SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

   1. Demolition and removal of existing roof materials and rooftop equipment as shown on the drawings.

1.2 DEFINITIONS

A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.

B. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Owner, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

C. QUALITY ASSURANCE

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

1.3 PROJECT CONDITIONS

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

B. Asbestos: Asbestos abatement shall be done in coordination with the demolition work. Areas of known asbestos-containing materials are shown in the Asbestos Survey. If any additional materials suspected of containing asbestos are encountered, do not disturb the materials and immediately notify the Owner.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION
3.1 EXAMINATION
A. Verify that utilities have been disconnected when moving rooftop gas lines or electrical conduits.
B. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

3.2 UTILITY SERVICES
A. Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
   1. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction.
      a. Provide not less than 72 hours' notice to Owner if shutdown of service is required during execution of the work.
   B. Do not start demolition work until utility disconnecting and sealing have been completed and verified.

3.3 PREPARATION
A. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
   B. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area. Protect existing site improvements, appurtenances, and landscaping to remain.

3.4 POLLUTION CONTROLS
A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
   1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
   B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
      1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.
   C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.
3.5 SELECTIVE DEMOLITION

A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:

1. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning: Do not burn demolished materials.

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

END OF SECTION 02070
SECTION 06105 – MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Wood blocking, furring, grounds and nailers.

PART 2 - PRODUCTS

2.1 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX). Comply with requirements of Division 1 Section "Environmental Impact of Materials."

   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and one of the following:
      a. Ammoniacal, or amine, copper quat (ACQ).
      b. Copper bis (dimethylthiocarbamate) (CDDC).
      c. Copper azole, Type A (CBA-A).
      d. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood curbs, blocking and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2.2 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
   1. Where carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

C. Power-Driven Fasteners: CABO NER-272.
D. Wood Screws: ASME B18.6.1.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

E. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.2 WOOD BLOCKING INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 WOOD STRUCTURAL PANEL INSTALLATION


END OF SECTION 06105
SECTION 07410 – STANDING SEAM METAL ROOF – **BASE BID C**

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the work included in Base Bid C:

   1. Install factory formed metal roof panels over the existing skylight:
      Standing-seam, hidden fastener, non-insulated.

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide metal roof panel assemblies that comply with performance requirements specified as determined by testing manufacturers' standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.

B. Finish must conform to the "Metal Construction Association Certified Premium Painted™" Standard.

C. Wind-Uplift Resistance: Capable of producing sheet metal roofing assemblies that comply with UL 580 for Class 90 wind-uplift resistance. Other performance test shall include ASTM E1592 Static Air Pressure Test for Roof Coverings.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal roof panel and accessory.

B. Shop Drawings: Show layouts of sheet metal roofing, including plans, elevations, and keyed references to termination points. All fastening patterns shall be clearly designated to meet the specified wind speed requirements.

   1. Include details for forming, joining, and securing sheet metal roofing, including pattern of seams, termination points, expansion joints, roof penetrations, edge conditions, special conditions, connections to adjoining work, and accessory items.

C. Samples: Submit samples of painted metal for color selection.
D. Coordination Drawings: Roof plans drawn to scale and coordinating penetrations and roof-mounted items. Samples: For each exposed finish.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer of sheet metal roofing for a minimum of 5 years.

B. Roll-Formed Sheet Metal Roofing Fabricator Qualifications: Minimum of 5 years factory forming experience.

C. Source Limitations: Obtain each type of metal roof panels through one source from a single manufacturer.


E. Pre-installation Conference: Conduct conference at project location with building owner, installing contractor, and sheet metal roofing manufacturer a minimum of 10 days prior to start of work. All details shall be reviewed including: substrates, fastening patterns, scheduling, trim and flashing components, accessories such as fasteners and sealants.

F. Construction Inspection: Manufacturer shall conduct on site inspection and formal written report to owner at the following intervals: 50 percent sheet metal roofing installation completion, and final inspection upon completion of roof system.

1.5 DELIVERY, STORAGE & HANDLING

A. Do not deliver materials of this section to project site until suitable facilities for storage and protection are available.

B. Protect materials from damage during transit and at project site. Store under cover, but sloped to provide positive drainage. Do not expose materials with strippable protective film to direct sunlight or extreme heat.

C. Do not allow storage of other materials or allow staging of other work on installed metal panel system.

D. Upon receipt of delivery of metal panel system, and prior to signing the delivery ticket, the installer is to examine each shipment for damage and for completion of the consignment.
1.6 PROJECT CONDITIONS

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

B. Field Measurements: Verify locations of roof framing and roof opening dimensions by field measurements before metal roof panel fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal roofing that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish Warranty Period: 30 years from date of Substantial Completion.

B. Special Installer's Warranty: Roofing Installer agrees to repair or replace components of custom-fabricated sheet metal roofing that fail in materials or workmanship within 5 years from date of Substantial Completion.

C. Special Weathertight Warranty: Manufacturer's warranty in which manufacturer agrees to repair or replace roof panel assemblies that fail to remain weathertight within the specified warranty period.

1. Product Warranty Period: 20 years from date of Substantial Completion.

2. Material and Workmanship Warranty: Manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
   a. Structural failures including rupturing, cracking, or puncturing.
   b. Deterioration of metals and other materials beyond normal weathering.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer's Qualifications: All panels are to be factory formed and packaged per job requirements.
B. Manufacturer shall have a minimum of ten (10) years experience in the factory fabrication of metal roof panels.

C. Specification is based upon the products of Berridge, Inc. Other manufacturers or equivalent roof systems shall be accepted as an alternate product with prior written approval. These substitution requests must meet specifications and must be submitted a minimum of ten (10) days prior to date of bid.

2.2.1 STANDING SEAM METAL ROOF PANELS

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

B. Integral-Standing-Seam Metal Roof Panels: Vertical-Rib, Seam Cap Seamed Joint, Standing-Seam Metal Roof Panels. Formed with vertical ribs at panel edges; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of the panels, aligning vertical ribs and seaming on seam cap.

C. Basis-of-Design Product:
Subject to compliance with requirements, provide Berridge Manufacturing Company; Tee-Lock or equivalent product by one of the following:
   a. Tremco Tremlock T-238
   b. MBCI Craftsman “High Batten” series
   c. ATAS International “PDC System”

D. Material: 24 gauge AZ50 Galvalume Steel Steel complying with ASTM A 792/A 792M, Class AZ50/AZ55 coating designation; structural quality.
   a. Texture: Smooth
   b. Pan Coverage: 18"
   c. Seam Height: 2.375”
   d. Exposed Finish: Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Color: Match existing metal roof.
   e. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
2.3 MISCELLANEOUS MATERIAL

A. Fasteners: Self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads. Manufacturer shall provide or authorize all fasteners utilized with the sheet metal roofing system.

1. Fasteners for Flashing and Trim: Blind fasteners or screws spaced to resist wind uplift loads.

B. Sealing Tape: Pressure-sensitive, 100 percent solid polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, non-sag, non-toxic, non-staining tape.

C. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use classifications required to produce joints in sheet metal roofing that will remain weathertight.

D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15 mil dry film thickness per coat.

2.5 ACCESSORIES

A. Sheet Metal Roofing Accessories: Provide components required for a complete sheet metal roofing assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of sheet metal roofing, unless otherwise indicated. All trim and flashing components shall be supplied in a minimum of 12'-0” lengths and shall conform to manufacturer's standard part dimensions and details.

1. Flat Clip, 24 ga. Galvanized steel clips designed to withstand negative-load requirements.

2. Closures: Closed-cell, expanded, cellular, rubber or cross linked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch thick, flexible closure strips; cut or premolded to match sheet metal roofing profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

3. Sealants as recommended by manufacturer.

4. Fasteners as recommended by manufacturer.

B. Flashing and Trim: Formed from matching materials as sheet metal roof panel in gauges noted. Provide flashing and trim in heavier gauge materials as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed
openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent sheet metal roofing.

C. Snow Guards: Manufacturer’s standard prefabricated, non-corrosive units designed for compatibility with metal roof panels. Provide one on each seam. Color: Match color of roof panels.

2.6 FABRICATION

A. General: Fabricate sheet metal roofing and components to comply with details shown, manufacturers installation details and recommendations in SMACNA’s "Architectural Sheet Metal Manual" and NRCA Waterproofing Manual that apply to the design, dimensions (pan width and seam height), geometry, metal thickness, and other characteristics of installation indicated. Fabricate sheet metal roofing and accessories at the manufacturer’s location to the greatest extent possible.

B. General: Fabricate sheet metal roofing panels to comply with details shown and sheet metal roofing manufacturer’s written instructions.

C. Fabricate sheet metal roofing to allow for expansion in running work sufficient to prevent leakage, damage, and deterioration of the Work. Form exposed sheet metal work to fit substrates without excessive oil canning, buckling, and tool marks, true to line and levels indicated, and with exposed edges folded back to form hems.

1. Fold and cleat eaves as required by manufacturer to insure weathertightness and wind uplift resistance.

2. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal roofing to profiles, patterns, and drainage arrangements shown and as required for leak proof construction and wind uplift resistance.

D. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before manufacturer fabrication.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Remove existing slate roof and underlayment and dispose of properly.
B. Examine existing roof sheathing for structural soundness and for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of work.

1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.

2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

B. Examine roughing-in for components and systems penetrating metal roof panels and verify actual locations of penetrations relative to seam locations of metal roof panels before metal roof panel installation.

C. Replace any areas of deteriorated sheathing with new sheathing of a like thickness. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Lay out and examine substrate before installation of sheet metal roofing. Space fasteners as required to resist design uplift, but not more than 24 inches o.c.

B. Install flashings and other sheet metal to comply with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim."

3.3 UNDERLAYMENT INSTALLATION

A. Underlayment: Install underlayment and building-paper slip sheet, if required, under metal roof panels, unless otherwise recommended by metal roof panel manufacturer. Apply in shingle fashion to shed water, with lapped joints of not less than 2-1/2 inches.

3.4 INSTALLATION, GENERAL

A. General: Anchor sheet metal roofing and other components of the Work securely in place, with provisions for thermal and structural movement. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required for a complete roofing system and as recommended by fabricator for sheet metal roofing.

1. Field cutting of sheet metal roofing by torch is not permitted.
2. Rigidly fasten ridge end of sheet metal roofing and allow for positive panel attachment as per manufacturer’s recommendations. All flashing details shall accommodate thermal movement.

3. Provide metal closures at peaks, ridge, gable and hip caps.

4. Flash and seal sheet metal roofing with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.

5. Lap metal flashing over sheet metal roofing to allow moisture to run over and off the material.

B. Fasteners: Use fasteners of size and length as required for compatibility with substrate.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by fabricator of sheet metal roofing or manufacturers of dissimilar metals.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

3.5 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete sheet metal roofing assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

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

B. Coordinate with installation of:

1. Rough Carpentry, as noted in Section 6.
2. Sheet Metal Flashing and Trim, as noted in Section 7.

C. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as sheet metal roofing is installed. On completion of sheet metal roofing installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

3.7 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal roof panel installation, including accessories. Report results in writing.

B. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.

C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 07410
SECTION 07535 - SINGLE-PLY MEMBRANE ROOFING – BASE BIDS B and B.1

PART 1 - GENERAL

1.1 SUMMARY
A. The project consists of installing Adhered TPO (Thermoplastic Polyolefin) Roofing Systems as outlined below:

1. **Roof System B-1**: Apply the Adhered, Fleece Back TPO Adhered Roofing System over the existing adhered EPDM roof. Provide 20-year watertight warranty.

2. **Roof System B-2**: Apply the Adhered TPO Roofing System in conjunction with new tapered insulation after tear off of the existing EPDM and built-up roofs to expose the steel roof deck for verification of suitable substrate as specified in this specification. Provide 20-year watertight warranty.

3. **Roof System B-3**: Apply the Adhered TPO Roofing System in conjunction with new flat insulation after tear off of the existing EPDM roof to expose the steel roof deck for verification of suitable substrate as specified in this specification. Provide 30-year watertight warranty of entire roof system, including puncture warranty.

1.2 EXTENT OF WORK
A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of the reinforced TPO (Thermoplastic Polyolefin) Adhered Roofing System including flashings and insulation as specified herein and as indicated on the drawings in accordance with the manufacturer's most current specifications and details.

B. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.

C. The roofing contractor shall confirm all given information and advise the building owner, prior to bid, of any conflicts that will affect their cost proposal.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING
A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.

B. Comply with the manufacturer's written instructions for proper material storage.

C. Insulation must be on pallets, off the ground and tightly covered with waterproof materials.
D. Any materials which are found to be damaged shall be removed and replaced at the applicator's expense.

1.4 WORK SEQUENCE
A. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.
B. Do not disrupt activities in occupied spaces.

1.5 USE OF THE PREMISES
A. Before beginning work, the roofing contractor must secure approval from the building owner's representative for the following:
   1. Areas permitted for personnel parking.
   2. Access to the site.
   3. Areas permitted for storage of materials and debris.
   4. Areas permitted for the location of cranes, hoists and chutes for loading and unloading materials to and from the roof.

1.6 EXISTING CONDITIONS
A. If discrepancies are discovered between the existing conditions and those noted on the drawings, immediately notify the owner's representative by phone and solicit the manufacturer's approval prior to commencing with the work. Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

1.7 TEMPORARY FACILITIES AND CONTROLS
A. Temporary Utilities:
   1. Water and power for construction purposes are available at the site and will be made available to the roofing contractor.
   2. Provide all hoses, valves and connections for water from a source designated by the owner when made available.
   3. When available, electrical power should be extended as required from the source. Provide all trailers, connections and fused disconnects.
B. Temporary, Sanitary Facilities: Sanitary facilities will not be available at the job site. The roofing contractor shall be responsible for the provision and maintenance of portable toilets or their equal.
C. Building Site:

1. The roofing contractor shall use reasonable care and responsibility to protect the building and site against damages. The contractor shall be responsible for the correction of any damage incurred as a result of the performance of the contract.
2. The roofing contractor shall remove all debris from the job site in a timely and legally acceptable manner so as to not detract from the aesthetics or the functions of the building.

D. Security: Obey the owner's requirements for personnel identification, inspection and other security measures.

1.8 JOB SITE PROTECTION

A. The roofing contractor shall adequately protect building, paved areas, service drives, lawn, shrubs, trees, etc. from damage while performing the required work. Provide canvas, boards and sheet metal (properly secured) as necessary for protection and remove protection material at completion. The contractor shall repair or be responsible for costs to repair all property damaged during the roofing application.

B. During the roofing contractor's performance of the work, the building owner will continue to occupy the existing building. The contractor shall take precautions to prevent the spread of dust and debris, particularly where such material may sift into the building. The roofing contractor shall provide labor and materials to construct, maintain and remove necessary, temporary enclosures to prevent dust or debris in the construction area(s) from entering the remainder of the building.

C. Do not overload any portion of the building, by either use of or placement of equipment, storage of debris, or storage of materials.

D. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.

E. Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas where work is in progress. Install flags or other telltales on plugs. Remove plugs each night and screen drain.

F. Store moisture susceptible materials above ground and protect with waterproof coverings.

G. Remove all traces of piled bulk material and return the job site to its original condition upon completion of the work.

1.9 SAFETY

A. The roofing contractor shall be responsible for all means and methods as they relate to safety and shall comply with all applicable local, state and federal requirements that are safety related. Safety shall be the responsibility of the roofing contractor. All related personnel shall be instructed daily to be mindful of the full time requirement to maintain a safe environment for the facility's occupants including staff, visitors, customers and the occurrence of the general public on or near the site.
1.10 SUBMITTALS

A. Product Data: For each type of roofing product specified. Include data substantiating that materials comply with requirements.

B. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system.

C. Shop Drawings: Include plans, sections, and details of the following:
   1. Base flashings and membrane terminations.
   2. Tapered insulation, including slopes.

D. Samples for Verification: Of the following products:
   1. 12-by-12-inch square of sheet roofing, including lap seam.
   2. 12-by-12-inch square of roof insulation.

E. Maintenance Data: For roofing system to include in the maintenance manuals specified in Division 1.

F. Warranty: Sample copy of standard roofing system manufacturer's warranty stating obligations, remedies, limitations, and exclusions of warranty.

1.11 PROJECT CONDITIONS

A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.

A.12 WARRANTY

A. Base Bid A: Provide manufacturer’s 20-year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 90 mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.

B. Base Bid A.1: Provide manufacturer’s 30-year “Golden Seal” Warranty covering entire roof system “Edge to Edge” including membrane, flashing, insulation, adhesives, sheet metal and other components for both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 90 mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.

1. Warranty shall also cover leaks caused by accidental punctures: 16 man-hours per year.

C. Pro-rated System Warranties shall not be acceptable.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: This specification is based on the “Sure-Weld” TPO System by Carlisle Syn-Tec, Inc. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. TPO Sheet:
   a. Firestone Building Products Company
   b. Versico Roofing Systems
   c. Johns Manville Corp.

2. Polyisocyanurate Board Insulation: Roof Manufacturer’s Proprietary insulation board, or products from the following manufacturers, as approved by the roof manufacturer as part of its warranted roofing system:
   a. Apache Products Co.
   c. Celotex Corp. (The).
   d. GAF Materials Corp.
   e. NRG Barriers, Inc.

2.2 TPO SHEET

A. Roof System B-1 TPO Sheet: Fleece-backed, flexible sheet formed from a Thermoplastic Polyolefin membrane complying with ASTM D 4637, Type 1, of the following grade, class, thickness, backing, and exposed face color:

1. UL Class: A
2. Thickness: 115 mils, nominal.
4. Exposed Face Color: Gray.
5. Elongation: 250% minimum, per ASTM D-412.
7. Tear Strength: 55 lbs. minimum, per ASTM D-751 B.

B. Roof System B-2 TPO Sheet: Uniform, flexible sheet formed from a Thermoplastic Polyolefin membrane complying with ASTM D 4637, Type 1, of the following grade, class, thickness, backing, and exposed face color:

1. UL Class: A
2. Thickness: 60 mils, nominal.
4. Exposed Face Color: Gray.
5. Elongation: 250% minimum, per ASTM D-412.
7. Tear Strength: 55 lbs. minimum, per ASTM D-751 B.
C. Roof System B-3 TPO Sheet: Uniform, flexible sheet formed from a Thermoplastic Polyolefin membrane complying with ASTM D 4637, Type 1, of the following grade, class, thickness, backing, and exposed face color:

1. UL Class: A.
2. Thickness: 80 mils, nominal.
4. Exposed Face Color: Gray.
5. Elongation: 250% minimum, per ASTM D-412.
7. Tear Strength: 55 lbs. minimum, per ASTM D-751 B.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with TPO membrane roofing.

B. Sheet Flashing: 60- or 80-mil-thick reinforced TPO membrane or 115-mil-thick fleece-backed TPO membrane, according to application.

C. Bonding Adhesive: Use manufacturer's foam adhesive for the insulation and fleece-backed membrane. Use the manufacturer's standard low-VOC bonding adhesive elsewhere.

D. Splice Adhesive and Cleaner: Single-component butyl splicing adhesive and solvent-based splice cleaner.

E. Splice Primer and Tape: Manufacturer's standard synthetic rubber polymer primer and 3-inch-wide minimum, butyl splice tape with release film.

F. Lap Sealant: Manufacturer's standard single-component sealant.

G. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

H. Metal Termination Bars: Manufacturer's standard aluminum bars, approximately 1 inch wide, roll formed and prepunched.

I. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions of FM 4470, designed for fastening sheet to substrate, and acceptable to roofing system manufacturer.

J. Miscellaneous Accessories: Provide seam tape, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, and other accessories recommended by roofing system manufacturer for intended use.

K. Traffic Pads: Protective surfacing for roof traffic shall be roof manufacturer’s standard TPO Walkway Pads installed per manufacturer’s requirements.
2.4 INSULATION MATERIALS
A. General: Provide preformed roof insulation boards that comply with requirements, selected from manufacturer's standard sizes and of thicknesses indicated.

   1. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

B. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed without using CFCs as blowing agents to comply with ASTM C 1289, classified as follows:

   1. Polyisocyanurate Board Insulation: aged R-value of 6.0 per inch of thickness. Facer shall be Type II, felt or glass-fiber mat on both major surfaces, as approved by Roof Manufacturer as a component of its warranted fully adhered TPO roof system. Install directly on roof deck with approved adhesive or fasteners.

      a. On System B-2 areas, provide 3” thick base layer over gym and 4” thick base layer over other areas. Provide matching tapered insulation in slopes as shown on the drawings. Install tapered insulation directly over areas of flat base insulation.

      b. On System B-3 areas, provide two (2) layers of 1-1/2” thickness over gym and two (2) layers 3” thickness over other areas. Provide matching tapered insulation in slopes as shown on the drawings. Top layer of insulation shall have a minimum density of 25 psi. as required by conditions of the 30-year warranty. Stagger the joints of the two flat layers.

2.3 INSULATION ACCESSORIES
A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with sheet roofing material.

PART 3 - EXECUTION
3.1 EXAMINATION
A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements.

B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.

C. Verify that wood nailers are in place and secured and match thicknesses of insulation required.

D. Do not proceed with installation until unsatisfactory conditions have been corrected.

E. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
F. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of the roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.2 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installing roof insulation.

C. Install crickets and areas of tapered insulation on areas of roofing to conform to slopes indicated and to Shop Drawings.

D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

E. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

F. Attached Insulation: Install each layer of insulation and secure to deck using adhesive or fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type indicated. Use foam adhesive over the gym roof deck and any areas of concrete roof deck. Screw fasteners may be used elsewhere where rooms below have lay-in ceilings.

1. Fasten insulation according to the insulation and roofing system manufacturers' written instructions to meet specified wind-uplift requirements.

3.3 ADHERED SHEET INSTALLATION

A. Install TPO sheet over area to receive roofing according to roofing system manufacturer's written instructions. Unroll sheet and allow to relax for a minimum of 30 minutes.

B. Accurately align sheets and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Apply bonding adhesive to substrate and underside of sheet at rate required by manufacturer and allow to partially dry. Do not apply bonding adhesive to splice area of sheet.

D. Adhesively fasten sheet securely at terminations and perimeter of roofing.

E. Apply roofing sheet with side laps shingled with slope of roof deck where possible.

F. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing sheet in place with clamping ring.
3.4 SEAM INSTALLATION
   A. Hot air weld the TPO membrane seams in accordance with the manufacturer's hot air welding procedures.
   B. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

3.5 FLASHING INSTALLATION
   A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.
   B. Apply bonding adhesive to substrate and underside of flashing sheet at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
   C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing as recommended by manufacturer.
   D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
   E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.6 FIELD QUALITY CONTROL
   A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect. Notify Architect or Owner 48 hours in advance of the date and time of inspection.

3.7 PROTECTING AND CLEANING
   A. Install walkways at all locations as identified on the drawings. Hot air weld walkway pads to the membrane in accordance with the manufacturer's specifications.
   B. Protect membrane roofing from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its condition in a written report to Architect.
   A. Correct deficiencies in or remove roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair sheet flashings to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.

END OF SECTION 07535
SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes shop-fabricated sheet metal flashing and trim in the following categories:
1. Exposed trim, gravel stops and copings.
2. Metal flashing and counterflashing.
3. Scuppers, gutters and downspouts.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

C. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

D. Samples of sheet metal flashing, trim, and accessory items, for finish selection.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

PART 2 - PRODUCTS

2.1 METALS

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:
1. Factory-Applied Finish: 70% Kynar/Hylar fluoropolymer coating 1.0 mil total dry thickness.
2. Color as selected by Owner from manufacturer’s standard colors.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

B. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

C. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

D. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

E. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.

F. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

G. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

2.3 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

E. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

G. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

I. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.  
   3. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.4 SHEET METAL FABRICATIONS

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Gutters with Girth up to 15 Inches: Fabricate from the following material:
   1. Aluminum: 20 gauge, 0.0320 inch thick, with factory-applied 70% fluoropolymer coating.

C. Downspouts: Fabricate from the following material:
   3. Aluminum: 20 gauge, 0.0320 inch thick, with factory-applied 70% fluoropolymer coating.

D. Scuppers: Fabricate from the following material:
   3. Aluminum: 20 gauge, 0.0320 inch thick, with factory-applied 70% fluoropolymer coating.

E. Copings, Exposed Trim, Gravel Stops, and Fasciae: Fabricate from the following material:
   3. Aluminum: 16 gauge, 0.050 inch thick, with factory-applied 70% fluoropolymer coating.

F. Counter flashing: Fabricate from the following material:
   3. Aluminum: 18 gauge, 0.040 inch thick, with factory-applied 70% fluoropolymer coating.

G. Flashing Receivers: Fabricate from the following material:
   3. Aluminum: 18 gauge, 0.040 inch, mill finish.

H. Downspout standoff support brackets:
   1. Aluminum: 16 gauge, 0.050 inch thick, with factory-applied fluoropolymer coating.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.
3.2 INSTALLATION

A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

D. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.

E. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

F. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

3. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.


G. Counterflashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches and bed with sealant.

H. Roof-Drainage System: Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation.
JAMES BRECKINRIDGE MIDDLE SCHOOL ROOF RESTORATION

3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 07620
3.1 SUMMARY

A. This Section, which describes the work in Base Bids A and A.1, includes cold fluid-applied roof restoration of existing EPDM single ply membrane, consisting of the following:

1. **Roof System A-1:** Roof Replacement Areas over Fitness Center as delineated on the plans:
   a. Remove all existing roofing to deck.
   b. Install new tapered insulation as specified.
   c. Install SBS Modified Bitumen Base Sheet adhered in Solvent Free Urethane Adhesive.
   d. Application of fully reinforced urethane-based fluid applied roof membrane and flashings over SBS Modified Bitumen Base Sheet to provide minimum, cured thickness of 230 mils.

2. **Roof System A-2:** Roof Replacement Areas over Gymnasium: as delineated on the plans:
   a. Roof Preparation and Cleaning.
   b. Replacement of all identified areas of wet insulation and existing EPDM roof membrane.
   c. Replacement of existing metal edge / fascia, gutters and downspouts on Gymnasium.
   d. Application of a fully reinforced 80 mil urethane-based, fluid-applied membrane and flashings over existing EPDM membrane on the roof areas.

3. **Roof System A-3:** Roof Restoration on main building as delineated on the plans:
   a. Roof Preparation and Cleaning.
   b. Replacement of all identified areas of wet insulation and existing EPDM roof membrane.
   c. Replacement / repair of existing metal sheet metal copings, gravel stops, etc.
   d. Application of a partially reinforced ( flashings, edges and seams ), 64 mil, urethane based, fluid-applied membrane and flashings over existing EPDM membrane on the main building roof areas.

4. Paint all gas pipes on roof. Scope of work requires wire brush cleaning of loose paint or scaled rust, priming and painting with one coat of acrylic enamel paint in OSHA yellow color. Paint shall be Rust-Oleum DTM 3700 System or approved equal.
3.2 DEFINITIONS
A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual" for definition of terms related to roofing work in this Section.

3.3 ACTION SUBMITTALS
A. Product Data: For each type of product specified both Specification Data Sheets and Safety Data Sheets.
B. Shop Drawings: For roofing system. Include plans, sections and details.
   1. Roof plan with wet roof areas identified for replacement.
   2. Roof plan with location of rooftop equipment and projections and walkway layout.
   3. Roof flashing details with location ID.
   4. Tapered insulation plan for Roof System A areas.
   5. Metal roof system details and retrofit roof plan for large skylight.

3.4 CLOSEOUT SUBMITTALS
A. Maintenance Data: To include in maintenance manuals.
B. Warranties: Executed copies of approved warranty forms.
C. Copy of Manufacturer’s Inspection Reports.
D. Infrared Scan results / performed by the manufacturer’s approved certified Thermographer after job completion. Contractor shall include any post scan costs in the lump sum bid price.

3.5 QUALITY ASSURANCE
A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of three years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Owner, and employees, and the following:
   1. Qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
   2. Have a documented safety program as outlined by current OSHA regulations.
   3. Be experienced in urethane, fluid applied roofing systems.
   4. Must be Class A licensed roofing contractor in Virginia.
B. Roofing Inspector Qualifications: A trained representative of manufacturer experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer’s compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be:
1. An authorized full-time trained employee of the manufacturer.
2. If the manufacturer does not have a local technical employee to inspect the roof installation, the manufacturer may hire a roof inspector with either RRO or RRC certification as issued by the Roof Consultants Institute (RCI).
3. Roofing inspector shall inspect the project a minimum two (2) times per week, minimum four (4) hours on roof per visit, and at all critical phases of construction. The inspector shall notify the designated Owner representative upon arrival to meet at job site. Inspection reports shall be submitted to the owner within 48 hours.

C. Preconstruction Roofing Conference: Before delivery of materials or starting any construction, conduct conference at project site. The owner shall schedule the conference within fifteen (15) days after issuance of a Notice to Proceed. The conference shall be conducted at the project site. Review of administrative issues and methods and procedures related to the roofing system.

1. Required Attendance: Owner’s representative(s), Contractor personnel – project manager, superintendent, and project foreman, and roof system manufacturer’s representative.
2. Meet with Owner, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
6. Review governing regulations and requirements for insurance and certificates if applicable. The roofing contractor is responsible to purchase a county building permit and post at the job site until the project is complete. Include permit fees in the base bid.
7. Review temporary protection requirements for roofing system during and after installation.
8. Review roof observation and repair procedures after roofing installation.

D. Progress Meetings: Scheduled once a week by the Owner’s representative. Required attendance: Owner’s representative, project superintendent and foreman. Minimum agenda as follows:

1. Review status of work in progress.
2. Make field observations of completed work in place.
3. Identify and discuss problems and/or concerns.
4. Identify any problems, which impede planned progress.
5. Review status of project schedule.
6. Review and discuss corrective measures to regain projected schedules as required.
7. Review proposed activities planned for succeeding work period.
8. Review quality of workmanship and work standards.
9. Review housekeeping and site conditions.
10. Review and discuss other installation and/or administrative issues relating to work.
E. Final Inspection: Shall be scheduled by roofing material manufacturer upon job completion. The Contractor shall be responsible for notifying the Owner’s representative of specific dates and times of inspection.

1. Required Attendance: Owner’s representative, Roofing material manufacturer and Contractor personnel.
3. The contractor shall have fourteen (14) days from the date of the inspection to correct any discrepancies that were discovered during the final inspection.

F. Daily Communications: Due to the sensitive nature of the school buildings, frequent communications between contractor, owner and roof system manufacturer’s representative shall be a requirement of this contract. The contractor shall initiate this communication.

G. Moisture control: Contractor is responsible for moisture control in areas or sections of roof where activity has begun.

H. Plans and Specifications: The contractor shall have a complete set of the contract documents to include drawings, specifications, product SDS sheets, submittals, change orders and addenda on site at all times. Documents shall be made readily available to Owner’s Representative(s).

3.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

3.7 PROJECT CONDITIONS

A. Protect building, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from roofing operations.

B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
C. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit work to proceed without water entering into existing roofing system or building.

1. Store all materials prior to application at temperatures between 60 and 90 deg. F.
2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer. Do not apply materials when air temperature is expected to drop below 40 degrees the night after coating or when daytime temperatures exceed 110 deg. F. Do not apply roofing in snow, rain, fog, or mist.

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

E. Owner will occupy portions of building immediately below roofing area. Conduct roofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

F. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer’s written instructions and warranty requirements.

G. Environmental Requirements: Coordinate with and advise Owner’s representative when volatile materials are to be used near air ventilation intakes. Allow sufficient time before application to allow preventative measures to be put into place.

H. Existing Building Conditions.

1. Building space directly under roof area covered by this specification will be utilized by on-going operations. Do not interrupt Owner’s operations unless prior written approval is received.
2. Access to roof shall be from exterior only. No employees of the roofing company will be allowed within the building without Owner approval.
3. Appropriate measures shall be taken to prevent dust, vapors, gases or odors from entering the building during roof removal, replacement or repair.
4. Roofing contractor shall be responsible for any damage to job site during roofing project, including interior and exterior of the building until punch list is complete.

I. Safety Requirements:

1. All application, material handling, and associated equipment shall conform to and operated in conformance with OSHA safety requirements.
2. Comply with federal, state, and local fire and safety requirements.
3. Advise Owner whenever work is expected to be hazardous to Owner’s employees and/or operators.
4. Maintain fire extinguisher within easy access on roof whenever power tools are being used.
5. No open flame torch or any other open flame tool is to be used on site.
6. No smoking on any school property including the roof at any time.
J. Temporary Sanitary Facilities:
   1. Furnish, install, and maintain temporary sanitary facilities for employee use during project. Remove at project completion.
   2. Place portable toilets in compliance with applicable laws, codes, and regulations.

3.8 WARRANTY

A. Warranty, General: Warranties specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Warranty Period: 20 years (Base Bid A) and 30 years (Base Bid A.1) from date of Substantial Completion.
   1. Warranty shall explicitly require the manufacturer to perform follow up inspections and housekeeping at regular intervals during the warranty period. As a minimum, inspections shall be performed in years 2, 5, 10, and 15. The owner shall be provided a report with the results of the inspection and details of any preventive maintenance or other items that require owner’s attention
   2. Base Bid A Warranty shall include an explicit written provision allowing for extension / renewal of Warranty at the end of the 20 Year Period.
   3. Base Bid A.1 Warranty Period: 30 years from date of Substantial Completion. Same service interval requirements during warranty period including additional inspections during years 20 and 25.

C. Roof System Warranty Coverage, General: Warranty shall cover labor and material for leak repairs on the entire weatherproofing assembly and restored roof system to include components supplied and / or manufactured by others. The roofing manufacturer’s warranty period shall begin from the date of final acceptance of the roof by the Owner. Coverage shall include, but not necessarily limited to:
   1. Existing and New Roof Membrane.
   2. Existing and New Insulation.
   3. Existing and New Flashing.
   4. All termination details and components.
   5. All sheet metal related details to include contractor fabricated sheet metal components.
   6. Roofing membrane accessories.
   7. Fasteners, cover board and other components of the roofing system.
   8. New roof walkway surfaces.
   9. New standing seam metal roof system over skylight if this work is accepted.

D. Installer's Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section and related Sections indicated above, including all components of restored EPDM membrane, base flashing, roof insulation, fasteners, non-slip walkway products and new metal roof over skylight for the following warranty period:
   1. Warranty Period: Two years from date of Substantial Completion.
PART 2 - PRODUCTS

3.9 MANUFACTURERS

A. Basis of Design Manufacturer/Product: Subject to compliance with all specified requirements including material performance requirements, quality control inspections, and warranty coverage provide primary materials from the following manufacturers or pre-approved equal:

1. Tremco Inc., Beachwood, OH:
2. Alphaguard Bio, Fluid Applied, Partially or Fully Reinforced, Restoration System

B. The following restoration coating manufacturers provide similar products and are pre-approved:

1. Sika Corporation: Manufacturers recommended S.B.S. base sheet: Sikalastic RoofPro 641 Lo-VOC with Sika Fleece Polyester Mat
3. Siplast: Pro Base TG: Parapro Roof Membrane System Base Coat with reinforcement and Parapro Roof Membrane System Top Coat

C. Source Limitations: Obtain all components for roof coating system from the same manufacturer or as approved by the roof coating system manufacturer.

3.10 ALTERNATE MATERIALS

B. The type and description of materials specified herein denote the kind, quality and performance rating required, whether or not a specific brand name or the words "or approved equal" are used. These materials shall serve as minimum performance standards and all proposals shall be based upon the same level of quality.

C. To substantiate the equality of performance of any proposed alternate roofing system, a bidder offering "or equal" materials shall submit product data and material samples and include a list of three (3) project references of similar size projects. The list shall indicate where the proposed alternate materials have been used under similar conditions as specified. Said jobs must be within Virginia and must be available for detailed inspection by Roanoke City Public Schools. All alternate bid information must be received no later than the deadline date established for questions by the Owner in the IFB so that, if approved, an addendum can be delivered to all bidders.

3.11 PERFORMANCE REQUIREMENTS OF FLUID APPLIED COATING SYSTEM:

A. Cured dry mil thickness of Restoration Coating shall not be less than 64 mils (partially reinforced) or 80 mils (fully reinforced).

B. Coating System shall be urethane based. Acrylics and Silicones will not be accepted.
C. Coating System shall be 100% solids by volume in accordance with ASTM D 2697.

D. Coating shall be a catalyzed system as opposed to a moisture curing or moisture triggered curing system.

E. Base Coat shall be fully reinforced with polyester based fleece over entire roof as required by the specifications.

F. Coating system shall be comply with ASTM E-108 Class A Fire Rating and meet code requirements.

G. Coating shall have an SRI not less than 100.

H. Coating shall be BIO based and certified as part of USDA’s Bio Preferred Program.

I. Coating system shall be very low odor as determined by designated owner’s representatives and, if necessary and requested by the Owner, shall be proven safe by air sampling during an actual project of similar scope.

2.2 MATERIALS

A. General: Roofing materials recommended by roofing system manufacturer for intended use and compatible with components of existing membrane roofing system.

B. Roofing Membrane Base Ply: ASTM D 6163, Grade S, Type III, bi-laminate, glass-fiber-reinforced, SBS modified asphalt sheet; smooth surfaced.
   1. Basis of design product: Tremco Powerply Heavy Duty Base or pre-approved equal.
   2. Tensile Strength at 0 deg. F (18 deg. C), minimum, ASTM D 5147: Machine direction, 220 lbf/in (26.2 kN/m); cross machine direction, 190 lbf/in (26.2 kN/m).
   3. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D 5147: machine direction, 220 lbf (977 N); cross machine direction 240 lbf (1065 N).
   4. Elongation at 0 deg. F (18 deg. C), minimum, ASTM D 5147: machine direction, 3.0 percent; cross machine direction, 3.5 percent.
   5. Thickness, minimum, ASTM D 5147: 0.120 inch (3.0 mm).

C. Cold-Applied, Solvent-Free Base Ply Adhesive: 2-part, solvent-free, cold-applied interply adhesive specially formulated for compatibility and use with specified roofing membranes and flashings.
   1. Basis of design product: Tremco Powerply Endure Bio Adhesive or pre-approved equal.
   2. Volatile Organic Compounds (VOC), maximum, ASTM D 6511: 25 g/L.
   3. Nonvolatile Content, minimum, ASTM D 6511: 95 percent.
2.3 FLUID-APPLIED ROOFING MEMBRANE FOR USE OVER NEW EPDM (Replacement Areas) OR EXISTING EPDM MEMBRANE (Restoration Areas)

B. Polyurethane Elastomeric Fluid-Applied System: Two-coat, partially or fully reinforced, fluid-applied roofing membrane formulated for application over prepared roofing substrate.
   1. Basis of design product: Tremco Alphaguard Bio or pre-approved equal.

C. Bio-Based Polyurethane Roof Coating Base Coat: ASTM D7311, Two-part catalyzed low-odor polyurethane roof base coating formulated for direct application and for use with fiber reinforcement in conjunction with a compatible top coat.
   1. Basis of design product: Tremco Alphaguard Bio Base Coat
   2. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 1 g/L.
   3. Combustion Characteristics, UL 790: Class A.
   4. Bio-Based Content: Not less than 20 percent.

D. Bio-Based Polyurethane Roof Coating Top Coat: ASTM D7311, Two-part catalyzed low-odor polyurethane roof top coating formulated for direct application over compatible reinforced base coat.
   1. Basis of design product: Tremco Alphaguard Bio Top Coat
   2. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 6 g/L.
   3. Combustion Characteristics, UL 790: Class A.
   4. Bio-Based Content: Not less than 20 percent.
   7. Water Vapor Transmission, ASTM E 96, Wet Cup: 0.020 perm-in (1.32 g/m2/day).

   1. Basis of design product: Tremco Permafab
   2. Tensile Strength, ASTM D 1682: Not less than 50 lbf. (222 N).
   3. Elongation, ASTM D 1682: Not less than 60 percent.
   4. Tear Strength, ASTM D 1117: Not less than 16 lbf. (70 N).
   5. Weight: 3 oz. /sq. yd. (102 g/sq. m).

2.4 AUXILIARY ROOFING MEMBRANE MATERIALS

B. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with existing roofing system and fluid-applied roofing system.

C. Structural Concrete/Masonry Primer: Two-component, 100 percent solids, epoxy penetrating primer for concrete deck surfaces.
D. Metal Surface Primer: Single-component, water based primer to promote adhesion of base coat
to metal surfaces.

E. Asphaltic Surfaces Primer: Single-component, multi-substrate primer to promote adhesion of
base coat to surfaces recommended by manufacturer.

F. Joint Sealant: Single component, high solids, moisture curing polyurethane sealant
recommended by coating manufacturer.

G. EPDM Membrane: For Restoration Areas where wet insulation is to be removed. EPDM
compatible with existing membrane of same type and thickness. Install fully adhered, 60 mil
EPDM membrane compatible with existing and adhere tie-ins with manufacturer’s
recommended bonding or seam tape adhesive. Seal perimeter of repair with manufacturer’s
recommended material.

H. Aggregate: For finish coat slip resistance: No.11 ceramic granules.

I. Wood Blocking: Mixed Southern Pine. No. 2 grade lumber with maximum moisture content of
19%.

J. Sheet Metal: 24 ga. Kynar coated, G-90 galvanized steel w/ 22 ga. cleats where required for
new coping, metal edge / fascia, gutters and downspouts. See drawings for gutter support
brackets.

K. Rust Inhibitor for Rusted Deck or Sheet Metal: Rust inhibiting primer as manufactured by Rust-
O-Leum.

L. EPDM Accessories: cleaners, primers, peel and stick materials, cured and uncured flashing as
recommended by EPDM manufacturer: Carlisle, Firestone, or approved equal.

M. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system
manufacturer and generally recognized by industry standards for purpose intended.

2.5 ROOF INSULATION

B. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer,
selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

C. Cover Board: ASTM C1278 4’ x 8’ x 1/2" gypsum fiber board

1. Basis of design products: Georgia Pacific Dens Deck Prime or U. S. Gypsum Securock

D. In-Fill and Tapered Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1,
approved and listed by FM Global for windstorm and fire characteristics specified, CFC- and
HCFC- free, with recycled content glass-fiber mat facer on both major surfaces. CCMC
listed.

2. Thickness: match existing roof thickness.
3. Tapered Insulation: 2” base layer and 1/4” fully tapered w/ 1/2” saddles and crickets as shown on roof plan.

2.6 INSULATION ACCESSORIES

B. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with the specified roofing system.

C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Approvals 4450 or 4470, designed for fastening roof insulation to substrate and acceptable to roofing manufacturer.

D. Insulation Adhesive: Two-component, solvent-free, low odor, elastomeric urethane adhesive formulated to adhere roof insulation to substrate.

1. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive or pre-approved equal.
2. Flame Spread Index, ASTM E 84: 10.
4. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 0 g/L.
5. Tensile Strength, minimum, ASTM D 412: 250 psi (1724 kPa).
6. Peel Adhesion, minimum, ASTM D 903: 17 lbf/in (2.98 kN/m).

E. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

F. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

PART 3 - EXECUTION

2.7 EXAMINATION

B. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that existing surfaces are dry and prepared in accordance with manufacturer’s recommendations. Verify atmospheric conditions are suitable for application of coating materials.

C. Proceed with installation once unsatisfactory conditions have been corrected.

2.8 PREPARATION

B. For Replacement areas: Removal and proper disposal of existing EPDM and original built-up roof membrane, wet insulation boards and accessories where indicated on roof plan. The Fitness Room roof shown as Roof System A on the plans requires replacement. The existing,
original built-up roof membrane and flashing has tested negative for asbestos containing materials.

C. For Restoration areas:

1. Membrane Surface Preparation:
   a) Remove loose debris from surface, with brooms and leaf blowers. Remove substrate irregularities from existing roofing membrane that would inhibit application of uniform, waterproof coating. Remove all existing walkpads.
   b) Repair membrane at locations where irregularities have been removed. Remove areas of wet insulation and replace with the specified insulation and membrane products.
   c) Substrate Cleaning: In accordance with manufacturer requirements clean all EPDM roof substrates of contaminants such as dirt, debris, oil, and grease that can affect adhesion of coating by power washing at maximum 2,000 psi. Allow to dry thoroughly.
   d) Verify adhesion of new products.
   e) Prime surfaces in accordance with manufacturer’s recommendations.

2. Existing Flashing and Penetration Detail Preparation:
   a) Repair flashings, gravel stops, copings, and other roof-related sheet metal and trim elements where required. Reseal joints, replace loose or missing fasteners, and replace components where required to leave in a watertight condition.
   b) Do not damage metal coping, counterflashings or other components that are to remain. Replace any damaged components with in-kind, matching color material.
   c) Wire brush clean and prime drain bowls and sheet metal surfaces required by manufacturer.
   d) Replace metal edge, gutters, and downspouts on Gymnasium roof. Follow detailed drawings for replacement details.

D. Protect existing roofing system that is indicated to remain, and adjacent portions of building and building equipment.

1. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
2. Maintain temporary protection and leave in place until restoration process has been completed.

E. If necessary and requested by the Owner, shut down air intake equipment in the vicinity of the Work in coordination with the Owner. Cover air intake louvers before proceeding with recoating work that could affect indoor air quality or activate smoke detectors in the ductwork.

1. Verify that rooftop utilities and service piping affected by the Work have been shut off before commencing Work.
2. Coordinate above steps closely and in coordination with the Owner.

F. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. Do not permit water to enter into or under existing membrane roofing system components that are to remain.
2.9 ROOFING INSTALLATION, GENERAL

B. Install roofing membrane according to roofing manufacturer's written instructions.
   
   1. Commence installation of roofing in presence of manufacturer's technical personnel.
   
   C. Coordinate installation of replacement roofing so areas are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
   
   D. Substrate-Joint Penetrations: Prevent fluid-applied materials and adhesives from penetrating substrate joints, entering building, or damaging adjacent building construction.

2.10 INSULATION INSTALLATION

B. Comply with roofing manufacturer's written instructions for installing roof insulation.

C. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
   
   1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
   
   D. Install insulation under area of wet roof replacement to achieve required matching thickness of existing roof. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
   
   E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
   
   F. Install tapered edge strips along roof perimeters where wet areas are replaced and at drains and any other required areas.
   
   G. Fastened Insulation:
      
      1. Fasten insulation to metal or tectum decks in accordance with manufacturer’s requirements and in accordance with wind uplift requirements.

2.11 BASE PLY INSTALLATION (For Fitness Room Roof Replacement Area shown as Roof System A-1 on the plans.)

B. Install the specified fully adhered, modified bitumen base sheet starting at low point of roofing. Align base sheet without stretching. Shingle side laps of base a minimum of 4 inches. Shingle in direction to shed water. Extend base sheets over edges and terminate above cants.
   
   1. Embed base sheet in cold-applied solvent free urethane membrane adhesive applied at the minimum coverage of 32 mils, or greater if required by roofing manufacturer, to form a uniform membrane. Utilize a 75# roller to insure base sheet has uniform contact with adhesive without voids.
   
C. Extend base flashing (backer sheet) up walls or parapets a minimum of 8 inches above roofing and 6 inches onto field of roofing. Adhere in solvent free flashing adhesive. Heat Weld laps and toe of flashing backer sheet 4” onto field membrane.

D. Mechanically fasten top of backer sheet securely at terminations and perimeter of roofing.
   1. Seal top of termination of backer sheet with fluid applied flashing. Extend fluid applied flashing a minimum of ½” above top edge of backer sheet.

E. Install stripping according to roofing manufacturer's written instructions where metal flanges and edgings are set on roofing.
   1. Flashing Sheet Stripping: Install flashing sheet stripping in specified cold adhesive and extend onto roofing membrane.

F. Roof Drains: Install base sheet in cold adhesive around drain bowl. Base sheet must be installed so that it will be under compression from the clamping ring. Install base coat, fabric reinforcement, and top coat over base sheet. Install drain clamping ring and strainer.

G. New Coping: Install new shop fabricated metal coping, with continuous cleat, at all perimeters of roof recover areas and in all areas requiring coping as shown on drawings.

2.12 FLUID-APPLIED FLASHING APPLICATION

B. Fluid-Applied Flashing and Detail Base Coat Application: Complete base coat and fabric reinforcement at parapets, curbs, penetrations, and drains prior to application of field of fluid-applied membrane. Apply base coat in accordance with manufacturer's written instructions.
   1. Prepare and prime surfaces as recommended by manufacturer.
   2. Extend coating minimum of 8 inches up vertical surfaces and 4 inches onto horizontal surfaces.
   3. Back roll to achieve a minimum wet mil coating thickness 48 mils unless otherwise recommended by manufacturer. Verify thickness of base coat as work progresses.
   4. Embed fabric reinforcement into wet base coat. Lap adjacent flashing pieces of fabric minimum 3 inches along edges and 6 inches at end laps.
   7. Allow base coat to cure prior to application of top coat.
   8. Apply top coat as recommended by manufacturer. NOTE: if base coat sits longer than 72 hours prior to top coat application then prime base coat.

2.13 FLUID-APPLIED MEMBRANE APPLICATION

B. Base Coat: Apply base coat to field of membrane in accordance with manufacturer's written instructions.
Apply base coat on prepared and primed surfaces and spread coating evenly.

2. Back roll to achieve minimum wet mil coating thickness of 32 mils unless otherwise recommended by manufacturer; verify thickness of base coat as work progresses. Note: Increase base coat to 48 mils for fully reinforced system on Roof System A-2 areas and adjacent Roof System A-1 areas where new tapered insulation and base ply membrane are installed.

3. Apply base coat over entire roof surface tie-in to all flashed vertical wall and curb flashing surfaces. Lap adjacent pieces of fabric minimum 3 inches along edges and 6 inches at end laps. One layer of reinforcement is required only over roof seams and all flashings for Roof System A-3 areas. Note: 100% reinforcement is required over all roof and flashing surfaces on Roof Systems A-1 and A-2.

4. Allow base coat to cure prior to application of top coat.

C. Top Coat: Apply top coat to all membrane and flashings uniformly in a complete, continuous installation.

1. Prime base coat prior to application of top coat if top coat is not applied within 72 hours of the base coat application, using manufacturer's recommended primer.

2. Apply top coat extending coating up vertical surfaces and out onto horizontal surfaces. Install top coat over field base coat and spread coating evenly.

3. Back roll to achieve wet mil thickness of 32 mils.

4. Avoid foot traffic on new fluid-applied membrane for a minimum of 24 hours.

5. Note: For Base Bid A.1, increase coating thickness as required to comply with manufacturer’s 30-year warranty requirements.

D. Slip-Resistant Walkway Topcoat: Apply walkway second topcoat following application and curing of top coat. Locate as indicated on Drawings.

1. Mask out walkway locations with painter’s tape.

2. Prime first top coat prior to application of walkway top coat if walkway top coat is not applied within 72 hours of the first top coat application, using manufacturer's recommended primer.

3. Back roll to achieve minimum coating thickness of 20 wet mils (0.5 wet mm) unless greater thickness is recommended by manufacturer.

4. Broadcast 30 lb per 100 sq. ft. (9.6 to 14.6 kg per 10 sq. m) of Slip-Resistant Top Coat Aggregate in wet top coat.

5. Back roll aggregate and top coat creating even dispersal of aggregate. Remove masking immediately.

6. Sweep away and dispose of all loose aggregate after walkways are completely dry.

3.8 FIELD QUALITY CONTROL

A. Roof Inspection: Contractor shall engage roofing system manufacturer's technical personnel to inspect roofing installation, and submit report to the Owner. Notify Owner 24 hours in advance of dates and times of inspections. Inspect work as follows:

1. Installation urethane flashings. A “pre-final” inspection of all flashing details shall be completed prior to installation of base coat.

2. Installation of partially reinforced base coat with seam and flashing reinforcement.

3. Installation of urethane top coat.

4. Metal Details.
5. A minimum of two (2) inspections per week is required for the duration of the project.
6. Inspection reports shall record environmental conditions and indicate any issues that require attention. Each report shall contain progress photos.

B. Repair fluid-applied membrane where inspections indicate non-compliance with specified requirements.

3.9 PROTECTING AND CLEANING
A. Protect roofing system from damage and wear during remainder of construction period.
B. Correct deficiencies in or remove coating that does not comply with requirements, repair substrates, and reapply coating.
C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.10 ROOFING INSTALLER'S WARRANTY
A. WHEREAS _________________ of ____________________, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
   1. Owner: _________________
   2. Address: __________________
   3. Building Name/Type: ___________
   4. Address: __________________
   5. Area of Work: _______________
   6. Acceptance Date: ____________
   7. Warranty Period: ____________
   8. Expiration Date: ____________

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:
   1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
      a. lightning;
      b. peak gust wind speed exceeding 90 mph;
      c. fire;
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d. failure of roofing system substrate (roof deck), including cracking, settlement, excessive deflection, deterioration, and decomposition;

e. faulty construction of parapet walls, copings, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;

f. vapor condensation on bottom of roofing; and

g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed by:

1. Authorized Signature: ____________
2. Name: __________________________
3. Date: __________________________

END OF SECTION 07700

FLUID-APPLIED ROOF RESTORATION 07700 - 17
SECTION 07920 – JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
   1. Roofing and flashing joints requiring sealant.

1.2 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.
B. Samples for Initial Selection: Manufacturer’s color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.3 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. When contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with roofing materials.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
B. Non-Sag Polyurethane Sealant:
   1. Products: One of the following or an equal product approved by the roofing manufacturer:
      a. Pecora Dynatrol 1 one part polyurethane.
      b. Sonneborn Sonolastic NP 1 one part polyurethane.
      c. Tremco Dymonic one part polyurethane.
   2. Typical applications:
      a. Exterior joints at sheet metal flashing and trim.
      b. Metal roof systems.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
   B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF JOINT SEALANTS
   A. General: Comply with joint-sealant manufacturer’s written installation instructions for products and applications indicated, unless more stringent requirements apply.
   B. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
   D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
      1. Place sealants so they directly contact and fully wet joint substrates.
      2. Completely fill recesses in each joint configuration.
      3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
   E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

3.3 CLEANING
   A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
3.4 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07920
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes removal of damaged translucent polycarbonate panels on the existing aluminum-framed skylight and installation of new translucent polycarbonate panels.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum components of panel assemblies.

B. Shop Drawings: For panel assemblies.
   1. Include plans, elevations, sections, details, and attachments to other work.
   2. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior.

C. Samples: In manufacturer's standard size.
   1. For each type and color of structured-polycarbonate panel.

D. Sample Warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For panel assemblies to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall be an authorized company who is trained and approved by manufacturer.
1.6 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace translucent polycarbonate panels that exhibit defects in materials or workmanship within specified warranty period.

1. Defects include, but are not limited to, the following:
   a. Delamination.
   b. Color changes exceeding requirements.
   c. Losses in light transmission beyond 6 percent from original when measured after 10 years according to ASTM D 1003.

2. Warranty Period: 10 years from date of Substantial Completion.
3. Warranty Period for Hail Damage: Five years from date of Substantial Completion for hail stone penetration exceeding requirements.

B. Installer's Warranty: Installer agrees to repair or replace components of panel assemblies that fail in installation workmanship within specified warranty period.

1. Failures include, but are not limited to, installation defects and water leakage.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

1. Overhead Panel Assemblies: Limited to 1/60 of clear span for each assembly component of aluminum framing and panel joint according to the IBC, Table 1604.3, footnote h.

B. Structural-Test Performance: Panel assemblies tested according to ASTM E 330, as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not show evidence of deflection exceeding specified deflection limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not show evidence of material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

C. Windborne-Debris-Impact-Resistance Performance: Panel assemblies that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and the testing information in ASTM E 1996 for the local Wind Zone.

1. Large-Missile Test: For glazed openings located within 30 feet of grade.
2. Small-Missile Test: For glazed openings located more than 30 feet above grade.
D. Hail-Stone Impact Resistance: Panel assemblies that resist penetration by hail stone smaller than 1-3/16 inches in diameter, impacting panel surface at a final velocity up to 44 fps per ASTM E 822.

E. Panel Clip Performance: Corrosion-resistant clips tested to meet a minimum 90-lb/sq. ft. wind uplift when tested according to ASTM E 330.

F. Panel End Seals: Continuous factory-applied, self-adhered micro-filter tape over open panel cells and factory heat-seal-crimped open panel cells.

G. Panel Performance:

1. Smoke-Developed Index: 450 or less according to ASTM E 84, or 75 or less according to ASTM D 2843.
2. Flame Spread: 25 or less when tested according to ASTM E 84.
3. Combustibility Classification: Class CC1 based on testing according to ASTM D 635.
4. Interior Finish Classification: Class A based on testing according to ASTM E 84.
5. Visible Light Transmittance (VT) Loss: 6 percent maximum over 10 years, measured according to ASTM D 1003.
6. Thermal Aging: When exposed to 300 deg F for 25 minutes, interior and exterior panels tested according to ASTM D 2244.
   a. Color Retention: 0.75 (Hunter) units ΔE maximum fade.
   b. Color Darkening: 0.3 (Hunter) units ΔL maximum.
   c. Cracking or Crazing: None when exposed to 300 deg F for 25 minutes.
   d. Delamination: None when exposed to 300 deg F and 0 deg F for 25 minutes.
7. Impact Resistance: No failure at an impact of 500 lbf when tested according to ASTM E 695.
8. Concentrated Loading: No damage while applying a load of 600 lbf over 1 sq. ft. when tested according to 29 CFR 1910.23(e)(8); and no damage while applying a load of 400 lbf over 3 inches in diameter according to ASTM E 661.

H. Water Penetration under Static Pressure: Provide panel assemblies that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

I. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

J. Energy Performance: Provide panel assemblies with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below[ and certified and labeled according to NFRC].

1. Thermal Transmittance (U-Factor): Fixed panel and mill finish aluminum framing whole assemblies shall have U-factor of not more than 0.28 Btu/sq. ft. x h x deg F vertical
application and 0.31 Btu/sq. ft. x h x deg F sloped application as determined according to NFRC 100.
2. Visible Light Transmittance (VT): 0.31 or greater according to NFRC 202; or 0.50 or greater according to ASTM E 972, ASTM E 1084.
3. Air Infiltration: Maximum air leakage through fixed glazing and skylight framing assemblies of 0.20 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft.

2.2 TRANSLUCENT POLYCARBONATE-PANEL ASSEMBLIES

A. Translucent Polycarbonate-Panel Assemblies: Translucent assemblies that are supported by aluminum framing and glazed with translucent polycarbonate panels.

1. Basis-of-Design Product: Subject to compliance with requirements, provide CPI Daylighting, Inc.; QuadWall or a comparable product by one of the following:
   a. Skylights over Texas.
   b. Super Sky Products Inc.

TRANSLUCENT POLYCARBONATE ROOF PANELS AND SKYLIGHTS

B. Translucent, Multiwall Cellular Polycarbonate Panel Thermally-Broken Assembly: Consisting of two independent, multiwall cellular cross-section, polycarbonate glazing panels, providing air-insulated spaces and coextruded UV protection, integrated into a panel assembly with concealed metal or polycarbonate connectors consisting of a one-piece "H" batten concept. Panelized assembly shall be incorporated into a complete aluminum framing system. Design panels for exterior panel replacement, independent of interior single panel and without exposing the interior, or compromising weather-tightness, or interfering with the normal working functions of the building.

C. Panel Thickness: Overall minimum 2.75 inches.

D. UV Resistance: Coextruded on weather-exposed surfaces during glazing panel manufacture.

E. Panel Assembly Color: As selected by Architect from manufacturer's full range.

F. Roof-Covering Classification: [Class A] [Class B] [Class C] according to ASTM E 108 or UL 790.

G. Panel Performance:

1. Color Retention: 3.0 (Hunter) units ΔE, maximum fade as measured according to ASTM D 2244 when tested on minimum of two white color samples after panels have weathered outdoors in Arizona with panels exposed to a minimum 36.78 Langleys.
2. Haze Factor: Greater than 90 percent when tested according to ASTM D 1003.

2.3 ALUMINUM FRAMING SYSTEMS

A. Components: Reuse existing aluminum structural frame.
B. Brackets and Reinforcements: Add, repair or replace as required to provide a fully functional skylight system.

C. Fasteners and Accessories: Provide manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding fasteners and accessories; compatible with adjacent materials as required to provide a fully functional skylight system.

D. Concealed and Exposed Flashing and Closures: Add, repair or replace as required to provide a fully functional skylight system.

E. Gaskets: Manufacturer's standard gasket system with low-friction surface treatment designed specifically for retaining translucent polycarbonate panels.

F. Frame-System Sealants: As recommended in writing by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and condition for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions.

1. Do not install damaged components.
2. Rigidly secure nonmovement joints.
3. Seal joints watertight unless otherwise indicated.

B. Install glazing components plumb and true in alignment with established lines and elevations.

C. Skylight Assemblies: Install glazing panels with continuous aluminum sill closures with weatherproof expansion joints and locked and sealed corners. Install glazing components to drain water passing through joints and moisture migrating within assembly to exterior.

D. Erection Tolerances: Install panel assemblies to comply with the following maximum tolerances:

1. Alignment: Limit offset from true alignment to 1/32 inch where surfaces abut in-line, edge-to-edge, at corners.
2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet, but no greater than 1/2 inch over total length.
3.3 FIELD QUALITY CONTROL

A. Water-Spray Test: After completion of new roof installation glazing panel assemblies shall be tested according to AAMA 501.2 and shall not show evidence of water penetration.

B. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.

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

D. Prepare test and inspection reports.

END OF SECTION 0845
PROJECT MANUAL & SPECIFICATIONS

JAMES BRECKINRIDGE MIDDLE SCHOOL ROOF RESTORATION
February 4, 2020

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