect liquid components from freezing.

E. Store materials in areas where temperatures and conditions conform to the manufacturer's recommendations and instructions. Store adhesives, solvents, and sealants in their original containers, and between 60°F and 80°F. If exposed to lower temperatures, restore to a uniform temperature of no less than 60°F, prior to use.

F. Promptly remove from the site all materials or incomplete roofing work exposed to any moisture, anywhere, at any time, during transportation, storage, handling, and installation.

G. Remove from the site all materials rejected by the Owner or Engineer.

H. Handle all materials to avoid damage. Store rolled goods on ends only. Discard rolls which have been flattened, creased, or otherwise damaged. Unroll sheets and allow them to "relax" prior to use. Replace materials damaged during handling or storage. Remove damaged materials from the premises immediately.

I. Do not dilute primers, roofing cements, adhesives, coatings, or sealants. Keep containers closed except when removing materials from them.

J. Do not stockpile materials, debris, or equipment in the building or where they may overload a building component.

K. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life. Store flammable materials in a cool, dry, protected area away from sparks and open flames.

1.10 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Work only in areas permitted by the Owner-approved schedule. Arrange work sequence to avoid use of newly constructed membrane for storage, walking surface, and equipment movement.

C. Field Measurements: Verify all site conditions and dimensions by field measurements before material fabrication or delivery and indicate measurements on Shop Drawings. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the contract drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Consider the special conditions associated with repairs to existing construction when measuring for shop drawings.

D. Coordination requirements: Coordinate installation with other trades, to help ensure proper installation sequencing and transitions between materials for all assemblies.

E. Protection

1. Protect the building and its contents from risks associated with the work in this Section. Schedule and execute work without exposing adjacent building areas to water, dust, and debris, or materials used by this Contractor. Protect adjacent areas from damage and stains with appropriate barriers and masking. Repair damage as a result of the work of this Section to its condition at the start of work, or if such cannot be determined, to its original condition. Clean stains by approved means.

2. Do not damage existing materials scheduled to remain. Provide adequate protection of all mechanical equipment to prevent breakage, scratches, staining, and any other damage during work associated with this Section.

3. Where work is performed above or near roofing surfaces, clean the work areas free of all debris including fasteners, scrap metal, and metal shards, on a daily basis. Notify the Engineer immediately if any damage to the existing or new waterproofing and roofing system is observed, regardless of the source of the damage. Ensure that all adjacent roofing is covered with plywood protection board with taped joints prior to commencing work in the area.

4. Repair all damage as a result of the work of this Section to its condition at the start of work or, if such cannot be determined, to its original condition to the satisfaction of the Owner. Clean all stains from masonry, stone, EIFS, and other surfaces, and protect all site work from damage. Clean surfaces only by methods approved in advance, and in writing, by the Engineer.

5. Coordinate operations with the Owner's requirements for shut down of air handling equipment to minimize fumes drawn into the building.

6. The Contractor is solely responsible for the watertight integrity of the roof, flashing, and adjacent building components at all times during the construction. Schedule and execute all work to avoid exposing the building and its contents to inclement weather. Keep water out of the building at all times.

7. Provide safe access, staging, temporary protection and barricades, cleanup, dust and fume control, layout, equipment, waste disposal, and documentation. Compliance with OSHA and all other safety laws and regulations is the exclusive responsibility of the Contractor, his Subcontractors, suppliers, consultants, and servants.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Roofing system components may be toxic and flammable. Heed all manufacturer's cautions and warnings regarding their use.

B. Completed membrane is slippery when wet or frost covered. Take proper precautions.

1.12 WARRANTY

A. Applicator Warranty: Guarantee work under this section in a document stating that if, within 2 yrs after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents,

the Applicator shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Applicator a written acceptance of such condition. Also, state that the Applicator shall bear costs incurred by the Owner, including reasonable attorney's fees, court costs, and expert witness and consultant fees, to enforce Applicator's compliance with the obligations of this Guarantee. The obligations of this Guarantee shall run directly to the Owner and its successors and assigns, and may be enforced by the Owner and its successors and assigns against the Applicator, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

B. Manufacturer's Warranty: Provide manufacturers' standard warranty for material defects for the steep-slope roofing products, including SIP panels, roof membrane underlayment, synthetic slate, and other accessories.

PART 2 – PRODUCTS

2.01 SYNTHETIC SLATE

A. Synthetic Slate: Majestic Slate by EcoStar LLC., a rubber and plastic-based roof tile designed to provide the look of natural stone slate.

1. Width: 12 in.

2. Exposure: 6 in.

3. Thickness: 1/4 in.

4. Shape Design: Traditional

5. Color: Stone Red

B. Nails: EcoStar Fasteners by EcoStar, LLC., ring shank stainless steel nails as recommended by the slate manufacturer. Provide length sufficient to penetrate 1/4 in. through underside of the top layer of plywood decking.

2.02 ROOFING UNDERLAYMENT

A. Secondary Underlayment / Protection Sheet: Felt underlayment, 30 lb unperforated, asphalt saturated felt, two staggered layers. Tamko #30 UL or approved equal; ASTM D226 Type 2 and must have UL listing. Use with roofing cement ASTM D4586. Loose laid (do not staple) in low-slope areas.

B. Fasteners for Felt: Zinc-coated steel ring-shank nails with plastic button caps. Use only on steep-sloped areas, do not nail felt or rosin paper in low slope areas.

C. Self-Adhered Roofing Underlayment: Blueskin Roof Tile and Metal RF200TM by Henry Company, a vapor-impermeable SBS modified bitumen roofing membrane underlayment reinforced with a skid-resistant polyethylene film.

1. Acceptable alternative: Grace Ice & Water Shield HT by W.R. Grace.

2.03 STRUCTURAL INSULATED PANEL (SIP)

A. Typical SIP: ThermaCal 2 Ventilating Roof Insulation Panel by GAF Cornell, a venting nailable composite roof insulation panel with two layers of oriented strand board (OSB) and one layer of polyisocyanurate insulation with a built-in air space for roof ventilation.

1. OSB Thickness: 7/16 in.

2. Total System Thermal Performance: R-20 min.

3. Air Space: 1 in.

4. Edge Construction: Wood panel edges shall be rabbetted to allow the foam edges to fit together while providing clearance between the wood sheathing on adjoining panels. The sides and ends of the insulation shall have a machined tongue and groove profile.

B. SIP at Rising Walls: ThermaCal Non-Ventilating Roof Insulation Panel by GAF Cornell, a nailable composite roof insulation panel with one layer of oriented strand board (OSB) and one layer of polyisocyanurate insulation.

1. OSB Thickness: 7/16 in.

2. Total System Thermal Performance: R-20 min.

3. Air Space: 0 in.

C. Fasteners: ThermaCal Fasteners by GAF Cornell, as required by the SIP manufacturer to support the loading requirements shown on the Drawings. Provide fastening pattern required for heavy material such as natural slate, unless project-specific calculations are provided.

D. Sealant for SIP joints: HE925 BES Sealant by Henry or approved equal; a moisture-curing medium modulus polymer modified STPe sealant compatible with self-adhered air/water barrier membranes.

2.04 ROOFING VAPOR RETARDER

A. Vapor Retarder: Blueskin Roof Tile and Metal RF200TM by Henry Company, an SBS modified bitumen, vapor-impermeable, roofing membrane underlayment reinforced with a skid-resistant polyethylene film.

1. Acceptable alternative: Grace Ice & Water Shield by W.R. Grace.

2.05 BATT INSULATION

A. Glass Fiber Batt Insulation: ASTM C665, Type III, Class A preformed glass fiber batts to replace in-kind the existing insulation between the sloped roof beams as necessary.

1. Thickness: As indicated on Drawings

2. Facing: Unfaced

3. Thermal Resistance: R-19

4. Acceptable Products:

a. SpeedyR Tabless Fiber Glass Insulation by CertainTeed

b. Unfaced Batts Insulation by Johns Manville

c. EcoBatt Insulation by Knauf Insulation

d. EcoTouch PINK FIBERGLAS Insulation by Owens Corning

B. Fasteners for Batts: 16 ga zinc-coated steel staples with minimum crown width of 3/8 in. and leg length of less than 1/2 in. or as required to not penetrate through the deck.

2.06 FLASHING

A. See Section 07 62 00 – Sheet Metal Flashings and Trim

2.07 ACCESSORY MATERIALS

A. Snow Guards: EcoStar Snow Guards by EcoStar LLC, painted aluminum.

B. Gutters at Steep-Sloped Roofs: 24500 Series by Josam Company, cast iron roof drain with dome-type cast iron. Size to accommodate the gutter dimensions and provide 3 in. diameter down leaders.

C. Wire (to attach angle-out slate): Stainless steel.

D. Slater's Cement: 197AF Karnastatic “Slaters” Cement or approved equal; for use in concealed locations only. Review with Engineer before use.

E. Primer for Self-adhered Membranes: Blueskin Adhesive by Henry; a synthetic rubber based adhesive, quick setting, having the following physical properties. Water-based primers are not permitted.

F. Penetration, Termination, and Lap Sealant for Self-Adhered Membranes: HE925 BES Sealant by Henry; a moisture-curing medium modulus polymer modified STPe sealant compatible with self-adhered air/water barrier membranes.

G. Wood decking and blocking: where necessary to patch and repair existing damaged or deteriorated tongue-and-groove wood decking. Provide blocking where required and/or shown on the drawings.

1. Lumber: Southern yellow pine; #2 grade or better.

2. Plywood: AdvanTech Roof Sheathing by Huber Engineered Wood Products, oriented-strand-board roof sheathing with enhanced moisture resistance, tongue and groove edge profile and strength as shown in the Drawings.

a. Alternate: APA Exposure 1 marine grade rated sheathing to meet requirements of PS 1-07, made with southern yellow pine, 4 ft x 8 ft;

3/4 in. thick, unless noted otherwise on the Drawings or as necessary to match existing thickness for wood decking replacement.

3. Pressure Preservative Treatment: All wood is to be preservative treated under pressure in a closed retort and kiln dried after treatment (KDAT). Treatment to be ACQ (alkaline copper quaternary) – Type B by Osmose Inc. CCA (chromated copper arsenate) treatment is NOT permitted and CCA-treated materials are not permitted on the jobsite. Treatment in accordance with Federal Specification TT-W-571 and AWPA Standards U1, UC3A, T1 (Section 8.8), P5 and C2 or U1-A. The treatment used is to be stamped on each piece by the processor. The minimum net retention of preservative shall be as called for by ASTM D1760 for ground contact (0.40 lbs/cu ft of wood). In addition, treat plywood to this minimum standard. Do not use solvents that can stain adjoining materials or will affect any roofing bituminous material.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify all site conditions and dimensions by field measurement in consideration of the special conditions associated with repairs to existing construction. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the Contract Drawings.

B. Examine all surfaces to receive roofing for roughness, contaminants, unsound structural substrates, or other conditions that may impair the application. Notify the General Contractor and Engineer in writing of any such conditions; do not commence work until all defects are remedied.

C. Notify the Owner 7 days' minimum prior to commencing any work in or around occupied spaces.

D. Cover, protect, or move all items located in occupied spaces where work is required, per the Owner's request. Replace or repair all damaged items and/or interior finishes at no cost to the Owner.

E. Allow deck surfaces to dry; if necessary, dry deck surface by artificial means approved in advance by the Engineer. Use electric dryers, portable blowers, or compressed air, but no open-flame dryers. Do not start work until the deck surface and blocking are satisfactory for roof application.

F. Inspect existing roof deck for damage. Remove and replace all deteriorated deck; Refer to Section 02 41 19 – Selective Demolition.

3.02 GENERAL REQUIREMENTS

A. Do not work in rain, snow, or temperatures below 40°F, in any presence of water, or in winds gusting over 30 mph. Comply with applicable recommendations by manufacturers of all materials for workmanship and handling, except as modified in this Section.

B. Protect building from water infiltration during and after removal of roofing and waterproofing systems until new systems are installed and watertight. Remove only as much of the existing roofing as can be replaced and made watertight during the same workday. Complete the entire roofing assembly in each work area and associated flashing in a single working day to avoid exposure of any components to rain, snow, or dew.

C. If rain threatens during the day, or in an emergency, provide temporary protection for the unfinished exposed roofing and flashing components. At the end of each work day install cut-offs from the new roofing to the deck and to the adjacent existing roofing. Cut-offs shall be constructed to withstand protracted periods of service. Remove cut-offs completely before proceeding with subsequent work.

D. Replace damaged or wet new roofing or insulation at no additional cost to the Owner. If water infiltrates under the new roof membrane, the membrane and insulation will be considered damaged.

E. Do not allow wrappers and packaging materials to be included in the roofing system.

F. Keep a full fire extinguisher within reach during all roofing operations. Keep only full fire extinguishers on-site; promptly remove discharged or partially full extinguishers.

3.03 REPAIRS TO EXISTING ROOFING ASSEMBLY

A. Refer to the Structural Drawings and Section 05 40 00 – Cold-Formed Metal Framing for procedures relating to the cold-formed metal framing and structural repairs.

B. Fasten new plywood panels over the new or existing cold-formed metal beams

1. Install plywood clips, one at midpoint between adjacent rafters, and at the joints of all replacement plywood.

2. Fasten all replacement plywood with screws at a spacing required for appropriate structural attachment.

C. Staple the insulation batts to the underside of the wood deck to prevent settlement during service. Install batt insulation in tandem with the plywood deck replacement to allow for access to the underside of the deck.

1. Coordinate the length of the staples with the plywood deck thickness. Staples shall not penetrate the top side of the deck or puncture the vapor retarder membrane.

2. Where the perimeter of the existing batts are exposed and accessible due to the scope of work described within the Contract Documents, staple the accessible edges of the existing batt to the underside of the deck.

3. At the last section of roof deck to be replaced, fill the cavity with insulation as necessary to ensure the insulation is compressed between the interior finishes and the underside of the deck.

3.04 SELF-ADHERED MEMBRANE (VAPOR RETARDER) INSTALLATION

A. Inspect the condition of the substrate scheduled to receive self-adhered membrane underlayment; no gaps or voids shall be present when membrane is applied. Report any unusual conditions to the Engineer promptly and stop work as not to cover atypical areas. Repair any areas of damaged decking in accordance with Section 06 10 00 – Rough Carpentry.

B. Do not apply the permanent roofing materials unless the exposed surface of the substrate is clean and dry.

C. Do not leave self-adhered membrane underlayment exposed to the elements for more than 1 month. Remove and replace self-adhered membrane underlayment that has been exposed for longer than this period.

D. Remove all dirt and debris from surfaces scheduled to receive underlayment. Prime all surfaces to receive membrane underlayment. Apply primer only to the area to be covered with membrane during the current working day. Apply primer with a roller or brush at the rate recommended by the manufacturer; do not spray. Allow primer to dry tack free before covering.

E. Apply self-adhered membrane underlayment in compliance with the printed instructions of the manufacturer, unless modified by this Section.

1. Begin application of sheets at bottom of slope and work up the roof slope; shingle all side laps 3-1/2 in. minimum to shed water, and provide 6 in. minimum end laps. At valleys, provide 6 in. minimum end lap between all sheets.

2. Provide self-adhered membrane underlayment where shown on the drawings. Apply sheets in longest lengths practical; shingle side laps so they do not “buck” water. Roll out sheets on primed surfaces and align. Re-roll one half of sheet in its long direction and cut through release paper, taking care not to cut membrane.

3. Roll membrane onto primed surfaces, pulling release paper in front of roll such that once release paper is removed membrane is immediately set onto surface. Place sheets without fishmouths or wrinkles. Do not stretch the membrane.

4. If fishmouths and wrinkles appear, cut out and flatten the affected area, and cover with membrane extending at least 6 in. beyond the cut on all sides.

5. Immediately after applying membrane sheet, hand press into contact with the surface, and roll entire membrane towards lap seams with a hand held neoprene roller. Remove air pockets and patch as described in Step 4. Create a uniform and complete bond.

6. Seal all exposed perimeter edges at temporary tie-ins with specified liquid membrane each day, and remove liquid membrane before applying additional sheet membrane.

7. Re-prime areas that become dirty or debris-covered during the course of the work prior to installing membrane.

F. At self-adhered membrane underlayment flashing locations:

1. Round or chamfer all outside corners; ensure that corners are smooth and free of sharp protrusions. At inside corners, apply a 3/4 in. fillet of mastic or liquid membrane, troweled into corners, and allow to cure prior to installing membrane underlayment.

2. At all inside and outside corners, provide a 12 in. wide reinforcing strip of the membrane centered over the transition, using general procedures described above.

3. At base of walls and curbs, extend membrane sheet up vertical surfaces (over reinforcing strip) a minimum of 12 in., or to the top of curbs.

4. Apply liquid membrane over all sheet seams a minimum of 12 in. in each direction in the following locations:

a. At all interior and exterior corners formed by the intersection of two surfaces.

b. Along entire length of valleys.

c. At bottom edge of membrane at eaves, valleys or transitions with low-slope roofing.

d. At all seams on crickets and 12 in. onto roof deck surrounding crickets.

e. Along entire length of the base of rising walls or curbs within 3 ft of eaves, valleys, or transitions with low-slope roofing.

f. At all seams in the membrane gutter trough lining.

g. Seal ends of vertical seams and ends of membrane with a bead of liquid applied membrane.

5. At gutters and other "bottom-of-slope" terminations, provide a starter strip of underlayment adhered to the substrate and extending into the gutter as described above. After metal flashing is installed, proceed with general underlayment installation. Provide 6 in. min. overlap between starter strip and underlayment sheet up-slope of the metal flashing, as shown on the drawings.

G. Self-adhered membrane underlayment is slippery, particularly when wet; take proper safety precautions.

3.05 STRUCTURAL INSULATED PANEL INSTALLATION

A. Installation shall follow the manufacturer’s written installation instructions.

B. Lay panels with the wood side up and the long side parallel to the ridge.

1. Orient the grooved insulation edges with the tongue facing up the slope.

2. Stagger end joints in succeeding panel rows.

3. Check the OSB top surface for uneven edges BEFORE fastening. Adjust the existing substrate or shave off the bottom face of the insulation as necessary to provide even edges between panels.

    a. Lippage shall be less than 1/8 in. between adjacent panels, or as required by Engineer to provide an even substrate for the membrane underlayment and slate roofing system.

4. Apply a smash bead of sealant around the entire perimeter of each panel prior to setting into place. Insulation edges shall fit tightly together without air voids or gaps.

C. Field cut panels should be kerf cut to maintain a 1/8 in. minimum gap between the sheathing on adjacent panels.

D. Secure the SIP fasteners to the supporting roof deck as required by the manufacturer and shown in the approved shop drawings.

1. Provide a minimum of fifteen screws per 4 ft x 8 ft panel.

2. Use additional screws at the rakes, eaves and ridge as recommended by the manufacturer.

3. Do not over-torque fasteners and compress the insulation.

4. Extend fasteners 1/4 in. min. through the plywood deck.

    a. Coordinate the fastening system with the location of all interior building systems, including mechanical, electrical, and plumbing systems, hung from the sloped deck.

    b. Notify the Engineer if the fasteners conflict with existing systems.

    c. All building systems damaged as a result of the reroofing operations shall be replaced in-kind by the Contractor at no cost to the Owner.

5. Check the insulation top surface for uneven edges BEFORE covering. Grind off any uneven edges of the OSB with an electric sander or grinder.

E. When constructing the perimeter flashing systems provide a 1 in. min. continuous ventilation space at the top and bottom of the roof slope, as shown on the Drawings.

F. Protect nail base insulation work from exposure to moisture damage and deterioration, primarily by prompt installation of the roofing, sheet metal and waterproofing work.

3.06 SELF-ADHERED MEMBRANE UNDERLAYMENT INSTALLATION

A. Refer to Article 3.04 above for installation procedures.

B. At gutters and other "bottom-of-slope" terminations, fasten the metal vent flashing to the roof deck prior to installing the membrane underlayment. Provide 6 in. min. overlap between vent flashing and underlayment sheet and ensure all fastener heads are covered, as shown on the drawings.

C. At “top-of-slope” terminations, extend the membrane above the sloped roof deck as shown in the Drawings. Apply termination sealant or liquid membrane along the membrane top edge and mechanically secure the membrane edge to the plywood substrate with the metal flashing.

D. At rake and other “edge-of-slope” terminations, extend the underlayment up the parapets and integrate it with the wall air/water barrier membrane.

3.07 FELT UNDERLAYMENT INSTALLATION

A. Inspect the condition of the substrate scheduled to receive felt underlayment; no gaps or voids shall be present when membrane is applied. Report any unusual conditions to the Engineer promptly and stop work as not to cover damaged areas. The Engineer will determine the nature of the repairs to be made to wood decking and other substrates.

B. Install felt underlayment with 6 in. minimum end lap and 3-1/2 in. minimum side laps. Shingle laps to shed water.

C. Secure felt to underlayment with approved fasteners on steep sloped areas. Loose lay felt on low slope areas.

3.08 SLATE INSTALLATION

A. Slate shingles between bundles and pallets shall be blended to ensure even distribution of shade variations.

B. Do not install slate singles during temperatures lower than 45°F and rising.

C. Snap guide lines both horizontally and vertically during installation to provide straight and uniform shingle pattern. Do not use red chalk, as it will stain the tiles.

D. Inspect each slate shingle prior to installing, to ensure that the slates are sound, without cracks or delaminations, and are not warped. Twist slates to ensure that they are not cracked or delaminated. Dispose of all rejected slates.

1. Broken corners on exposed ends are prohibited; broken corners on unexposed ends greater than 1-1/2 in. any direction are prohibited.

2. Reject slates that are curved or warped 1/8 in. in 12 in. length or more.

E. Provide roofing slate in strict accordance with industry practice and recommendations, as described in the National Slate Association Manual and the manufacturer’s recommendations. Where industry standards and these specifications differ, the most restrictive practices and recommendations shall govern.

1. Maintain minimum 3 in. head lap between first and third slates, or as shown on the Drawings.

F. Regularly inspect the work from the ground and correct any bending problems related to the slates during installation.

G. Fasten the slates as required by the manufacturer.

1. Prior to fastening, flex each shingle to provide a downward curve.

2. Do not over drive the fasteners. If tiles have been installed with over driven nails causing the ends of the tile to curve upward, tiles will not lay flat. Regularly check the fastener depth and the pressure setting of all pneumatic nailing equipment.

3. Tiles with overdriven nails must be removed and discarded.

4. Never hold tiles from behind while nailing, as this will cause an upward curl of the tile.

H. If any shingles are damaged or broken during the work, remove them with a slater's ripping bar. Provide replacement shingles using two nails located between the vertical joint of the overlying shingle, just above the head lap of the slate below. Do not strain slates. Place a 3 in. wide copper bib with a 1/2 in. return hook over the exposed nail heads and engage over top edge of the replacement shingle. Bibs shall be sized to extend to within 1-1/2 in. of the bottom edge of the overlying shingle. Areas of excessive breakage shall be completely removed and replaced as required by the Consultant.

I. Upon completion of shingle installation, shingles shall be sound, whole, properly attached, configured to shed water, and clean.

J. Slate Attic Stock:

1. At the conclusion of the Work, provide the quantity of attic stock slate equal to 1.5% of the slate roof area. Neatly stack, crate and label slate.

3.09 FIELD QUALITY CONTROL

A. Roof Inspections: Arrange for roofing system manufacturers' technical personnel to inspect roofing installation and submit a written report of each visit to Engineer and Owner.

1. Manufacturer representatives from the following systems shall review the steep-sloped roofing insulation:

a. Self-adhered roofing underlayment

b. SIP

c. Synthetic slate tile

2. Notify Architect or Owner 48 hrs in advance of date and time of inspection.

3. Perform a minimum of one inspection during application of the roof, and one visit at time of substantial completion. Inspections are in addition to the initial pre-installation conference.

3.10 CLEANUP

A. At the time of Substantial Completion, thoroughly clean all items of work (newly installed, repaired, or painted components). Clean the building and site of all dust, dirt, and debris related to the work.

B. Protection

1. Provide protection of installed materials from water infiltration into or below them.

2. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.

a. Minimize traffic over completed areas of the roof. The slate shingles will show any mud or dirt tracked across them, which will cause aesthetic issues with the completed appearance of the roof. All stained slates shall be removed and replaced at no additional cost to the Owner.

3.11 MAINTENANCE

A. Provide the Owner with a detailed manual of the required roofing maintenance, including information regarding the necessary frequency of inspections and common visual evidence of system defects.

END OF SECTION

SECTION 07 52 16

STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED-BITUMINOUS MEMBRANE ROOFING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

1.02 RELATED DOCUMENTS

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

B. Refer to other Divisions of these Specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

C. Reference Drawings: The Work of this Section is shown on the Contract Drawings titled “Physical Education Building Exterior Renovations, Montgomery College, Germantown Campus, Germantown, MD”.

D. Provide a copy of applicable Drawings including Shop Drawings and Specifications at the site during work.

1.03 SUMMARY

A. The scope of work specified herein includes, but is not limited to, the following:

1. Remove the existing built-up membrane roofing assembly at the perimeter of the Gymnasium and Central Lobby roofs and over the entirety of the Natatorium and Weight Room roofs as shown on the Drawings. Provide the following roofing assembly, from interior to exterior:

    a. Existing tongue and grove wood deck; repair as described herein

    b. Self-adhered membrane vapor retarder

    c. Polyisocyanurate insulation

    d. EFVM grid and accessories

    e. Mechanically-attached gypsum coverboard

    f. Three-ply modified-bitumen roofing membrane adhered with hot-applied asphalt

    g. Granular-surfaced cap sheet

2. Provide all flashings, sealants, and accessories required for a complete installation.

3. Perform an in situ mockup of the work specified herein in coordination with Section 01 45 00 – Mockups.

B. The work shown in the Contract Documents includes the work of all trades required and all labor, equipment, and materials and supervision necessary and incidental to the work indicated. The following description of the work represents a summary and should be considered in conjunction with the Drawings and all other Specifications.

C. All work is to be done in accordance with applicable codes and regulations.

D. Document all existing conditions prior to start of construction. Prepare measured shop drawings of roofing and flashing systems to be replaced as indicated on the Drawings.

1.04 RELATED SECTIONS

A. Coordinate the work of this Section with the work of other trades under this Contract, including, but not limited to, the following:

1. Section 02 41 19 – Selective Demolition

2. Section 07 24 19 – Water-Drainage Exterior Insulation Finish System (EIFS)

3. Section 07 27 00 – Air and Water Barrier

4. Section 07 31 26 – Slate Shingles

5. Section 07 62 00 – Sheet Metal Flashing and Trim

6. Section 07 92 00 – Joint Sealants

1.05 PERFORMANCE REQUIREMENTS

A. The roofing system, in combination with adjacent construction, shall provide a fully watertight system.

B. Installed roofing membrane and components shall withstand the wind uplift pressures determined by ASCE 7-10, thermally induced movement, and exposure to weather without failure and shall remain watertight.

1. Wind Uplift Pressures: Refer to the Drawings.

C. Initial Solar Reflective Index (SRI): Not less than 89 when calculated according to ASTM E1980.

D. Slope roof membrane to drain: 1/4 in. per foot minimum.

E. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A

F. Follow recommendations and procedures of the following standards and publications, except where these Contract Documents (project specifications and drawings) are more stringent:

1. National Roofing Contractors Association:

a. NRCA Roofing Manual.

2. Factory Mutual Insurance Company

a. FM Global Property Loss Prevention Data Sheets.

3. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):

a. Standard Practice in Sheet Metal Work.

1.06 SUBMITTALS

A. See Section 01 33 00 – Submittals for general submittal procedures.

B. Submit the following items in time to allow for review by the Engineer and resubmittals, if needed, without delaying the work. Do not order materials or start work before receiving the Engineer's written approval.

1. Product Data: For each item, submit information on the component materials, information on the construction and application details, information on the manufacturer's recommendations for application and use, test data substantiating that products comply with requirements, and material safety data sheets.

2. Shop Drawings: After field measurement and documentation of all existing conditions, participate in the preparation of Shop Drawings, coordinated among all participatory and related trades, which establish and accommodate existing constraints and the variance in existing conditions. Provide complete shop drawings for each assembly indicated, including components, flashing, materials, dimensions, drainage system, etc. and the specific requirements listed. Show layout, joining, profiles, terminations, and anchorages of wood blocking, sheet metal, and membrane flashing. Include membrane manufacturer's standard details where they apply to this project.

a. Provide tapered-roof-insulation shop drawings. Plans shall show the layout of the tapered insulation, including location of crickets and typical insulation cross-sections. Show thickness of the tapered roof insulation at roof perimeters, curbs, penetrations, and high points. Indicate slope of tapered insulation in the field of the roof and at tapered crickets.

b. Shop drawings of all metal flashing conditions showing exact profiles, lengths, joints, and terminations; include isometric corner and intersection details and exploded views of all complex intersections.

Coordinate Shop Drawings with all relevant work of other trades specified in other Sections.

C. Informational Submittals

1. Samples: Samples for all materials specified or proposed for use on the project, properly labeled and referenced to the appropriate specification section.

2. Material Safety Data Sheets (MSDS): For each material where appropriate.

3. Certifications: By the producers of the materials that all materials supplied comply with all the requirements of the appropriate referenced standards, that all materials are compatible with adjacent materials, and that all materials are suitable for their intended purpose.

4. Description of any materials or methods the Contractor proposes to use that are different from that described herein, including manufacturer's literature, samples, sketches, and mockups as necessary.

5. Maintenance Data: For modified-bitumen roofing to include in maintenance manuals.

6. Confirmation: From the manufacturer of the membrane roofing system that the roofing contractor is an approved applicator for the specified system.

7. List of Projects: By the contractor showing at least 5 yrs of successful experience with the specified or an equivalent modified-bitumen roofing system. List building name and address, Engineer, owner, and general contractor with phone numbers and contact person.

1.07 MOCKUPS:

A. Notify the Engineer at least 48 hrs before installation of the membrane roofing begins so that a representative may be present during construction. Each initial installation will serve as a mockup. Mockup must be large enough to show all typical conditions.

B. Build in situ mockup(s) of typical roofing assembly with vapor retarder, insulation, EFVM grid, cover board, roofing membrane, and accessories to demonstrate aesthetic effects, quality of materials, sequencing, transitions between materials and cladding, and execution. Mockups shall include the typical roofing assembly, base flashings, metal copings, sealants, tie-in to existing-to-remain roofing assembly, and other roof components. Refer to Section 01 45 00 – Mockups.

1.08 COORDINATION AND SEQUENCING WITH RELATED WORK

A. Refer to other Divisions of these Specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

B. The exterior wall, soffit, and cladding work must be completed prior to beginning any roofing installation work.

C. The existing roofing assembly over the Gymnasium and Central Roof was replaced approximately 7 yrs ago. The replacement roofing assembly is manufactured by Johns Manville and is still under warranty. The new roofing membrane and assembly must be compatible with the existing-to-remain roofing assembly and components, and maintain the current warranty at these roofing assemblies.

1.09 QUALITY ASSURANCE

A. Engage experienced modified-bitumen installers to perform work of this Section. The Contractor shall be approved by the existing roofing membrane manufacturer and have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least 5 yrs. The contractor shall staff the work of this Section with only qualified personnel experienced in the application of this system.

B. Conduct a quality control program that includes, but is not limited to, the following:

1. Inspection of materials to assure conformity with contract requirements, and that materials are new and undamaged.

2. Establishment of procedures for executing the work.

3. Inspecting surface preparation prior to material application.

4. Inspection of work in progress to ensure work is being done in accordance with established procedures, manufacturer's instructions, and specific Engineer instructions.

5. Inspection of work completed and prompt correction of defective work.

C. Obtain each type of material from a single manufacturer for the duration of the project.

D. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so the intent of the Drawings and Specifications is carried out. Coordinate with other trades to maximize efficient use of scaffolding, to minimize disruption to the building, and to avoid unnecessary traffic over areas of completed work.

E. Pre-Installation Conference: A pre-installation conference shall be held with representatives of the Owner, Engineer, and all involved trades prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing. Attend job meetings during the course of the work as required by the Owner.

F. In addition to the Contractor’s quality control program, arrange with the roofing membrane manufacturer to have a competent field representative participate in the roofing preconstruction meeting, visit the site periodically during the installation of the roofing system to inspect and approve substrate preparation before installation of roofing membrane, to inspect work in progress, to review completed work, and to issue

written reports of the manufacturer's findings and recommendations to the Owner and Engineer. The Contractor shall include all costs for the field representative, including expenses, in the bid price.

G. The roofing manufacturer shall review all details for compliance with guarantee requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site only in manufacturer's original containers, clearly marked with legible, intact labels with manufacturer's name and brand name and identifying contents of containers.

B. Keep all materials dry while they are transported, stored, and delivered. Deliver materials to the site only in manufacturer's unbroken original containers, clearly marked with legible, intact labels with manufacturer's name and brand name and identifying contents on containers. Materials shall be marked with the date of manufacture and shelf life shall be stated. Do not use products beyond the expiration of their shelf life.

C. Store all materials on pallets and cover with fire-resistant canvas tarpaulins (materials covered with other tarpaulins are subject to rejection), top to bottom. Store materials in a secure area designated by the Owner, with adequate tie-downs against wind gusting.

D. Protect materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers as necessary. Keep containers tightly closed when not in use. Store flammable materials in a cool, dry, protected area away from sparks and open flames. Protect liquid components from freezing.

E. Store materials in areas where temperatures and conditions conform to the manufacturer's recommendations and instructions. Store adhesives, solvents, and sealants in their original containers, and between 60°F and 80°F. If exposed to lower temperatures, restore to a uniform temperature of no less than 60°F, prior to use.

F. Promptly remove from the site all materials or incomplete roofing work exposed to any moisture, anywhere, at any time, during transportation, storage, handling, and installation.

G. Remove from the site all materials rejected by the Owner or Engineer.

H. Handle all materials to avoid damage. Store rolled goods on ends only. Discard rolls which have been flattened, creased, or otherwise damaged. Unroll sheets and allow them to "relax" prior to use. Replace materials damaged during handling or storage. Remove damaged materials from the premises immediately.

I. Do not dilute primers, roofing cements, adhesives, coatings, or sealants. Keep containers closed except when removing materials from them.

J. Do not stockpile materials, debris, or equipment in the building or where they may overload a building component.

K. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life. Store flammable materials in a cool, dry, protected area away from sparks and open flames.

1.11 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Work only in areas permitted by the Owner-approved schedule. Arrange work sequence to avoid use of newly constructed membrane for storage, walking surface, and equipment movement.

C. Field Measurements: Verify all site conditions and dimensions by field measurements before material fabrication or delivery and indicate measurements on Shop Drawings. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the contract drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Consider the special conditions associated with repairs to existing construction when measuring for shop drawings.

D. Coordination requirements: Coordinate installation with other trades, to help ensure proper installation sequencing and transitions between materials for all assemblies.

E. Protection

1. Protect the building and its contents from risks associated with the work in this Section. Schedule and execute work without exposing adjacent building areas to water, dust, and debris, or materials used by this Contractor. Protect adjacent areas from damage and stains with appropriate barriers and masking. Repair damage as a result of the work of this Section to its condition at the start of work, or if such cannot be determined, to its original condition. Clean stains by approved means.

2. Do not damage existing materials scheduled to remain. Provide adequate protection of all mechanical equipment to prevent breakage, scratches, staining, and any other damage during work associated with this Section.

3. Where work is performed above or near roofing surfaces, clean the work areas free of all debris including fasteners, scrap metal, and metal shards, on a daily basis. Notify the Engineer immediately if any damage to the existing or new waterproofing and roofing system is observed, regardless of the source of the damage. Ensure that all adjacent roofing is covered with plywood protection board with taped joints prior to commencing work in the area.

4. Repair all damage as a result of the work of this Section to its condition at the start of work or, if such cannot be determined, to its original condition to the satisfaction of the Owner. Clean all stains from masonry, stone, EIFS, and other surfaces, and protect all site work from damage. Clean surfaces only by methods approved in advance, and in writing, by the Engineer.

5. Coordinate operations with the Owner's requirements for shut down of air handling equipment to minimize fumes drawn into the building.

6. The Contractor is solely responsible for the watertight integrity of the roof, flashing, and adjacent building components at all times during the construction. Schedule and execute all work to avoid exposing the building and its contents to inclement weather. Keep water out of the building at all times.

7. Provide safe access, staging, temporary protection and barricades, cleanup, dust and fume control, layout, equipment, waste disposal, and documentation. Compliance with OSHA and all other safety laws and regulations is the exclusive responsibility of the Contractor, his Subcontractors, suppliers, consultants, and servants.

8. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement. Protect new and existing-to-remain roof surfaces with smooth 5/8 in. thick (at a minimum) plywood runways where access is absolutely required, and ensure full protection of new and existing roofing surfaces against mechanical damage. Move equipment and ground storage areas as work progresses to avoid abuse of roof. Notify the Owner's Representative immediately, and in writing, if anyone abuses or damages roofing or flashing components.

1.12 ENVIRONMENTAL REQUIREMENTS

A. Roofing system components may be toxic and flammable. Heed all manufacturer's cautions and warnings regarding their use.

B. Completed membrane is slippery when wet or frost covered. Take proper precautions.

C. Contaminants, such as grease, fats, oils, and solvents, shall not be allowed to come into direct contact with the roofing membrane. Any such contact shall be reported to the Engineer.

D. Take necessary precautions when using adhesives around air intakes. The smell of the adhesive could be a disturbance to the building owner and occupants. Coordinate equipment to be turned off and on with the Owner as needed. Cover vents and other locations as needed to protect occupants and public from fumes.

E. Maintain adequate ventilation during preparation and application of roofing materials.

1.13 WARRANTY

A. Applicator Warranty: Guarantee work under this section in a document stating that if, within 2 yrs after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents, the Applicator shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Applicator a written acceptance of such condition. Also, state that the Applicator shall bear costs incurred by the Owner, including reasonable attorney's fees, court costs, and expert witness and consultant fees, to enforce Applicator's compliance with the

obligations of this Guarantee. The obligations of this Guarantee shall run directly to the Owner and its successors and assigns, and may be enforced by the Owner and its successors and assigns against the Applicator, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

B. Manufacturer's Warranty: Provide manufacturer's Red Shield 20 yr no dollar limit material and labor warranty for new roofing system, including insulation and other accessories, to cover failure to prevent penetration of water.

C. Maintain existing manufacturer's warranty at existing-to-remain roofing assemblies over the Gymnasium and Central Roof areas.

PART 2 – PRODUCTS

2.01 MANUFACTUER

A. Except as noted, components specified herein are based on the modified-bitumen roofing membrane by Johns Manville. Manufacturer's products and specifications are generally referred to for identification.

1. Basis-of-Design Manufacturer: Johns Manville, Denver, Colorado, www.jm.com.

2. No substitutions or alternative manufacturers are allowed.

B. Unless approved by the Engineer, obtain waterproofing system materials from the same manufacturer or approved by the roofing membrane manufacturer to maintain single source warranty. Check all specified items upon contract signing and order early so that the work is not delayed. Certain materials may require considerable lead time for delivery.

2.02 ROOFING MEMBRANE

A. Roofing Membrane Sheet: ASTM D6164/D 6164M, Grade S, Type I, SBS-modified asphalt sheet (reinforced with polyester fabric); smooth surfaced; suitable for asphalt mop adhesive attachment method.

1. Roofing Membrane (Base Sheet): DynaLastic 180 S by Johns Manville.

2. Roofing Membrane (Inter-ply Sheet): GlasPly IV by Johns Manville.

3. Roofing Membrane (Cap Sheet): DynaLastic 250 FR by Johns Manville.

2.03 ACCESSORY MATERIALS

A. Vapor Barrier: JM Vapor Barrier SA by Johns Manville, a self-adhered non-slip, UV-resistant membrane with woven polyethylene surface.

1. Acceptable Alternate: DynaLastic 180 S by Johns Manville, set in hot rubberized asphalt or cold adhesive with solvent-based primer as part of tested assembly over wood deck.

B. Insulation

1. Polyisocyanurate Insulation Boards (Flat): ENRGY 3 Insulation by Johns Manville. Insulation in roofing assembly shall meet a minimum total long term thermal resistance (LTTR) of R-30. Minimum average compressive strength of insulation shall be 20 psi.

2. Tapered Polyisocyanurate Insulation Boards: ENRGY 3 Insulation by Johns Manville, tapered at 1/4 in./ft and 1/8 in./ft. sizes, minimum compressive strength 20 psi. Maximum board size for insulation adhesive: 4 ft x 4 ft.

C. Cover Board: 1/2 in. thick factory primed, Densdeck Prime by Georgia Pacific.

D. Attachment: Set insulation, cover board, and membrane in ASTM D312, Type III hot rubberized asphalt adhesive.

1. Alternative adhesive (for cover board and insulation): Manufacturer's recommended cold-applied or low-rise foam adhesive that is part of the manufacturer's tested and warrantied assembly.

E. EVFM Leak Detection System: Include grounding grid and test panel connector box, perimeter conductor wire, electrical cable, and related accessories as recommended by the system manufacturer.

1. Provide detection grounding grid that is installed on top of the insulation and below the cover board.

F. Base Flashing Sheet Materials:

1. Flashing Sheet: DynaLastic 250 FR by Johns Manville.

2. Liquid Applied Flashing: PermaFlash System by Johns Manville.

G. Primer:

1. Self-Adhered Membrane Primer: SA Primer by Johns Manville, roller- or spray-applied primer for application over wood and gypsum decks.

a. Low VOC solvent-based primer may be acceptable if part of a tested assembly and pending a successful mockup and adhesion test.

2. SBS Primer: Asphalt Primer by Johns Manville

3. Water-based primers are not allowed at roof areas over the Natatorium.

H. Wood decking and blocking: where necessary to patch and repair existing damaged or deteriorated tongue-and-groove wood decking. Provide blocking where required and/or shown on the drawings

1. Lumber: Southern yellow pine; #2 grade or better.

2. Plywood: AdvanTech Roof Sheathing by Huber Engineered Wood Products, oriented-strand-board roof sheathing with enhanced moisture resistance, tongue and groove edge profile and strength as shown in the Drawings.

   a. Alternate: APA Exposure 1 marine grade rated sheathing to meet requirements of PS 1-07, made with southern yellow pine, 4 ft x 8 ft; 3/4 in. thick, unless noted otherwise on the Drawings or as necessary to match existing thickness for wood decking replacement.

3. Pressure Preservative Treatment: All wood is to be preservative treated under pressure in a closed retort and kiln dried after treatment (KDAT). Treatment to be ACQ (alkaline copper quaternary) – Type B by Osmose Inc. CCA (chromated copper arsenate) treatment is NOT permitted and CCA-treated materials are not permitted on the jobsite. Treatment in accordance with Federal Specification TT-W-571 and AWPA Standards U1, UC3A, T1 (Section 8.8), P5 and C2 or U1-A. The treatment used is to be stamped on each piece by the processor. The minimum net retention of preservative shall be as called for by ASTM D1760 for ground contact (0.40 lbs/cu ft of wood). In addition, treat plywood to this minimum standard. Do not use solvents that can stain adjoining materials or will affect any roofing bituminous material.

I. Fasteners and Fastener Accessories: Except as noted below, all fasteners and accessories in contact with wood to be stainless steel. Provide fasteners as follows:

1. Attachment plates for mechanically attached insulation and cover board: 3 in. diameter Insulation Fastening Plate by Johns Manville.

   a. Mechanically fastened insulation and cover board is not allowed over the Natatorium.

2. Use rivets, screws, bolts and nails as required. Nails to be 12 ga, with 1/4 in. dia. flat head, annular threaded, with needle point, and of sufficient length to obtain 1-1/4 in. embedment in blocking. Expansion shields shall be stainless steel except as noted on the Drawings; do not use powder-driven fasteners unless specifically approved for the intended application.

3. For wood-to-wood connections: annular ring nails, 10d minimum for 2x wood blocking and metal attachments, with length to provide a minimum of 1-1/4 in. embedment into the final piece receiving the nail points, except full depth into plywood.

4. For wood-to-steel deck: coated, #14, self drilling, self tapping screws, sized to penetrate through blocking and gypsum sheathing, and 1/2 in. through the steel deck.

2.04 AUXILIARY ROOFING COMPONENTS

A. Cant strips and tapered edge strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

B. Termination Bar: Stainless steel, 1/8 in. x 1 in. in size and shall be pre-drilled for non-corrosive screw attachment on a maximum of 8 in. centers.

C. Band Clamp: Stainless steel hose clamp.

D. Mastic Sealant: Polyisobutylene, plain or modified-bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.

E. Low-Sloped Roofs: 21500-AE Series with Leveleze Adjustable Extension by Josam Company, cast iron roof drain with adjustable extension collar to accommodate continuous insulation. Locate internal replacement roof drains at existing drain locations. Provide manufacturer's recommended extension sleeve where required to accommodate new roofing assembly thickness and to integrate with the existing internal plumbing.

F. Metal Roof Ladder: Model 561 by Alaco, fixed wall ladder with handrails over roof, or approved similar. No penetrations are allowed through the horizontal roofing membrane.

G. Walkway Pads: Polymer-modified, reconstituted rubber pads with slip-resisting textured surface, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, 3/8 in. thick, minimum.

H. Metal Flashings: Refer to Section 07 62 00 – Sheet Metal Flashing and Trim.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify all site conditions and dimensions by field measurement in consideration of the special conditions associated with repairs to existing construction. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the Contract Drawings.

B. Examine all surfaces to receive roofing for roughness, contaminants, unsound structural substrates, or other conditions that may impair the application. Notify the General Contractor and Engineer in writing of any such conditions; do not commence work until all defects are remedied.

C. Notify the Owner 7 days' minimum prior to commencing any work in or around occupied spaces.

D. Cover, protect, or move all items located in occupied spaces where work is required, per the Owner's request. Replace or repair all damaged items and/or interior finishes at no cost to the Owner.

E. Allow deck surfaces to dry; if necessary, dry deck surface by artificial means approved in advance by the Engineer. Use electric dryers, portable blowers, or compressed air, but no open-flame dryers. Do not start work until the deck surface and blocking are satisfactory for roof application.

F. Inspect existing roof deck for damage. Remove and replace all deteriorated deck; Refer to Section 02 41 19 – Selective Demolition.

G. Owner will engage Engineer of Record to perform an infrared survey of existing low-slope roofs to remain to identify and document thermal anomalies and areas of potentially wet insulation in accordance with ASTM C1153.

1. During the roofing construction, the Contractor will, at the request of the Owner and Engineer, open the existing roofing assembly at one of the anomalies to check for moisture within the roofing assembly.

2. Results from the preconstruction infrared survey will be compared to infrared surveys performed as part of the Field Quality Control testing described in Section 3.04 below.

3.02 GENERAL REQUIREMENTS

A. Do not work in rain, snow, or temperatures below 40°F, in any presence of water, or in winds gusting over 30 mph. Comply with applicable recommendations by manufacturers of all materials for workmanship and handling, except as modified in this Section.

B. Protect building from water infiltration during and after removal of roofing and waterproofing systems until new systems are installed and watertight. Remove only as much of the existing roofing as can be replaced and made watertight during the same workday. Complete the entire roofing assembly in each work area and associated flashing in a single working day to avoid exposure of any components to rain, snow, or dew.

C. If rain threatens during the day, or in an emergency, provide temporary protection for the unfinished exposed roofing and flashing components. At the end of each work day install cut-offs from the new roofing to the deck and to the adjacent existing roofing. Cut-offs shall be constructed to withstand protracted periods of service. Remove cut-offs completely before proceeding with subsequent work.

D. Replace damaged or wet new roofing or insulation at no additional cost to the Owner. If water infiltrates under the new roof membrane, the membrane and insulation will be considered damaged.

E. Do not allow wrappers and packaging materials to be included in the roofing system.

F. Keep a full fire extinguisher within reach during all roofing operations. Keep only full fire extinguishers on-site; promptly remove discharged or partially full extinguishers.

3.03 INSTALLATION OF ROOFING ASSEMBLY OVER WOOD DECK

A. Installation of Wood Blocking

1. Cut wood straight and true. Generally, cut ends square except at mitered corners and edges. Install all components to provide a flush surface, without buckles or localized deviations from the intended plane. Shim components or

plane finished pieces as to provide a smooth, flush, planar surface at junctures between wood pieces. Where slope is required, provide continuous tapered shims within the wood assembly to create uniform slope. Mill and taper cut blocking to match existing profiles and configurations.

2. Do not use powder-actuated fasteners. Do not use fasteners other than stainless steel. Provide all hardware, including nails, screws, staples, bolts, straps, hangers, anchors, etc. as required for attaching wood to itself or any other material. Set all fasteners so that heads are either flush or slightly countersunk.

3. Install and anchor all wood components in accordance with requirements and recommendations of the referenced standards, and as outlined below.

4. Install all components to provide a flush surface without localized deviations from the intended plane. Solidly shim components as required during installation to provide a flush, planar surface. Provide a minimum of 1/4 in./ft slope on horizontal surfaces. Cut and mill wood blocking to match adjoining roof and wall elements and to provide smooth transitions to adjacent surfaces.

5. Predrill holes in wood and substrates for anchors. Countersink fasteners into wood only to depth for heads to be flush. Securely fasten wood blocking every 6 in.

6. Screw nailers or wood blocking as required to the existing tongue-and-grove wood deck and CMU backup walls, at spacing not over 12 in. o.c., 8 in. at building corners, unless shown otherwise on the details. Use flat head screws without washers or nail-in type anchors.

7. Where low-slope roofing sheathing will be visible from the interior (e.g., at the Natatorium) prime and paint underside of boards as required to match the existing interior finishes prior to installing the sheathing. Avoid requiring subsequent interior access to complete finishing of underside of the sheathing from the building interior.

A. Installation of Vapor Retarder

1. Prime all substrates to receive self-adhered vapor retarder with brushes or rollers according to the manufacturer’s application instructions.

2. Install sheet vapor retarder over area to receive vapor retarder, continue vapor retarder over parapets to integrate with the exterior wall air/water barrier as shown on the drawings; side and end lapping each sheet a minimum of 3-1/2 in. and 6 in., respectively. Seal laps by rolling.

3. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

B. General Installation of Adhesive

1. Comply with all installation and fire safety measures required by all applicable codes and all manufacturer recommendations.

2. Prior to applying adhesive, ensure all substrates and materials to be in contact with the adhesive are dry.

3. For Hot Asphalt Adhesive: All containers used to heat or hold asphalt shall be double-jacketed and have attached covers in good condition, and operating, accurate thermometers, checked at least hourly, to maintain the following temperatures for the asphalt:

   a. Kettle temp: as recommended by the manufacturer, 450°F maximum.

   b. EVT temperatures may be used if approved by the Engineer upon submittal of current, complete data.

4. Following the roofing and adhesive manufacturer's recommendations for installing the adhesive, setting the insulation and cover boards, and "walking-in" or ballasting the boards until the adhesive is cured.

5. Ensure full and continuous seal and contact between adhesive and boards or sheets, including ends, edges, and laps.

   a. For Hot Asphalt: Mop uniformly with a broom not less than 34 in. wide, before the asphalt cools. Cut out fishmouths or side laps not completely sealed with asphalt, and patch. Remove and replace all sheets which are not fully and continuously bonded, or which do not have continuous mopping along laps.

6. Remove used roofing mops and adhesive containers, cartridges, and equipment from the roof daily at the end of work, and store safely away from the building or other materials.

C. Installation of Insulation and Roof Board (Fully-Adhered, supporting the roofing membrane)

1. Install all insulation (tapered, flat, and cover board) to achieve complete and permanent attachment between the vapor retarder, all insulation surfaces, and the roofing system.

2. Offset parallel insulation joints between and within each layer at least 6 in.

3. Arrange insulation board staggers at the end of each day's work, to provide continuity of staggered joints between adjacent work areas.

4. Install tapered insulation and crickets in hot asphalt as shown on the drawings.

5. Lay the first layer of insulation boards into a continuous, 30 lb/100 sq ft, mopping of hot steep asphalt on the vapor retarder and shove them tightly together to fill all joints solidly with asphalt. Immediately thereafter, walk the

insulation boards into the plastic asphalt, to achieve a solid bond to the substrate. Do not use pieces of insulation smaller than 18 in. in length or width.

6. Provide temporary ballast over the insulation boards until the adhesive cures and fully bonds to the insulation surface.

7. Adhere subsequent layers of insulation to the first layer as required in a uniform and continuous mopping of 30 lb/100 sq ft of hot steep asphalt. All insulation shall be capped with an appropriate specified roof board as the top layer. Do not allow asphalt to pool or collect on the top surface of the roof boards.

D. Installation of EFVM Leak Detection System

1. Examine surfaces upon which grounding grid will be installed. Verify that membrane and penetrations are non-conductive materials or are electrically isolated by applications of additional layers of insulating materials.

2. Install EFVM leak detection system components in accordance with manufacturer’s recommendations and approved shop drawings.

E. Installation of Cover Board

1. Set cover boards into a continuous adhesive , 30 lb/100 sq ft, mopping of hot steep asphalt over the EFVM leak detection system and the insulation. Shove the boards tightly together to fill all joints solidly with asphalt. Immediately thereafter, walk the cover boards into the plastic asphalt, to achieve a solid bond to the substrate.

2. Provide temporary ballast over the cover boards until the adhesive cools and fully bonds to the boards.

3. Offset parallel cover board and insulation joints at least 6 in.

F. Installation of Roofing Membrane

1. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

2. Install modified bituminous roofing sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:

a. Adhere membrane to substrate using asphalt adhesive.

b. Unroll roofing sheets and allow them to relax for minimum time period required by manufacturer.

3. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.

    a. Repair tears and voids in laps and lapped seams not completely sealed.

    b. Install roofing sheets so side and end laps shed water.

    c. All end laps should be cut at a 45° angle prior to sealing.

G. Installation of Roof Flashing Systems

1. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:

    a. Backer-Sheet Application: Adhere backer sheet to substrate in cold-applied adhesive.

    b. Flashing-Sheet Application: Torch apply flashing sheet to substrate.

2. Extend base flashing up walls or parapets a minimum of 12 in. above roofing membrane and 4 in. onto field of roofing membrane.

3. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

    a. Seal top termination of base flashing.

4. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.

5. Roof Drains: Set 30-by-30-in. metal flashing in bed of asphaltic adhesive on completed roofing membrane. Cover metal flashing with roofing cap-sheet stripping, and extend a minimum of 6 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.

    a. Install stripping according to roofing system manufacturer's written instructions.

    b. Extend membrane adhesive 1/2 in. down vertical surface of drain bowl to prevent water from rolling back under membrane.

H. Installation of Walkway Pads

1. Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size, according to walkway pad manufacturer's written instructions.

    a. Set walkway pads in cold-applied adhesive.

b. Coordinate walkway pad placement and orientation with roof drainage system.

3.04 FIELD QUALITY CONTROL

A. Roof Inspections: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation and submit a written report of each visit to Engineer and Owner.

1. Notify Architect or Owner 48 hrs in advance of date and time of inspection.

2. Perform a minimum of one inspection during initial application of the roof, and one visit at time of substantial completion. Inspections are in addition to the initial preinstallation conference.

B. Prior to final inspection, conduct a drainage test of the roof in the presence of the Engineer and the Owner. Applying water over the completed Natatorium and Weight Room roofing assemblies. The test shall be considered failed if a 1/4 in. or more of water ponds over the roofing membrane. At each area of failed roofing, remove the roofing membrane, reconfigure the tapered insulation system to provide adequate slope, and reinstall the roofing system.

C. Infrared Survey: After visual inspection, but prior to manufacturer’s approval, Contractor shall engage a third party testing agency to perform an infrared survey of the existing and completed roofing membrane areas to identify potential areas of moisture below the roofing membrane in accordance with ASTM C1153.

1. Technician shall prepare and submit a written report documenting the existing conditions, test locations, and test results for each day’s work within 7 days following the testing.

D. Electronic Field Vector Mapping (EFVM) Survey: After visual inspection and approval by roofing system manufacturer's technical personnel, Contractor shall engage a qualified third-party testing agency to perform an EFVM survey in accordance with ASTM D7877 Low Voltage Technique.

1. Provide testing to verify membrane is free of holes, open seams and capillary defects that will allow water to pass.

2. For EFVM testing provide the following:

a. Thoroughly wet waterproofing membrane in area of test. Wetting can be accomplished by hand or mechanical spray devises. Membrane shall be wet during testing procedures. Ponded water shall not be necessary.

b. Allow testing technician to locate membrane breaches, if any. Technician shall mark on waterproofing membrane or surface exact location of defect and assign an identification number to each location.

c. Visually inspect entire membrane area and repair breaches found.

d. Perform EFVM retest to confirm integrity of repairs.

3. Technician shall prepare a report of each day's test results containing a written description and photograph of defects and a schematic CAD drawing indicating location of conductor wire and of defects in testing field to within 1 in. of accuracy.

4. Submit written report of EFVM tests within 7 days following testing. Report results of tests, both successful and unsuccessful. Include date of test, project name, list of products being applied and tested, name of applicator, name of Contractor, and conditions causing failures in event of a failed test.

E. Roofing system will be considered defective if it does not pass tests and inspections.

1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.05 CLEANUP

A. Keep roof areas clean of accumulating debris; police work areas on a daily basis.

a. Sweep areas around dumpsters and kettle daily. Setup, storage, and dumpster areas shall be clean, with materials neatly stacked.

B. Protection

1. Provide protection of installed materials from water infiltration into or below them.

2. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.

3. Cover newly installed and existing-to-remain roofing membrane with insulation and plywood to protect from adjacent construction activities that require roof access.

C. At the time of Substantial Completion, thoroughly clean all items of work (newly installed, repaired, or painted components). Clean the building and site of all dust, dirt, and debris related to the work.

3.06 MAINTENANCE

A. Provide the Owner with a detailed manual of the required roof system maintenance, including information regarding the necessary frequency of inspections and common visual evidence of system defects.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. Drawings and general provisions of the Contract, including the Division 1 Specifications Sections, apply to this Section.

B. Refer to other Divisions of these specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section

C. Anticipate some variations between conditions expressed in the above-referenced documents and actual field conditions. No adjustment to the Contract Sum shall be made due to minor discrepancies between existing conditions and the Drawings.

1.02 SUMMARY

A. Reference Drawings: The Work of this Section is shown on the Contract Drawings titled “Physical Education Building Exterior Renovations, Montgomery College, Germantown Campus. Germantown, MD”.

B. The work contemplated by the Contract Documents includes the work of all trades required and all labor, equipment, and materials and supervision necessary and incidental to the work indicated. The following description of the work represents a summary and should be considered in conjunction with the Drawings and all other Specifications.

C. The scope of work specified herein includes, but is not limited to, the following:

1. Provide stainless steel through-wall flashing in brick masonry and EIFS cladding and all related accessories required for proper installation, as shown on the Drawings.

2. Provide stainless steel flashing, jamb closures, and all related accessories required for proper installation at fenestration rough openings, as shown on the Drawings.

3. Provide sheet metal trim where exposed at curtain wall perimeters as shown on the drawings.

4. Provide sheet metal coping flashing and roof edge flashing as shown on the drawings.

5. Provide stainless steel gutter liner as shown on the drawings.

D. All work is to be done in accordance with applicable codes and regulations.

1.04 RELATED SECTIONS

A. Coordinate the work of this Section with the work of other trades under this Contract, including, but not limited to, the following:

1. Section 02 41 19 – Selective Demolition

2. Section 04 20 00 – Unit Masonry

3. Section 07 13 26 – Self-Adhered Sheet Waterproofing

4. Section 07 24 19 – Water-Drainage Exterior Insulation Finish System (EIFS)

5. Section 07 27 00 – Air and Water Barrier

6. Section 07 52 16 – Modified-Bitumen Roofing

7. Section 07 92 00 – Joint Sealants

8. Section 08 42 13 – Aluminum Framed Entrances and Storefronts

9. Section 08 44 13 – Glazed Aluminum Curtain Walls

10. 22 05 00 – Common Work Results for Plumbing

1.05 REFERENCE STANDARDS

A. The following Standards are incorporated into these Specifications.

1. Revere's "Copper and Common Sense" Standards for Details.

2. Architectural Zinc Material Standards: ASTM B69-11 – Types 1 and 2 – Standard Specification for Architectural Rolled Zinc sheet & coil; DIN EN 988.

3. Stainless Steel Alloy Material Standards: ASTM A167-99 & A240. Type 304.

4. Architectural Zinc Design Guidelines (handling, fabrication, & installation issues specific to zinc): RHEINZINK Div. 7 Binder; 3rd Edition & RHEINZINK “Applications in Architecture”; 2nd Updated Edition.

5. SMACNA – Architectural Sheet Metal Manual; 6th Edition; Chapter 6 as a minimum standard or these specification and details where they exceed SMACNA’s requirements.

6. NRCA’s “The NRCA Roofing Manual”.

7. ANSI-SPRI ES-1 – “Wind design standard for edge systems used with low-slope roofing systems”

1.06 PERFORMANCE REQUIREMENTS

A. Furnish and install sheet metal flashings, trim assemblies, and gutters following the guidelines included herein, to provide a complete flashing system capable of withstanding service loads (e.g., wind, snow, foot traffic, etc.) while maintaining the following long-term performance requirements:

1. Sufficiently watertight to prevent building leakage.

2. Secure attachment to the structure, without noticeable deformation.

3. Free of corrosion, either from atmospheric conditions, galvanic action, or reaction with surrounding materials.

4. Free of excessive scratching, staining, or other aesthetic issues. “Oil-canning” of sheet metal surfaces is not permitted.

B. Flashing installations shall not be reliant on sealants or gaskets for primary waterproofing performance. No exposed sealant products are permitted except where shown on the Drawings.

C. Install sheet metal flashings, trim assemblies, gutters and underlayment materials shingle fashion to avoid trapping of water. Flashing to divert all moisture infiltration to the building exterior.

D. Thermal Movement: Provide metal profiles and detail connections which allow for thermal movement of the metal resulting from ambient temperature range of 120°F.

E. Follow ANSI-SPRI ES-1 for typical attachment profiles and spacing requirements to meet the anticipated wind pressures determined by ASCE 7-10; refer to the Drawings.

1.07 SUBMITTALS

A. Refer to Section 01 33 00 – Submittals for provisions and procedures.

B. Provide the following submittals:

1. Product Data: For each item, submit information on the component materials and dimensions, information on the construction and application details, information on the manufacturer’s recommendations for application and use, test data substantiating that products comply with requirements, and material safety data sheets.

2. Shop Drawings: Provide complete drawings for each assembly and fabrication required for the project, showing exact profile, lengths, locations of joints,

terminations, and methods of attachment. Coordinate Shop Drawings with all relevant work of other trades specified in other Specification Sections.

3. Samples: Provide samples of the components listed in part two that will become part of the final assembly. Flashing samples shall be made to the exact profiles used for the project, 12 in. minimum length.

1.08 MOCKUPS

A. Working in conjunction with the related Sections, perform waterproofing and flashing work as specified herein as required to construct the following mockups at the following locations:

1. Typical Exterior Wall Flashings: Install in situ mockup of typical wall flashing assemblies to include sheet metal flashings to demonstrate aesthetic effects, quality of materials, sequencing, and execution. Mockups shall include all typical exterior wall components, including air/water barrier, insulation, and other wall components.

2. Window Sill Flashing: Install new metal sill flashing with an upturned back leg over the existing masonry. Provide an upturned back dam or profile as shown in the drawings, mill out projecting frame elements at the vertical mullion to allow the sill flashing to be continuous past the vertical mullion. Provide a minimum 6 in. overlap between metal flashing sections; bed overlapping flashing joints in three rows of butyl sealant. Cope drip edge to align flashing segments.

3. Roof edge flashing: Install in-situ mockup of typical roof coping flashing, in conjunction with all typical exterior wall components, including air/water barrier, EIFS, and roofing components.

4. Built-in Gutter Assembly: Install in situ mockup(s) of typical built-in gutter assembly. Mockup(s) must include the typical gutter profile, drain assembly, expansion joint, and gutter end. Integrate gutter mockups with typical steep-slope roofing, flashing, and gutter underlayment components.

5. Metal Panel Trim at Window Jambs: Install metal panel and attachment clips at a window jamb. Coordinate placement with air/water barrier, EIFS, and window flashing installation.

1.09 QUALITY ASSURANCE

A. Engage experienced waterproofing personnel to perform work of this Section. The Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least 5 yrs. The contractor shall staff the work of this Section with only qualified personnel experienced in the application of this system.

B. The Contractor is responsible for a quality control program that includes but is not limited to the following:

1. Inspection of materials to assure conformity with contract requirements, and that the materials are new and undamaged.

2. Establishment of procedures for safely executing the work.

3. Inspecting surface preparation prior to material application.

4. Inspection of work in progress to ensure work is being done in accordance with established procedures, manufacturer's instructions, and specific Engineer instructions.

5. Inspection of work completed and prompt correction of defective work.

C. Obtain each type of material from a single manufacturer for the duration of the project.

D. Preconstruction Conference: Attend a preconstruction conference to be held with a representative of the Owner, Engineer, Contractor's field superintendent, foreman, and other trades involved to discuss the conduct of the Work.

E. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so the intent of the Drawings and Specifications is carried out. Coordinate with other trades to maximize efficient use of scaffolding, to minimize disruption to the building, and to avoid unnecessary traffic over areas of completed work or existing components to remain.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site only in manufacturer's original containers, clearly marked with legible, intact labels with manufacturer's name and brand name and identifying contents of containers.

B. All materials to be new. Handle all materials to prevent damage. Place materials on pallets. Use waterproof and fireproof canvas tarpaulins (not plastic) to cover all stored materials top to bottom.

C. Protect all materials in original, unopened, labeled containers and packaging and in compliance with manufacturer's directions. Comply with manufacturer's recommendations for minimum and maximum time and temperature limits for storage.

D. Promptly remove from the site all materials rejected by the Engineer or exposed to any moisture anywhere, at any time, during transportation, storage, handling, or installation.

E. Do not stockpile materials or equipment to overload any building or site component.

1.11 PROTECTION AND ACCESS

A. Protect the existing building and its contents, interior finishes, and all site work during all demolition, removal, and repair operations against all risks associated with this

work. Replace damaged components at no charge to the Owner and to the satisfaction of the Engineer using mechanics skilled in the appropriate trade including all site work. The premises shall be left in a neat, clean, and safe condition at the end of each day's work.

B. Schedule and execute work without exposing adjacent building areas to water, dust, and debris, or materials used by this Contractor. Protect adjacent areas from damage and stains with appropriate barriers and masking. Clean stains by approved means.

C. Do not damage existing materials scheduled to remain. Provide adequate protection of all mechanical equipment to prevent breakage, scratches, staining, and any other damage during work associated with this Section.

D. Where work is performed above or near roofing surfaces, clean the work areas free of all debris including fasteners, scrap metal, and metal shards, on a daily basis. Notify the Engineer immediately if any damage to the existing or new waterproofing and roofing system is observed, regardless of the source of the damage. Ensure that all adjacent roofing is covered with plywood protection board with taped joints prior to commencing work in the area.

E. Schedule and execute all work to avoid exposing the building and its contents to inclement weather. Keep water out of the building at all times

1.12 PROJECT CONDITIONS

A. Field Measurements: Verify all site conditions and dimensions by field measurements before material fabrication or delivery and indicate measurements on Shop Drawings. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the contract drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Consider the special conditions associated with repairs to existing construction when measuring for shop drawings.

B. Coordination requirements: Coordinate installation with other trades, to help ensure proper installation sequencing for assemblies.

1.13 WARRANTY

A. Applicator Warranty: Guarantee work under this section in a document stating that if, within 2 yrs after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents, the Applicator shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Applicator a written acceptance of such condition. Also, state that the Applicator shall bear costs incurred by the Owner, including reasonable attorney's fees, court costs, and expert witness and consultant fees, to enforce Applicator's compliance with the obligations of this Guarantee. The obligations of this Guarantee shall run directly to the Owner and its successors and assigns, and may be enforced by the Owner and its successors and assigns against the Applicator, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Manufacturer's products and specifications are generally referred to for identification; except as noted, products of other manufacturers meeting the requirements itemized below may be submitted for approval. Unless approved in writing by the Architect, obtain flashing materials from the same manufacturer whenever possible.

B. All materials are to be new. Handle, store, and install materials as recommended by the manufacturer. Materials shall be delivered to the job site in their original containers with the manufacturer's name, grade, number, and batch identification on the container or packaging. Do not use powder-actuated fasteners.

2.02 METAL COPING AND GRAVEL STOPS

A. Manufactured metal coping system with caps in lengths not exceeding 12 ft, concealed anchorage, with pre-manufactured corner pieces, end caps, and concealed splice plates. All fasteners shall penetrate the vertical face of the parapet substrate. Provide 0.050 in. thick aluminum coping panels, with a two-coat fluoropolymer finish, color to match existing metal copings or as selected by the Owner. Coordinate coping size with cladding assembly, as shown in the Drawings.

1. Basis of Design: Una-Clad by Firestone
2. Alternate: Petersen Aluminum Corporation
   Hickman Company, W.P.

2.03 METAL PANEL TRIM

A. Painted aluminum, minimum 0.050 in. thick, with fluropan high performance Kynar 500 finish, color to match adjacent curtain wall framing. Provide concealed attachment clips secured to the backup wall framing.

2.04 METAL THROUGH WALL FLASHING

A. Metal flashings at window sills, jambs, and head, and other miscellaneous wall flashings: 18-8 stainless steel AISI Type 304, 2D finish, 24 ga with hemmed edge; use in conjunction with self-adhered membrane flashing accessory of selected air/water barrier product. Metal flashing shall be fastened to the backup wall, include a sloped horizontal surface, and shall daylight through the cladding.

2.05 METAL GUTTER LINER

A. Metal Gutter Liner: Minimum 22 ga stainless steel with fully soldered seams and corners. Provide gutter with dimensions shown on the Drawings, including 1/8 in. per ft min. cross slope.

B. Expansion Joints: Form elevated sheet metal expansion joints constructed integral with the metal gutter liner as shown in the Drawings. Expansion joints shall be spaced and designed to accommodate thermal movements as recommended by SMACNA.

Fully solder all sheet metal joints not designed to accommodate movement. The top edge of the expansion joint shall extend continuously from the outermost edge of the metal fascia to the sloped roof edge, as shown in the Drawings.

C. End dams: Form sheet metal end dams constructed integral with the metal gutter liner as shown in the Drawings. Fully solder all sheet metal joints not designed to accommodate movement. Coordinate end dam dimensions, flashing, and installation sequence with the membrane underlayment, roofing system, and cladding assembly.

D. Drainage and Downleaders: Refer to Section 22 05 00 – Common Work Results for Plumbing.

E. Underlayment: Refer to Section 07 31 26 – Slate Shingles.

2.06 LOW-SLOPE SHEET METAL FABRICATIONS

A. Base Flashing: Aluminum, 0.040 in. thick min.

B. Counterflashing: Aluminum, 0.040 in. thick min. Shop fabricate interior and exterior corners.

C. Flashing Receivers: Aluminum, 0.040 in. thick min. Shop fabricate interior and exterior corners.

D. Roof Penetration Flashing: Stainless Steel, 20 ga min. Field-measure all penetration sizes and shop fabricate flashing system. Provide a 6 in. min. wide flange to integrate with the modified-bitumen roofing assembly. Field solder all seams or metal laps, and provide a band clamp and sealant around the flashing top edge.

2.07 FENESTRATION PERIMETER FLASHING

A. Sheet Flashing: Minimum 26 ga stainless steel, unless specified otherwise in the Drawings. Provide continuous sheet metal flashing around all fenestration systems to separate the primary seal from the air/water barrier membrane and facilitate future sealant replacement.

B. Provide sheet metal shapes as shown in the Drawings to accommodate rough opening geometry and cladding systems. All sheet flashing shall be placed flush against the backup wall substrate; adjust fastening methods and/or metal thickness as necessary, pending Engineer’s approval.

2.08 MISCELLANEOUS ACCESSORIES

1. Mastic: Rubberized asphalt caulking and sealing compound; HE925-BES by Henry Company.

2. Slip Sheet: Rosin-sized Kraft paper, weighing approximately 3 lbs/100 sq ft.

3. Strip Flashing for Expansion Joints: Use preformed butyl glazing tape 1/8 in. thick by 1/2 in. wide conforming to AAMA 806.1.Membrane Strip Flashing, for use at expansion joints; 0.060 in. thick uncured EPDM, “Form Flash” by

Firestone; use manufacturer's recommended primers, adhesives, sealants, and solvent cleaners.

4. Release Tape: 0.006 in. thick polyethylene, adhesive-backed on one side, width as required.

5. Sloped Shims: Tapered, hard plastic shims, EZ-Shim by EZ-Shim Inc., Santa Barbara, California.

6. Rivets (for stainless steel): solid stainless steel rivers by Jay-Cee Sales and Rivet Inc. or similar.

7. Solder: ASTM B32, Class 50A or 50B, Bar Form, 50% block tin and 50% pig lead, with an approved brand of soldering flux.

8. Fasteners for attaching metal flashing to wood: Use stainless steel screws, bolts, washers, and nails as required. Nails to be 12 ga with minimum 1/4 in. dia. flat head, annular threaded, with needlepoint, and of sufficient length to obtain 1-1/4 in. embedment into blocking, and for full depth into plywood.

9. Fasteners for attaching metal flashing to concrete, CMU, or masonry: 1/4 in. dia. Nylon-Nailin with stainless steel nail and mushroom head by Rawl Powers Inc. Provide lengths to obtain 1-1/4 in. embedment. Unless otherwise shown on the drawings, install with 3 in. minimum edge distance in masonry and concrete.

10. Fasteners for attaching metal to metal: #12 HWH SDS/2 Flo-Seal hex head fastener with Stalgard coating and integral sealing washers by Textron Inc., Provide length as required to obtain 1-1/4 in. embedment.

PART 3 – EXECUTION

3.01 PREPARATION

A. Examine all surfaces to receive self-adhered membrane underlayment and flashing for roughness, contaminants, unsound structural substrates, or other conditions that may impair the membrane or metal application. Notify the Engineer in writing of any discrepancies between the drawings and field conditions. Do not start work until all discrepancies have been resolved.

3.02 SUBSTRATE PREPARATION

A. Membrane Underlayment

1. Do not leave the completed underlayment and waterproofing systems exposed to the elements. Remove and replace deteriorated or damaged underlayments and waterproofing as directed by the Engineer.

2. Install membrane underlayment in accordance with the manufacturer's published installation instructions and guidelines and as further defined in other

Divisions of these specifications. Prime all substrates scheduled to receive membrane underlayment.

B. Separator Sheet

1. Install rosin-sized Kraft paper immediately before installation of sheet metal flashing, copings and cladding; replace any separator sheet material that comes in contact with moisture at any time.

2. Lay out rosin paper without fastening through underlayment. Lap sides 2-1/2 in. minimum and ends 6 in. minimum in a shingled fashion.

3.03 SHEET METAL FABRICATION

A. Shop-fabricate work to the greatest extent possible. Form sheet metal on a bending brake. Perform shaping, trimming, and hand seaming in the shop as far as practical, with the proper sheet-metal working tools. Make the angle of the bends and the folds for interlocking the metal with full regard for expansion and contraction, to avoid buckling or other deformation in service. All lines shall be straight and crisp allowing for thickness of metal dictating minimum radius bend. Hem all exposed edges 1/2 in. minimum except where explicitly shown as shorter on the Drawings.

3.04 SEAMS

A. Immediately prior to soldering, mechanically clean all metal to be soldered with steel wool or by other acceptable means, apply flux, and pre-tin. Clean metal again if it is not soldered on the same work day. Perform all soldering slowly with well heated heavy (10 lbs/pair) irons with properly tinned clean blunt tips. Do not use torches. Apply enough heat to sweat the solder completely through the full width of the seam. Close clinch lock seams gently with a block of wood and mallet, then flux and show at least one full inch of continuous and evenly flowed solder. Whenever possible, do all soldering in flat position. All sloped and vertical seams shall be laced and soldered a second time. Wipe and wash clean soldered joints to remove all traces of acid from the flux immediately after the joints are made.

B. Lay out metal flashing to minimize transverse joints. Detail transverse joints in all flashing pieces to provide a watertight connection, and allow for expansion/contraction of the metal as shown on the Drawings. Provide pre-fabricated corner pieces with joints locked, riveted, and soldered watertight. Space rivets at 1 in. o.c. in staggered pattern unless otherwise indicated. Unless shown otherwise on the Drawings, provide expansion joints at 20 ft o.c. maximum and at 2 ft away from all changes in flashing direction (each side) and from all terminations of flashing. Unless shown otherwise on drawings, provide expansion joints at 20 ft centers, and 2 ft from corners (each side) and from all terminations of flashing. Lap metal 4 in., apply release tape over edge of metal, and apply EPDM strip flashing and metal cover plate as shown on the drawings.

3.05 GENERAL SHEET METAL INSTALLATION

A. Except as called for in this section, comply with all recommendations of the 1982 edition of Revere's "Copper and Common Sense" Standards for Details. Completed metal shall be straight, flat, and without buckles, dents, scratches, or other blemishes.

B. Isolate all dissimilar metals with bond breaker tape.

C. Lap all materials at all joints 6 in. minimum unless noted otherwise.

D. Provide 1/8 in. / ft minimum slope on all horizontal surfaces to prevent ponding, unless otherwise indicated. Slope roof edge copings toward roof. Slope copings between two roofs toward upper roof to avoid runoff on face of wall below.

E. Provide continuous hook strips where indicated on the Drawings, nailed 6 in. o.c. into solid wood blocking, and 12 in. o.c. into stone or concrete. Crimp the formed hook of metal flashing onto the hook strip, forming a 3/4 in. loose lock, overlapping the hook strip at least 1/2 in.

F. Provide metal receiver strips (blind nailers) at vertical terminations and where shown. Provide a solid bed of sealant in joints, behind and within receiver metal.

G. Form cleats from 2 in. wide strips of metal of the same weight as the base metal, of sufficient length so that cleats can be fastened to the substrate and hooked to the locks of flashing pans, onto the hemmed edge of apron flashing, etc. Space cleats at 12 in. centers maximum. Fasten cleats to the substrate with two nails or one expansion anchor per cleat (as appropriate for substrate), staggered and folded over the fastener heads.

H. Reinforce all metal flashing corners; rivet and solder all flashing corners for permanent waterproof connections.

I. Exposed fasteners are prohibited.

J. Do not penetrate the horizontal portion of any flashing with fasteners.

3.06 COPING

A. Provide continuous metal coping, locked continuously onto hook strips on each side. For installation, leave interior lock slightly open to engage hook strip, and crimp interior lock closed after installation. Construct transverse joints as described above.

B. Where noted on the drawings, provide pre-fabricated thimbles formed from the same material as the flashing base metal, with fully soldered joints and seams to cover setting dowels. Solder thimbles continuously to coping. Provide at least 1/2 in. overlap at all metal joints in thimble, and at connection to coping flashing.

C. Terminate coping at intersecting (rising) walls with a bulkhead flange locked and soldered to the end of the coping. Secure the flange to the face of the intersecting wall; terminate the vertical edges in receivers on each side of the coping, and counterflash the up-turned leg.

3.07 METAL THROUGH-WALL FLASHING

A. Provide continuous through-wall flashing at all locations shown in the Drawings.

B. The through-wall flashing drip edge shall extend 1/4 in. min. beyond the exterior face of the cladding system with a hemmed edge.

C. Provide prefabricated inside and outside corners; do not overlap lengths of flashing at corners.

D. Provide expansion joints as indicated in the Drawings and described herein.

3.08 APRON COUNTERFLASHING (TWO-PIECE METAL FLASHING)

A. Provide metal apron counterflashing with 2 in. wide loose cleats at 12 in. o.c., to counterflash the top of the metal and membrane base flashing, and step flashing, as shown on the Drawings. Lock the transverse seams of adjacent apron flashing together using a 1/2 in. flat seam. Offset seams from adjacent flashing courses. Hem the bottom edge of the apron, and hook the top edge into the flashing receiver. Fold cleat tabs up to firmly secure the apron. Do not solder cleat to apron.

3.09 GUTTER LINER

A. After removal of existing work as indicated, inspect substrate surfaces for unsatisfactory conditions and report such deficiencies to the Engineer. Do not proceed until corrective measures have been completed to provide satisfactory surface. Contractor shall inspect wood surfaces. Wood surface must be dry and smooth. Ensure that there are no projections to puncture underlayment, flashings, or gutter linings.

B. Box gutters: When areas of removed gutter lining will not be replaced in the same day, provide temporary covering to prevent penetration of water or moisture to interior. Any damage to interior finishes shall be repaired and refinished by the Contractor to the Engineer’s and Owner's satisfaction and at no cost to the Owner.

C. Prevent unnecessary walking on the installed gutter liners.

D. All joints to be soldered shall be prepared by cleaning to bright metal before joining. Cleaned area shall extend beyond actual joint dimension. Pre-tin joints before soldering where possible.

E. All joints to be soldered shall be soldered the same day as joint is formed to prevent intrusion of moisture and dirt into joint. If joint cannot be soldered on the same day it is formed in place, cover joint to prevent intrusion of dirt, water and moisture.

F. Coordinate gutter and flashing work with installation of roofing, replacement of deteriorated framing and decking work, as applicable. Install existing downspouts as soon as outlet tubes are completed.

G. Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal all fasteners, and set units true to line and levels as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.

H. Rivets shall be installed from below whenever possible, such that popped end of rivet is exposed to view to help ensure that thermal movement can take place freely.

I. The exterior edge of the gutter liner shall be 1 in. below the roof-side of the liner to allow for overflow over the top of the cladding.

3.10 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 in. over base flashing. Install stainless-steel draw band and tighten.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 in. over base flashing. Lap counterflashing joints a minimum of 4 in. and bed with sealant.

D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.11 FENESTRATION PERIMETER FLASHING

A. Provide metal sheet flashing around the perimeter of all curtain wall and door rough openings where shown in the Drawings.

B. Bed all flashing in silicone sealant over the air/water barrier.

C. Shingle-lap all flashing pieces to prevent water traveling down the fenestration-side of the flashing from bucking along the flashing edge. Overlap all flashing 4 in. min., unless stated otherwise in the Drawings, and bed laps in silicone sealant and fasten together unless intended to accommodate movement. At all inside corners of the rough opening, extend flashing onto adjacent surface to create end dams.

D. At the clerestory head and sill, provide expansion joints at 20 ft. o.c. max.

3.12 METAL PANEL TRIM

A. General: Layout locations of clips, furrings, and supports for the metal panel trim pieces. Secure supports to the backup wall or adjacent construction as shown on the drawings.

B. Secure metal panel trim to supports in accordance with design requirements to meet the anticipated wind loads

C. Strip in metal furrings and supports with self-adhered membrane. Install sealant over exposed fastener heads securing the furrings.

D. Install sealant in the horizontal and vertical reveals around the metal panel trim. Weep the sealant joints at the bottom of the panels, above the cast stone.

3.13 CLEANING AND PROTECTION

A. Protect finished work from damage during subsequent work, such as impact, marring of the surface, and other damage. Replace or repair at no additional cost to the Owner all damaged work or materials.

B. Clean exposed metal surfaces of substances that would interfere with uniform oxidation and weathering and as recommended by panel manufacturer and maintain in a clean condition during construction. Use WD-40 applied to a clean cloth and apply light pressure to remove contamination from surface.

C. Keep roof areas clean of accumulating debris; police work areas on a daily basis.

D. Sweep areas around dumpsters daily. Setup, storage, and dumpster areas shall be clean, with materials neatly stacked.

PART 4 – ALLOWANCES

4.01 ALLOWANCE FOR LEAF GUARDS

A. Include on Bid Form an allowance for metal screen leaf guards over the built in metal gutters along the bottom of the steep-slope roofs. The leaf guard screens will require soldered clips at approximately 24 in. on center along the front and back of the gutter liner to retain the screens.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

B. Refer to other Divisions of these Specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

1.02 REFERENCE DOCUMENTS

A. Reference Drawings: The Work of this Section is shown on the Contract Drawings titled “Physical Education Building Exterior Renovations, Montgomery College, Germantown Campus Germantown, MD”.

B. The work shown in the Contract Documents includes the work of all trades required and all labor, equipment, and materials and supervision necessary and incidental to the work indicated. The following description of the work represents a summary and should be considered in conjunction with the Drawings and all other Specifications.

C. All work is to be done in accordance with applicable codes and regulations.

1.03 SUMMARY

A. The scope of work specified herein includes, but is not limited to, the following:

1. Grind, clean, and prepare surfaces to receive sealant. Provide sealant, primer, and backer materials at EIFS and masonry control joints, cladding penetrations, metal-to-EIFS, curtain wall frame-to-air/water barrier, curtain wall frame-to-metal, curtain wall frame-to-EIFS, and curtain wall frame-to-masonry as shown.

2. Provide exterior sealant joints where removed and other miscellaneous locations as shown on the drawings.

3. Perform initial and ongoing jobsite sealant adhesion tests.

4. Perform mockups of the work specified herein in coordination with mockups described in related Sections.

B. Coordinate the work to keep the building watertight at all times. This may require some out-of-sequence work to be scheduled with all trades to prevent the building from being exposed to the weather. Prevent water intrusion through temporary protection.

1.04 RELATED SECTIONS

A. Coordinate the work of this Section with the work of other trades under this Contract, including, but not limited to, the following:

1. Section 02 41 19 – Selective Demolition

2. Section 04 20 00 – Unit Masonry

3. Section 04 72 00 – Cast Stone

4. Section 07 24 19 – Water-Drained Exterior Insulation Finish System (EIFS)

5. Section 07 27 00 – Air and Water Barrier

6. Section 07 52 16 – Styrene-Butadiene-Styrene (SBS) Modified-Bituminous Membrane Roofing

7. Section 07 62 00 – Sheet Metal Flashing and Trim

8. Section 08 42 13 – Aluminum Framed Entrances and Storefronts

9. Section 08 44 13 – Glazed Aluminum Curtain Walls

10. Section 09 20 00 – Interior Finishes

1.05 PERFORMANCE REQUIREMENTS

A. Joint sealants, backings, and other related materials must be compatible with one another and joint substrates under service conditions and application.

B. Provide sealants with movement characteristics as required in the design documents.

C. The following Standards are incorporated into these Specifications. Unless noted otherwise, comply with the current version of these Standards.

1. ASTM (American Society for Testing and Materials) – as noted and including ASTM C1193 – Guide to Use of Joint Sealants.

1.06 SUBMITTALS

A. See Section 01 33 00 – Submittals for general submittal procedures.

B. Submit the following items in time to allow for review by the Engineer and resubmittals, if needed, without delaying the work. Do not order materials or start work before receiving the Engineer's written approval.

1. Product Data: For each item, submit information on the component materials, information on the construction and application details, information on the manufacturer’s recommendations for application and use, color chart of standard sealant colors, test data substantiating that products comply with requirements, and material safety data sheets.

2. Samples: Provide samples of the components listed in part two that will become part of the final assembly.

C. Informational Submittals: Provide the following additional submittals:

1. Written explanation to decipher code numbers used on material containers to record manufacturing dates.

2. Product Test Reports: Reports for tests made within three years of the submittal date showing compliance with ASTM C920, and the standards C920 references including C793 and C719, using the standard substrates.

3. Laboratory Test Reports: Laboratory test reports from the sealant manufacturer for adhesion-in-peel tests showing adequate adhesion to the various metal panels, metal flashing, and other substrates used on this project before and after seven days water immersion, along with the manufacturer's recommendations for cleaning and priming each substrate.

1.07 MOCKUPS

A. Build in-situ mockup of typical wall assembly with brick masonry, EIFS cladding, and curtain wall to demonstrate aesthetic effects, quality of materials, sequencing, transitions between materials and cladding, and execution. Mockups should include all typical exterior wall components, including air/water barrier, insulation, through-wall flashing, sealant joints over backer rod, and other wall components. Refer to Section 01 45 00 – Mockups.

1.08 QUALITY ASSURANCE

A. Engage experienced sealant personnel to perform work of this Section. The Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least 5 yrs. The contractor shall staff the work of this Section with only qualified personnel experienced in the application of this system.

B. Conduct a quality control program that includes, but is not limited to, the following:

1. Inspection of materials to assure conformity with contract requirements, and that materials are new and undamaged.

2. Establishment of procedures for executing the work.

3. At least 6 weeks prior to the start of sealant application, apply specified sealants to each jobsite substrate following specified procedures. The tests on the brick masonry shall be carried out at the site, but do not have to be done on the face of the building. The tests on windows must be carried out on samples at the building and cured for at least 2 weeks. Notify Engineer at least 48 hrs prior to start of the installation and testing, so that Engineer can be present to observe it.

4. Construct two 10 in. long x 1/2 in. wide x 1/2 in. deep sealant joints against each substrate, including the brick masonry and the EIFS. Also, construct four 10 in. long x 1 in. wide x 3/16 in. thick strips of sealant over each substrate. Apply bond breaker tape to the substrate surface under the last 2 in. of the sealant at each end of the strips and joints to provide a tab for peel testing after curing. Prepare surface and install sealant joints and strips as described below and as will be done during the general sealant installation.

5. After curing for twenty-one days at outdoor temperatures (> 40°F), submerge two of the strip samples over each substrate in distilled water for seven days. Cure the other strip samples and sealant joints for twenty-one days at outdoor temperatures (> 40°F).

6. After curing, grasp the 2 in. tabs on the ends of the joints and the strip samples and pull the sealant at 90° to the surface.

7. For acceptable applications, the sealant shall fail cohesively (tearing within itself) with no adhesive (debonding) failure.

8. If sample debonds from the substrate, the sealant manufacturer shall make recommendations regarding changes in surface preparation or primers and submit these recommendations to the Engineer for his approval. Repeat sealant adhesion trials as many times as required to produce an acceptable application at no additional cost to the Owner.

C. Applicator Qualifications

1. Engage experienced sealant personnel to perform work of this Section. The Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least five years.

2. Firm shall staff the work of this Section with only qualified personnel experienced in the application of this system.

D. Single-Source Limitation: Obtain each type of material through one source from a single manufacturer for the duration of the project. Notify Engineer of any distributer or manufacturer changes in advance. Additional adhesion testing may be required at no additional cost to the Owner.

E. Conduct a quality control program that includes, but is not limited to, the following:

1. Inspection of materials to assure conformity with contract requirements and to ensure that materials are new and undamaged.

2. Establishment of procedures for executing the work.

3. Inspect substrate conditions and coordinate with the Engineer to ensure proper substrate preparation in conformance to the contract requirements.

4. Inspection of work in progress to assure work is being done in accordance with contract requirements.

5. Inspect all completed and any corrected work for compliance with the Contract Documents and the sealant manufacturer's recommendations. Promptly correct defective work.

F. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so the intent of the Drawings and Specifications is carried out. Coordinate with other trades to maximize efficient use of scaffolding, to minimize disruption to the building, and to avoid unnecessary traffic over areas of completed Work or existing materials to remain.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site only in manufacturer's original containers, clearly marked with legible, intact labels with manufacturer's name and brand name and identifying contents of containers.

B. All materials to be new. Handle all materials to prevent damage. Place materials on pallets. Use waterproof and fireproof canvas tarpaulins (not plastic) to cover all stored materials top to bottom.

C. Protect all materials in original, unopened, labeled containers and packaging and in compliance with manufacturer's directions. Comply with manufacturer's recommendations for minimum and maximum time and temperature limits for storage.

D. Promptly remove from the site all materials rejected by the Engineer or exposed to any moisture anywhere, at any time, during transportation, storage, handling, or installation.

E. Do not stockpile materials or equipment to overload any building or site component.

F. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life. Store flammable materials in a cool, dry, protected area away from sparks and open flames.

1.10 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Field Measurements: Verify all site conditions and dimensions by field measurements before material fabrication or delivery and indicate measurements on Shop Drawings. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the contract drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Consider the special conditions associated with repairs to existing construction when measuring for shop drawings.

C. Coordination requirements: Coordinate installation with other trades, to help ensure proper installation sequencing for assemblies.

D. Protection

1. Protect the building and its contents from risks associated with the work in this Section. Schedule and execute work without exposing adjacent building areas to water, dust, and debris, or materials used by this Contractor. Protect adjacent areas from damage and stains with appropriate barriers and masking. Repair damage as a result of the work of this Section to its condition at the start of work, or if such cannot be determined, to its original condition. Clean stains by approved means.

2. Do not damage existing materials scheduled to remain. Provide adequate protection of all mechanical equipment to prevent breakage, scratches, staining, and any other damage during work associated with this Section.

3. Where work is performed above or near roofing surfaces, clean the work areas free of all debris including fasteners, scrap metal, and metal shards, on a daily basis. Notify the Engineer immediately if any damage to the existing or new waterproofing and roofing system is observed, regardless of the source of the damage. Ensure that all adjacent roofing is covered with plywood protection board with taped joints prior to commencing work in the area.

4. Comply with Division 1 General Requirements, OSHA, and published, approved manufacturer's recommendations.

E. Schedule and execute all work to avoid exposing the building and its contents to inclement weather. Keep water out of the building at all times.

1.11 PRECONSTRUCTION CONFERENCE

A. Attend a preconstruction conference to be held with the Owner, Owner's Agent, and Engineer, and all other involved trades to discuss and coordinate the work covered under this Section.

1.12 WARRANTY

A. Applicator Warranty: Guarantee work under this section in a document stating that if, within 2 yrs after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents, the Applicator shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Applicator a written acceptance of such condition. Also, state that the Applicator shall bear costs incurred by the Owner, including reasonable attorney's fees, court costs, and expert witness and consultant fees, to enforce Applicator's compliance with the obligations of this Guarantee. The obligations of this Guarantee shall run directly to the Owner and its successors and assigns, and may be enforced by the Owner and its successors and assigns against the Applicator, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

B. Manufacturer's 20-yr weatherproof performance warranty for silicone and urethane sealant joints.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers' products and specifications are generally referred to for identification; except as noted below, the products of other manufacturers meeting the specifications and standards of the specified systems may be submitted for approval. The burden of proof for "equal" materials is on the Contractor who, if required by the Owner, shall bear the costs and delays involved in the Engineer's review of substitutions. Check all specified items upon contract signing and initiate submittals in time to allow early ordering so that the work is not delayed. All materials are to be new.

2.02 SEALANT MATERIALS

A. Silicone Sealant (for use at window perimeters): non-staining, single component, non-sag, neutral curing, joint sealant; ASTM C920, Type S, Grade NS, with +100% extension and -50% compression movement capability. Color as selected by the owner.

1. Basis- of-Design System: 790 Silicone Sealant by Dow Corning
2. Alternate Manufacturer: 890 Silicone Sealant by Pecora
Spectrum 1 by Tremco

B. Urethane Sealant (for use at brick masonry and EIFS): single component, non-sag; ASTM C920, Type S, Grade NS with +/- 25% min. movement capability. Color as selected by the Owner.

1. Basis- of-Design System: Sonolastic NP1 by BASF
2. Alternate Manufacturer: Dynatrol I-XL by Pecora
Dymonic by Tremco

C. Mildew-Resistant Joint Sealant (for interior applications in Pool Room): silicone joint sealant for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

1. Basis- of-Design System: 786-M by Dow Corning
2. Alternate Manufacturer: SCS1700 Sanitary by GE
Tremsil 200 by Tremco

D. Latex Joint Sealant (for interior applications): Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Basis- of-Design System: Sonolac by BASF
2. Alternate Manufacturer: AC-20 by Pecora

850A by Sherwin-Williams
Tremflex 834 by Tremco

2.03 ACCESSORIES

A. Backer Rod: Closed-cell, non-gassing, polyethylene rod; diameter of rod to be 25% in excess of joint width. Surface skin of rod shall be continuous and unbroken and of sufficient thickness to preclude outgassing and formation of voids in the overlying sealant.

1. Basis-of-Design System: HBR Closed-Cell Rod by Construction Foam Products

B. Surface Cleaner: As required or recommended by sealant manufacturer and confirmed by adhesion test results.

C. Sealant Primer: As recommended by sealant manufacturer and required by adhesion test results.

D. Bond Breaker Tape: 0.006 in. thick polyethylene, to which sealant does not bond, adhesive-backed on one side, width as required.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine all surfaces for roughness, contaminants, unsound structural substrates, or other conditions that may impair the work of this Section. Notify the Owner and Engineer in writing of any such conditions; do not commence work until all defects are remedied.

B. Verify all site conditions and dimensions by field measurement in consideration of the special conditions associated with repairs to existing construction. All engineered sealant joints shall be a minimum of 1/4 in. wide. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the Contract Drawings.

3.02 SURFACE PREPARATION

A. Do not install sealant until the substrate has first been cleaned and primed. Remove all dirt or other foreign substances, including existing sealant remnants, from surfaces to receive sealant. All surfaces shall be dry before preparation begins. The surface preparation is to be done immediately before insertion of the final backer rod or bond breaker and after any temporary rods or seals are removed.

B. Mechanical Cleaning: Cut away as much existing sealant from existing substrates as possible.

C. Solvent Cleaning: Use two clean, white, soft, lint-free, cotton cloths and clean, fresh solvent as required to clean all surfaces. Wet one cloth with solvent and wipe surface

vigorously. Use second cloth to clean surface before solvent evaporates. Pump solvent from cans onto first cloth. Do not dip cloth in solvent, to avoid contamination of solvent. Repeat this two-cloth procedure until surface does not discolor cloth, and repeat at least once. Do not solvent clean at temperatures below 45°F. Allow solvent to evaporate from non-porous surfaces before continuing.

D. Remove all dirt or other foreign substances, including existing sealant, from surfaces to receive sealant. All surfaces shall be dry before preparation begins. The solvent cleaning preparation is to be done immediately before insertion of the final backer rod or bond breaker and after any temporary rods or seals are removed.

3.03 GENERAL WORKMANSHIP FOR SEALANT

A. Configure the sealant joints as shown on the Drawings. Avoid three-sided adhesion at all sealant joints.

B. For typical butt sealant joints, place the backer rod or bond breaker so the sealant depth measured at the center of the joint after tooling is one-half of the sealant joint width, with a minimum depth of 1/4 in. and a maximum depth of 1/2 in.

C. For typical double sealant joints, separate the sealant joints, installed as specified above, by 1 in. minimum distance between sealant of the rear joint and backer rod of the front joint.

D. At fillet (triangular) joints, extend the sealant at least 3/8 in. onto the substrate beyond the bond breaker tape or backer rod and at least 5/8 in. onto the substrate perpendicular to the tape or rod. The minimum thickness between the edge of the tape or rod and surface of the sealant joint shall be at least 1/4 in.

E. INSTALL BACKUP MATERIAL

1. Unless noted otherwise, install clean, dry joint filler / backup rod or tape into all joint openings against dry substrates. Remove all wet materials from the jobsite. Replace any backer rod not sealed over by the end of each day and solvent clean surfaces again the following day.

2. Place the backer rod or bond breaker so the sealant shape will meet the joint shape requirements of this section and as shown on the Drawings.

3. Change rod sizes as frequently as required by the variation in the joint width. Do not twist rods together. Butt ends of rods tightly. Provide a full range of rod sizes at the site of all sealant work.

4. Do not touch with fingers or otherwise contaminate the substrate surfaces while inserting the backer rod or bond breaker tape.

5. Do not rupture the skin of the closed-cell backer rod during installation. Remove and replace any rod containing punctures and solvent-clean the surfaces again.

F. APPLY PRIMER

1. Apply primer to all substrates except glass after backer rod installation. Apply primer to clean, dry substrates at ambient temperatures above 45°F.

2. Pour primer into a clean container for use. Do not pour more than a 10 min. supply into container to prevent deterioration.

3. Replace cap on primer can immediately after use. Remove from the site any primer that is discolored, contains a precipitate or has thickened.

4. Apply primer with a clean brush. Do not apply primer to exposed surfaces beyond sealant. Mask all surfaces before priming, except where surface irregularities will allow the primer to wick beneath the masking tape. Use only one coat of primer. Do not apply primer in a thick layer.

5. Allow primer to dry. Do not allow primer to become wet before sealant application.

G. SEALANT APPLICATION

1. Inspect each cartridge or container of sealant before use and verify that the production date is within 6 months of the date of application. Remove from the site all sealant more than 6 months old. Each applicator shall understand the method of coding the production date on the cartridge.

2. Mask all exposed surfaces along joint before applying sealant.

3. Recheck correct backer rod and bond breaker tape positioning before applying sealant.

4. Do not install sealant during inclement weather, in strong winds, or when such conditions are expected. Surfaces must be dry and frost free.

5. Apply sealant only to clean, dry, primed surfaces at ambient temperatures above 45°F. Seal joints within 10 hrs of primer application.

6. Fill all joints solidly and continuously with sealant, neatly applied with a standard caulking gun in a continuous motion, using a slight pressure. “Push” the sealant bead ahead of the nozzle; do not “drag” the nozzle.

7. Within 5 min. of sealant application and before skin develops on sealant, dry tool the joint surface with a concave tool to insure intimate contact with substrate and to eliminate air bubbles. Do not use any liquid for tooling. Provide a smooth, uniform finished surface.

8. Remove masking tape within 10 min. of tooling. Avoid contaminating adjacent surfaces with excess sealant. Remove all traces of smears and droppings on building surfaces promptly, using a solvent recommended by the sealant manufacturer and that will not damage or discolor the building surfaces. Remove smears and droppings on porous surfaces by mechanical means after the initial cure of the sealant.

9. Coordinate work with other trades to prevent contamination of fresh sealant by dust or other debris.

10. Protect finished work from damage during subsequent work, such as impact, marring of the surfaces, and other damage. Replace or repair at no additional cost to the Owner all damaged work or materials.

3.04 FINAL CLEANING

A. Promptly remove sealant from surfaces not scheduled to receive sealant.

B. Remove excess primer, sealant, foam, and masking materials from exposed surfaces.

C. Thoroughly clean curtain wall frame, glazing and all other work areas after completion of work.

D. At the end of each workday, collect all debris, trash, etc., and place in a suitable container.

E. Keep the work areas neat and clean. Do not allow debris or construction materials to blow around or off the site.

F. Promptly remove from the site all used brushes and rollers at the end of each day. Do not place used mops in trash containers.

3.05 SITE QUALITY CONTROL

A. Manufacturer's Site Visit: A manufacturer's representative shall visit the site at least once during construction; the visit should occur within two weeks of commencement of sealant installation; subsequent visits should be made as required. During the visit, the manufacturer's representative shall perform, as a minimum, the following work:

1. Inspect installation of sealant for conformance with the manufacturer's installation instructions.

2. Perform a minimum of one adhesion test in accordance with the procedures herein.

3. Prepare a written field report summarizing each visit, pull test locations, and test results. The manufacturer's representative shall notify the Engineer immediately of any locations not meeting the manufacturer's requirements and recommend remedial action. The Contractor shall submit the written field reports to the Engineer for the project file.

B. Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and ASTM C1193, Method A, "Field-Applied Sealant Joint Hand-Pull Tab" as follows:

1. Perform five tests for first 1,000 lf of applied silicone sealant, one of which shall be at the in situ mockup, and one test for each 1,000 lf of sealant thereafter.

2. For sealants applied between dissimilar materials, test both sides of joint. Tests shall include intersections and overlaps with dissimilar sealant materials, including membrane lap sealant for air/water barrier membrane.

3. If any sample debonds from the substrate, the sealant manufacturer shall make recommendations regarding changes in surface preparation or primers and submit these recommendations to the Engineer for approval. Sealants failing adhesion test shall be removed, substrates cleaned, sealants reinstalled, and retesting performed. Repeat sealant adhesion tests as many times as required to produce an acceptable application at no additional cost to the Owner.

4. Maintain test log and submit report to Engineer indicating tests, locations, dates, results, and remedial actions.

5. Patch test areas in accordance with manufacturer's instructions.

END OF SECTION