TECHNICAL MANUAL

FOR

EDUCATION BUILDING: PARAPET AND ROOF REPAIRS
WAYNE STATE UNIVERSITY PROJECT: 140-235963

WAYNE STATE UNIVERSITY
5057 WOODWARD AVE
DETROIT, MI 48202

StructureTec®
Total Building Envelope Management Solution SM

34119 W. Twelve Mile Road, Suite 270
Farmington Hills, MI 48331

248.848.1791 (PH)

248.848.1813 (FAX)

STEC PROJECT NO. 3692.RST3 / WSU NO. 140-235963

ISSUED FOR BID OCTOBER 25, 2013

SECTION 00010

TABLE OF CONTENTS

END OF SECTION

SECTION 01100

SUMMARY OF WORK

PART 1 – GENERAL

1.01 LOCATION OF WORK

A. Work to be performed at:

Wayne State University
College of Education
5425 Gullen Mall
Detroit, MI 48202

1.02 WORK SUMMARY

A. This summary presents a general overview and should not be construed as a complete accounting of all work to be performed. The extent of the Work is indicated on the Drawings and by the requirements of each specification Section.

B. The Contractor shall be responsible for ensuring that interior finishes, carpeting, furnishings, merchandise and/or equipment in the building are adequately protected from debris and water leaks throughout the duration of the project.

C. Furnish all labor, trades, equipment, materials, incidentals, and supervision to repair and provide a complete weathertight restoration of the exterior facility walls. A summary of the specified Work is presented in this Section.

D. Base Scope of Work

1. Mobilization
   a. Provide all permits, staging / wall access, temporary protection, barricading, supervision, temporary facilities, etc. as required to complete the work. Reference General Conditions and Section 02220 – Selective Demolition.
2. Roof Repair Work – 5th Floor Roof
   a. Remove and replace existing sheet metal gravel guards and flashing sheet at all roof drains. Refer to Section 07591 – Coal Tar Pitch Built-Up Roof Repair and Restoration.
      1) Quantity: 8 drains.
   b. Provide new hot bitumen base flashings at designated locations and tied into existing roof system as specified. Work locations include roof perimeter edge, precast concrete columns, roof curbs, projections, and exterior side of mechanical screen wall. Refer to Section 07591 – Coal Tar Pitch Built-Up Roof Repair and Restoration.
3. Sheet Metal Flashings
   a. Provide new sheet metal coping and counterflashing at 4th floor roof parapet walls, and sheet metal counterflashing at 5th floor perimeter pre-cast columns and mechanical screen wall. Work includes removal of existing sheet metal components, and installation of underlayment flashing membrane prior to sheet metal installation. Reference Section 07620 – Sheet Metal Flashing and Trim.

4. Joint Sealants
   a. Provide new sealant at sheet metal coping joints, reglet counterflashing at pre-cast concrete interface, and base flashing terminations. Work includes cleaning, and properly preparing joints prior to sealant application. Reference Section 07920 – Joint Sealants.
5. Warranties
   a. Provide a written two (2) year contractor's warranty against defective materials, defective workmanship, and water leakage. Warranty shall cover 100% replacement of the completed work as required to maintain the building exterior in a sound and weathertight condition.
   b. Sheet metal, as specified and installed under this specification, shall have a manufacturer's finish warranty for a period of twenty (20) years.

PART 2 – PRODUCTS

2.01 NOT USED

PART 3 – EXECUTION

3.01 NOT USED

END OF SECTION

SECTION 02220

SELECTIVE DEMOLITION

PART 1 – GENERAL

1.01 SUMMARY

A. Provide all labor, materials, equipment, and supervision to demolish, haul and dispose of items in accordance with Specifications and Drawings.

B. Work of this Section includes the following:

1. Demolition and removal of designated components to complete the specified Work.
2. Provide shoring prior to / during work as required to maintain structural stability.
3. Cutting and alterations for completion of Work.
4. Protecting adjacent areas.
5. Disposal of demolished materials.
6. Contain all dust during cutting and grinding of masonry and concrete materials using dust-collection systems, or other approved means.

1.02 REFERENCES

A. References are latest editions, unless otherwise indicated.

B. American National Standards Institute (ANSI):

1. Safety Requirements for Demolition, Document A10.6.

C. Occupational Safety and Health Administration (OSHA):

1. Construction Safety Act, Part 1926.

D. National Fire Protection Agency (NFPA):

1. NFPA 241: Standard for Safeguarding Construction, Alteration, and Demolition Operations.

E. Environmental Protection Agency (EPA) regulations related to construction practices and the scope of work of the project.

1.03 DEFINITIONS

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

B. Remove and Salvage: Detach items from existing construction and save ready for reinstallation.

C. Existing: Existing items of construction that are not to be removed, salvaged, or recycled.

1.04 PERFORMANCE REQUIREMENTS

A. The responsibility for planning and the effective implementation of the Work, as well as safety to persons and property, are the responsibility of the Contractor. This responsibility shall not transfer to the Owner, Consultant or governing authorities.

B. Prior to demolition, examine areas and conditions under which the Work is to occur and notify the Consultant immediately in writing of any conditions detrimental to the proper and timely completion of this Work.

C. A review of the Contractor's means and methods will be performed by the Owner for general conformance with the requirements of this specification. This review shall not imply agreement by the Owner, Consultant or other governing authorities that the Contractor's planning is appropriate or reasonable.

D. Review with the Owner and Consultant the proposed types of equipment to be used during the course of the project.

E. Provide all necessary precautions to prevent unauthorized personnel from entering the job site.

F. Conduct demolition operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.

G. Protect adjoining properties, public thoroughfares, sidewalks, and utilities from damage due to this operation.

H. Provide all necessary protection to prevent airborne construction material, debris, dust, fumes, etc. from entering occupied spaces (e.g. adjacent building, air intake).

1.05 SUBMITTALS

A. Written plan of the demolition procedures and protection measures with sufficient detail necessary to ensure that the Work can be accomplished in a safe and prudent manner.

B. Proposed Environmental-Protection, Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed location, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

C. Contractor shall review with the Owner and Consultant the types of equipment proposed for use during the course of the project.

D. Plan of Demolition Activities:

1. Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
2. Interruption of utility services, including any required certificates of severance.
3. Coordination for shutoff, capping, and continuation of utility services.

4. Locations of temporary protection and means of safe egress for building occupants.
5. Proposed method of traffic maintenance and required permits by local governing agencies or authorities.
6. Coordination of Owner's continuing occupancy of adjacent buildings and use of premises.
7. Required permits for transport and disposal of debris.
8. Temporary barricades and shoring plan.

E. Pre-Existing Conditions Report: Written documentation, with associated photographs, of existing conditions of areas / item that are not scheduled to be repaired, adjoining construction, landscaping in the area of work, etc., including finish surfaces, which might be misconstrued as damage caused by the demolition operations. Do not proceed to the work until the report is submitted and approved by the Consultant.

F. Inventory: Submit a list of items that have been removed and salvaged after completing demolition of specified building components.

G. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.06 QUALITY ASSURANCE

A. Contractor Qualifications: Not less than five (5) current years relevant successful experience with comparable projects and employing personnel skilled in the Work specified in this Section. The skilled person shall have at least five (5) years of experience and shall have successfully completed at least two (2) projects within the past three (3) years involving quantities and complexities similar to those required under this Section.

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

C. Pre-Construction Conference: Conduct conference at Project site prior to commencing with Work. The items of discussion may include, but are not limited to, the following:

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review and finalize demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review requirements of work performed by other trades that rely on substrates exposed by demolition operations.
4. Review and finalize protection requirements.

1.07 PROJECT CONDITIONS

A. Maintain access to existing walkways, exits, corridors and other adjacent occupied or used facilities. Do not close or obstruct walkways, exits, corridors, or other occupied facilities without written permission from authorities having jurisdiction.

B. Utility Service: Maintain existing utilities in service and protect them against damage during selective demolition operations.

C. Fire Protection: Maintain fire-protection services during selective demolition operations.

1.08 SEQUENCING & SCHEDULING

A. Scheduling of the work shall be coordinated with the Owner. Contractor shall be prepared to modify or revise the plan as necessary to accommodate the Owner's requirements. The schedule shall include the number of days that are required for each area of work, coordination and sequencing between demolition and replacement, as well as disposal of materials.

PART 2 – PRODUCTS

2.01 NOT USED

PART 3 – EXECUTION

3.01 EXAMINATION

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

B. Inventory and record the condition of items to be removed and salvaged.

C. Any unanticipated conditions not shown on Drawings or indicated in Specifications are to be reported to the Consultant in writing.

3.02 PREPARATION

A. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement, settlement, or collapse of construction being selectively demolished. Strengthen or add new supports as required, or as directed by Consultant, during the progress of selective demolition.

B. Temporary Protection: Contractor is responsible for protection and safety in the work area.

1. Protect Work at all times, and protect all adjacent work, materials, landscaping and pavements, by suitable covering or other methods during the progress of the Work
2. Erect, and maintain temporary protection, such as walks, fences, railings, canopies, and covered passageways, including warning signs and lights, where indicated and required by authorities having jurisdiction.
3. Maintain exits at all times from the building(s). Erect protective scaffolding over entrances/exits as required, with a minimum clear height of 6 feet 8 inches.

C. Where traffic and/or equipment are required over any roofing/waterproofing and concrete paving materials, the Contractor shall provide the following layers of protection:

1. Minimum one inch insulation board directly on the roof/waterproofing surface.
2. Minimum 3/4 inch plywood traffic surface.
3. Care shall be taken to secure the protection layers against blow-off or other related damage.

4. Protection shall extend at least 4 feet from the wall / parapet in the areas of work, and all other areas that may be damaged by construction activities (such as access paths to the work)

3.03 DEBRIS CONTROL

A. At all times, prevent debris and materials from exiting staging equipment and falling to ground or lower roof levels.

B. Plug roof drains during demolition to prevent debris and materials from entering and clogging drainage pipes.

C. Adhere to Owners safety policy at all times, including personal protection equipment and protection of surrounding persons / property.

3.04 DUST CONTAINMENT

A. The Contractor shall contain all dust during saw-cutting of masonry and concrete, and any other materials.

B. Use dust-free saw-cutting equipment with integrated vacuum systems. Change filters frequently to prevent dust from escaping.

C. Wet cutting may be considered by the Owner, but must be approved in advance for each location. If wet cutting is used, pre-wet the area to be cut and the entire wall area below. After cutting, thoroughly wash down the entire wall area below to remove all mortar and debris.

3.05 DEMOLITION

A. Coordinate and execute all demolition to ensure that all reconstruction work can be completed once it is begun.

B. Demolish and remove existing construction only to the extent required by new construction or as otherwise indicated. Use methods required to complete selective demolition within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically. Conduct work in an order that avoids transporting removed items and debris through areas of completed Work.
2. Neatly cut openings and holes square and true to dimensions required. Use cutting methods least likely to damage adjoining construction. Whenever possible, use hand tools or small power tools designed for sawing or grinding, to minimize disturbance of adjacent surfaces.
3. Temporarily cover openings at the end of each workday.
4. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

C. Remove debris from elevated portions by chute, hoist, or other device that will convey debris to grade level in a controlled descent. All debris must be directly placed into trash receptacles at the elevation the work is being performed, and later transported to the ground elevation under safe controlled conditions.

D. Close and seal all heating and ventilation ducts as required to prevent contamination and intake of fumes inside the building. Where ducts cannot be closed, as determined by the Owner, provide filtering media for duct and fumes.

E. Protect all glass and metal surfaces in area of Work.

F. Existing Items to Remain: Protect construction items to remain in place 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.

G. Except for items or materials indicated to be salvaged, reinstalled or otherwise indicated to remain the Owners property, demolished materials will become the Contractor's responsibility and will be removed from the Owner's property.

3.06 REPAIRS

A. General: Promptly repair damage to adjacent construction caused by demolition operations. Provide required repairs due to inadequate protection methods at no cost to the Owner.

B. Where repairs to existing surfaces are required, provide materials and procedures to match existing construction.

C. Restore exposed finishes of repaired areas and extend restoration into adjoining construction in a manner that eliminates evidence of remedial and refinishing procedures.

3.07 ADJUSTING AND CLEANING

A. At the end of each work period, the Contractor shall remove from the premises all rubbish and accumulated materials of any nature not caused by others and shall leave his part of the Work in a clean, orderly and acceptable condition.

B. Disposal of debris shall be the responsibility of the Contractor.

END OF SECTION

SECTION 07591

COAL TAR PITCH BUILT-UP ROOFING REPAIRS AND RESTORATION

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Furnish all labor, materials, equipment and supervision to provide the following in accordance with the Contract Documents:
   a. Repair to existing built-up roof membrane using hot bitumen.
   b. Refer to Drawing A-2, Roof Plan, and Section 01100, Summary of Work, for identification of roof areas and quantities applicable to this section

1.02 REFERENCES

A. Comply with Quality Control, References, Specification, and Manufacturer's Data.

B. Products containing asbestos are prohibited. Use only asbestos-free products.

C. References

1. Materials used in this section shall be listed in the latest edition of the following:

   a. "Underwriters' Laboratories, Inc. Building Materials Directory"
   b. "Handbook of Accepted Roofing Knowledge – HARK", National Roofing Contractors Association.
   c. "Manufacturer's Built-Up Roofing Product Data and Application Guide"
   d. American Society for Testing and Materials (ASTM).

1.03 SUBMITTALS

A. Product Data:

1. Submit manufacturer's latest descriptive literature for manufactured items (e.g. membrane and bitumen materials, base flashing materials, protective covering).

B. Materials List:

1. List of materials proposed to be furnished and installed under this portion of the Work.
2. This shall in no way be construed as permitting substitution of materials for those specified.

C. Shop Drawings

1. Shop drawings shall indicate installation layout, installation details, joint locations, special configurations and expansion provisions as required for this project.
2. Shop drawings shall not consist of a reproduction of the Consultant's details, but rather shall provide supplemental information pertaining to specific dimensions,

sequencing requirements, joints and laps, as well as provisions for expansion and contraction as may be required for completion of the Work.

1.04 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten years documented experience.
2. Applicator: Company specializing in performing Work of this Section with minimum five years documented in-service experience approved by manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job site in their original, unopened containers. Package labels shall include material name, production date and/or product code.

B. An Owner designated area will be provided for storage of materials and related equipment.

C. Store materials in accordance with applicable manufacturer's recommendations and material safety data sheets.

D. Store approved materials in a suitable and designated area at the job site. Support materials off the ground and cover.

E. Store bulk bitumens in heated tanker not greater than 350^{o} F. Prevent modification of asphalt physical properties resulting from long periods of overheating.

F. Use necessary means to ensure safe storage and use of material, as well as prompt and safe disposal of waste.

G. Felts and other roll goods shall not be scraped, torn, bent, or otherwise damaged during unloading, storage, or installation. Any rolls which have been bent excessively or weathered shall not be acceptable for application.

1.06 PROJECT/SITE CONDITIONS

A. Advise Owner when volatile materials are to be used near air ventilation intakes so that they can be shut down or blocked as Owner requires.

B. Environmental Requirements:

1. Do not work in rain, snow or in presence of water.
2. Do not install materials marked "Keep from Freezing" when daily temperatures are scheduled to fall below 40^{o} F.
3. Remove any work exposed to freezing.
4. Do not apply roofing membrane to damp or frozen deck surface.
5. Do not expose materials vulnerable to water or sun damage in quantities greater than can be waterproofed same day.

1.07 SCHEDULING

A. The roof and building must be maintained watertight at the end of each day.

B. Completion of work shall be defined as the installation of all specified roof preparation, insulation and field membrane.

C. Surfacing, flashings, sheet metal, fasteners, and caulking work shall be coordinated and installed by the Contractor during the course of the Work.

PART 2 – PRODUCTS

2.01 EXISTING BUILT-UP ROOFING REPAIRS (REPLACE IN LIKE KIND)

A. Coal Tar Pitch Roofing Materials

1. Accepted Manufacturers:

a. Koppers Industries, Pittsburgh, PA
b. Durapax LLC, Pottstown, PA
c. Or Approved Subsitution

2. Bitumen

a. Type III asphalt bitumen for flashings shall comply with ASTM D312.

B. Flashing Sheet

1. Modified Bitumen Flashing

a. Styrene Butadiene Styrene (SBS): Reinforced SBS, mop grade flashing membrane, 150 mil thickness, granule surfaced, accepted 20-year system.
b. Flashing backer felt and/or base sheet shall be as recommended by manufacturer for flashing requirements.

C. Roofing Related Materials

1. Asphalt Primer: Asphalt cut-back primer, complying with ASTM D41.
2. Asphalt Roof Cement: Asphalt based plastic cement complying with ASTM D4586 Type I.
3. Coal Tar Primer: Coal tar based primer complying with ASTM D43.
4. Tar Roof Cement: Coal tar based plastic cement complying with ASTM D5643 Type I.
5. Reinforcing Membrane: Non-shrinking, non-rotting woven glass mesh.
6. Aluminum Roof Coating: Fibrated reflective coating with asphalt cut-back base, non-asbestos inorganic fiber reinforcement and leafing type aluminum pigment, complying with ASTM D2824, Type III.
7. Roofing Aggregate
   a. Gravel shall be commercial grade, washed, opaque, 3/8 inch to 5/8 inch gravel and shall comply with ASTM D1863, No. 6.

8. Fasteners
   a. Roofing membrane and flashing fasteners: Unless otherwise indicated, types as necessary for the conditions encountered. Refer to Section 07790, Fastening Systems
9. Lead Flashing Sheet: ASTM B749, 4.0 lb./sq. ft.
10. Top of Pre-Cast Concrete Columns: Alsan Flashing by Soprema Liquid Group, or approved substitute.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work.

3.02 MATERIAL DELIVERY, STORAGE AND HANDLING

A. Inspect materials delivered to the site for evidence of contact with moisture. Reject delivery of materials with stained or wet wrappers, or torn covers. Packaging labels must be readable, identify the material, and indicate conformance with the reference standard applicable to the material. Additionally, for roofing membrane sheet, adhesives/cements and sealant materials, labels shall indicate the date of manufacture and lot number.

B. Store all roofing materials, except metal components, and material in sealed cans, as follows:

1. Do not expose materials to moisture in any form.
2. If allowed by the Owner, store materials in a completely enclosed building or trailer. When out-of-doors, store on clean raised platforms at least four inches above the ground surface. Completely cover all roofing materials with weatherproof covers to protect from weather and moisture. Arrange covers to allow venting; do not allow covers to extend onto the ground. Do not use polyethylene or other non-breathing cover materials. Factory applied plastic wrap is not an acceptable weatherproof cover. Rooftop storage of materials is not permitted except for materials intended for installation that same day.
3. Use all materials within the time limits prescribed by the manufacturers.
4. Store sealant products in accordance with the manufacturer's instructions.
5. Inspect stored materials for evidence of contact with moisture. Mark improperly or unprotected materials or materials that get wet or damaged. Do not use these materials in the roof system.

3.03 PROTECTION

A. Contractor shall take all necessary precautions to prevent dirt, dust, resaturate and hot bitumen drippage inside the building during the course of the Work.

B. Roof areas traversed during work activities shall be protected by the Contractor, and it shall be the Contractor's responsibility to rectify any roofs damaged due to inadequate protection.

C. All surfaces shall be smooth, dry, and free from dirt, debris, and foreign matter before any treatment is initiated. Pumping equipment shall be located on the ground at a safe distance from buildings, and shall be subject to the approval of the Owner. The Contractor shall be responsible for exercising all reasonable precautions to avoid fires being started, and shall provide suitable fire extinguishers, which are to be located so that they can be used when required. Competent operators shall be in attendance at all times when equipment is in use. Materials shall be stored in area designated by the Owner's representative, and dispersed so as to ensure a minimum fire hazard. Loads placed on the roof at any point shall not exceed the safe loading for which the roof is designed.

D. Arrange work sequence to avoid use of constructed roofing for storage, walking surface, and equipment movement. Move equipment and ground storage areas as work progresses.

E. Provide clean plywood walkways and take other precautions required to prevent tracking of aggregate from existing membrane into new work area where aggregate pieces can be trapped within new roofing membrane. Contractor shall instruct and police his workmen to ensure that aggregate is not tracked into new work. Discovery of entrapped aggregate within new membrane is sufficient cause for rejection.

F. Roofing felts, insulation, and cant strips must be dry and protected from the weather at all times. All wet and damp materials must be removed from the job site.

3.04 REPAIR OF EXISTING BUILT-UP ROOF MEMBRANE

A. Cleaning and Preparation of Existing Roof Surface

1. Spud or scratch clean all embedded aggregate from the area of the roof membrane repair. Aggregate, loose and embedded, shall be completely removed from the area at least 24 inches.

B. Installation of New Base Flashing

1. Remove all base flashing from the vertical surface above the top of the cant. If the cant is wet or deteriorated, remove the flashing from the vertical surface down to the base of the cant.
2. If coal tar membrane is cut through at the base of the cant, the cut edge of the membrane should be sealed with asphalt mastic and fabric to prevent pitch migration into the building through the gap between the deck and the wall or curb.
3. Prime substrate surfaces to receive flashings with specified primer.
4. Install backer felt and reinforced modified bitumen base flashing in solid moppings of hot asphalt.
5. Lap flashing sheets a minimum of four (4) inches and bond the seams according to the manufacturer’s requirements.
6. Apply a three course application of fiberglass mesh and modified flashing cement to all vertical seams.
7. Apply a continuous bead of butyl sealant between substrate and back side upper leading edge of flashing sheet.
8. Install termination bar across top edge of base flashing assembly and secure to substrate six inch on centers with specified fasteners.
9. Re-embed aggregate.

C. Installation of New Perimeter Edge Base Flashing

1. Prime substrate surfaces to receive flashings with specified primer.
2. Install backer felt and reinforced modified bitumen base flashing in solid moppings of hot asphalt.
3. Lap flashing sheets a minimum of four (4) inches and bond the seams according to the manufacturer's requirements.
4. Apply a five (5) course application of fiberglass mesh and modified flashing cement to all horizontal and vertical seams.
5. Apply bead of specified sealant along the outside leading edge of base flashing sheet.
6. Re-embed aggregate.

D. Drain Flashing

1. Remove the drain clamping ring. Repair or replace all drain parts missing or broken. Drill and retap necessary drain bolts.
2. Remove existing drain flashing, lead flashing and sheet metal gravel guard.
3. Apply 1/16 inch uniformly thick layer of asphalt mastic to surface receiving lead flashing.
4. Set single piece of primed 30 inch square (min.) lead flashing in mastic centered over drain; extend lead six (6) inches beyond drain rim. Neatly dress lead with wood block or similar flat edge tool.
5. Install reinforced flashing sheeting 48 inch square (min.) set in a solid application of mastic adhesive. Strip in exposed edges with mastic adhesive and fiberglass mesh membrane.
6. Neatly cut lead and flashing sheet with drain rim; remove and discard.
7. Install new gravel guard. Set primed flange of gravel guard in roof cement. The flange of the gravel guard shall be stripped in with a five course of mastic and fabric.
8. Re-embed aggregate.

E. Projection Flashings

1. Trowel a liberal coating of mastic up the stack six (6) inches and out onto the roof membrane 12 inches.
2. Embed prepared mesh membrane into the mastic, both vertical and roof membrane surface
3. Trowel a liberal coating of mastic over the embedded mesh membrane, totally obliterating the weave of the membrane.
4. Re-embed aggregate into a top coating of roof cement in the joint repair area.

F. Aluminum Coating at Exposed Base Flashing – Two Coats

1. After preparatory work has been completed, including base flashing repairs, apply aluminum coating to all exposed flashing surfaces at the rate of application recommended by the manufacturer. Thoroughly mix the aluminum coating to a uniform consistency prior to application.
2. Apply second coat after the first coat has fully cured.

3.05 FIELD QUALITY CONTROL

A. Inspection will involve surveillance of Work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnish all labor, materials, equipment and supervision to install in accordance with the specifications and drawings all items listed, but not limited to:

a. Shop fabricated coping components.
b. Shop fabricated counterflashing components.
c. Shop fabricated drain gravel guards

1.02 REFERENCES

A. ASTM A 666 - Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

B. ASTM B 32 - Specification for Solder Metal.

C. SMACNA (Sheet Metal and Air Conditioning Contractors National Association) Architectural Sheet Metal Manual, latest edition.

D. NRCA (National Roofing Contractors Association) - Roofing and Waterproofing Manual, latest edition.

E. AAMA 611 (American Architectural Manufacturers Association) - Standards for Anodized Architectural Aluminum.

F. ASTM B 370 - Specification for Copper Sheet and Strip for Building Construction.

G. CDA (Copper Development Association) - Copper in Architecture – Handbook, latest edition

1.03 PERFORMANCE REQUIREMENTS

A. General Performance: Installed sheet metal flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Material Compatibility: Provide sheet metal materials that are compatible with one another under conditions of service and application required.

1.04 SUBMITTALS

A. Product Data:

1. Submit Manufacturer's latest descriptive literature for each type of sheet metal materials as specified.

B. Materials List:

1. List of materials proposed to be furnished and installed under this portion of the Work.
2. This shall in no way be construed as permitting substitution of materials for those specified.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1. Metal profiles and attachment methods.
2. Identification of materials, thickness, weight and finish for each item, and locations for each to be installed.

D. Manufacturer's Information:

1. Installation Instructions: Submit special procedures for perimeter conditions requiring special attention.
2. Manufacturer's Certificate: Certify submitted products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing products specified in this Section with a minimum of ten years documented experience and that has UL listing for sheet metal system specified herein.

B. Applicator: Company specializing in performing Work of this Section with minimum of five years documented in-service experience approved, authorized, or licensed by manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials causing discoloration or staining.

1.07 COORDINATION

A. Coordinate work of this Section with interfacing and adjoining work for proper sequencing of each installation.

PART 2 – PRODUCTS

2.01 SHOP FABRICATED METAL COMPONENTS

A. General Fabrication

1. Form all sheet metal pieces in longest practical lengths.
2. Fabricate cleats of same material as sheet metal, interlocking with sheet.
3. Hem exposed edges on underside of all perimeter systems every six (6) feet and all ends; miter and seam corners.
4. Fabricate sections not exceeding 10-feet long. Fabricate joint plates of same thickness as main flashing.
5. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
6. Fabricate vertical faces with bottom edge formed outward 1/2 inch at 30^{o} angle and hemmed to form drip.
7. Miter corners, and seal watertight.

B. Coping at 4^{th} Floor Parapet Wall

1. Fabricate concealed splice plates of same thickness as copings.
2. Cleat

   a. .050 inch thick Aluminum, face fastened.

3. Coping Metal

   a. Aluminum Sheet: ASTM B 209/B 209M, 5005 alloy, H-15 temper; .040 inch thick; clear anodized finish.

C. Pre-Cast Concrete Reglet Set Counterflashing Materials

1. Aluminum Sheet: ASTM B 209/B 209M, 5005 alloy, H-15 temper; .040 inch thick; clear anodized finish.

D. Slip Insert Counterflashing at 5^{th} Floor Mechanical Screen Wall and Roof Drain Gravel Guards

1. Copper: ASTM B 370, cold rolled; 16 oz, natural finish.

2.02 ACCESSORIES

A. Secondary Waterproofing Membrane: Ice & Water Shield by Grace Construction Products. High temperature version, Vycor Ultra.

B. Blind Rivets: Stainless steel.

C. Sealant: Refer to Section 07920, Joint Sealants for specific material requirements.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, blocking pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing terminations and base flashings are in place, sealed, and secure.

C. Verify surfaces to receive sheet metal flashings are clean and in sound condition.

D. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that work will properly commence. Do not proceed with installation until unsatisfactory conditions are correct.

3.02 GENERAL REQUIREMENTS

A. Examine the areas of Work and verify that existing conditions are acceptable for the specified installation procedures. Report, in writing, adverse conditions that could affect the performance of the Work within five calendar days. Absence of written notification will indicate the Contractor's acceptance of existing project conditions.

1. Verify surfaces to receive sheet metal are clean and in sound condition.
2. Examine substrates and conditions under which sheet metal components are to be installed and verify that Work will properly commence.

B. Preparation:

1. Secure flashings in place using specified fasteners.
2. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
3. Seal metal joints watertight.

C. Manufacturer’s Recommendations: Comply with the manufacturer’s written approved installation instructions and with any governing regulations and industry standards applicable to the Work.

D. Form sheet metal on a bending break. Perform shaping, trimming, and hand seaming in the shop as far as practicable, with the proper sheet-metal working tools. Make the angle of the bends and the folds for interlocking the metal with full regard for expansion and contraction, to avoid buckling or other deformation in service. All lines shall be straight and crisp except where thickness of metal dictates radius bend, and all exposed edges shall be hemmed 1/2 inch minimum.

E. Soldering - Copper Flashing Prior to soldering, mechanically clean all metal to be soldered with steel wool or by other acceptable means, apply flux, and pre-tin. For lead coated copper, remove lead coating by sanding or grinding to produce bright red surface prior to applying flux and pre-tinning. Clean metal again if it is not soldered on the same work day. Perform all soldering with well heated heavy (10 pounds per pair) irons with

tinned clean blunt tips. Do not use torches. Apply enough heat to sweat the solder through the full width of the seam. Close clinch lock seams gently with a block of wood and mallet, then flux and show at least one full inch of continuous solder. Whenever possible, do all soldering in flat position. All sloped and vertical seams shall be laced and soldered a second time. Wipe and wash clean soldered joints to remove all traces of acid from the flux after the joints are made.

F. Sheet Metal Expansion Joints:

1. Layout metal flashing to minimize transverse joints. Detail transverse joints in all flashing pieces to provide a watertight connection, and allow for expansion/contraction of the metal as shown on the Drawings.
2. Unless shown otherwise on the Drawings, provide expansion joints at 24 feet on-center maximum and at 2 feet away from all changes in flashing direction (each side) and from all terminations of flashing.

G. Prefabricated Transitions/Terminations:

1. Provide pre-fabricated corner pieces with joints locked, riveted, and soldered watertight. Space rivets at 1 inch on-center in staggered pattern unless otherwise indicated.

3.03 INSTALLATION OF SHOP FABRICATED METAL COMPONENTS

A. Shop Fabricated Metal Coping System

1. Install a continuous cleat on the outside face of the wood blocking, secure eight inches on center with specified fasteners.
2. Install new coping constructed of specified metal. Coping width shall be sufficient to extend 1-1/2 inches minimum below top edge of wall.
3. Install concealed cover plates at all metal coping joints. Install two sided Butyl tape to outside edges of cover plate prior to installing the coping. Gap coping ends 1/2 inch, minimum.
4. Install coping to the continuous cleat on front and secure on inside face with mechanical fasteners with rubber grommets, 24 inches on center.
5. Apply a bead of specified sealant to the horizontal surface of the coping joint.

B. Termination Bar/Counterflashing (Wall Transitions)

1. Install termination bar across top edge of base flashing assembly.
2. Mechanical securement shall be on six inch centers.
3. Wipe top of bar clean with metal cleaner. Prime metal surface to receive sealant with metal primer. Allow to dry.
4. Apply approved elastomeric sealant to the top of pressure bar. Provide watershed. Tool neatly.
5. Install counterflashing detail over top of pressure bar in conformance to counterflashing detail, and approved manufacturer's specification requirements.

C. Slip Insert Counterflashings

1. Install specified counterflashing behind the existing roof top unit flashing receiver.
2. Secure counterflashing into existing roof curb with specified fasteners with compression gaskets spaced 12 inches on center. Counterflashing shall be installed behind flashing receiver as high as possible. Fasteners shall be installed maximum of one inch below flashing receiver.

D. Gravel Guard

1. Install copper gravel guard, 36 inches square at all drains.
2. The gravel guard shall be formed with a four inch flange and one inch hemmed guard with saw tooth cut outs.
3. The flange shall be primed top and bottom with asphalt primer.

3.04 FIELD QUALITY CONTROL

A. Inspection will involve surveillance of Work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07790

FASTENING SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Furnish all labor, materials, equipment, and services to prepare and install the following:

a. Termination Bar/Counterflashing to Masonry or Concrete
b. Metal to Metal

1.02 SUBMITTALS

A. Product data:

1. Submit manufacturer's latest descriptive literature, installation instructions and/or procedures to be followed during installation.
2. Published information verifying compatibility of products specified within this Section and substrate materials to which products will encounter.

B. Materials list:

1. List of materials proposed to be furnished and installed under this portion of the Work.
2. This shall in no way be construed as permitting substitution of materials for those specified.

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job site with packages and labels intact identifying manufacturer, product name and lot numbers when appropriate.

B. Store approved materials neatly in a suitable and designated area at the job site. Support materials off the ground and covered.

C. Use necessary means to ensure safe storage and use of material, as well as prompt and safe disposal of waste.

PART 2 – PRODUCTS

2.01 MATERIALS/MANUFACTURERS

A. Termination Bar/Counterflashing to Masonry or Concrete

1. Tapcon 1/4 inch diameter, Phillips flat head anchor with EPDM washer, by Buildex Division of ITW, Itasca, IL
2. Kwik-Con II, 1/4 inch diameter fastener, by Hilti Corp., Tulsa, OK

3. Length: Sufficient to provide 1-1/4 inch embedment minimum.

B. Metal to Metal

1. Zip screw with EPDM washer, by Tech Specialties
2. Length: sufficient to penetrate substrate by ½ inch.

PART 3 – EXECUTION

3.01 AS DETAILED PER APPROPRIATE SECTION AND SCOPE OF WORK.

END OF SECTION

SECTION 07920

JOINT SEALANTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnish all labor, materials, equipment and supervision to install in accordance with the specifications and drawings all items listed, but not limited to:

a. Sealant at Sheet Metal Components
b. Sealant at Base Flashing Terminations.

1.02 PERFORMANCE REQUIREMENTS

A. General Performance: Installed sealant materials shall withstand specified pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Material Compatibility: Provide sealant materials that are compatible with one another under conditions of service and application required.

1.03 SUBMITTALS

A. Product Data:

1. Submit Manufacturer's latest descriptive literature for each type of sealant materials as specified.
2. Pre-installation Compatibility and Adhesion Testing: Test elastomeric sealants and accessories with samples of each joint substrate material for compatibility, adhesion, and freedom from staining. Include recommendations for substrate preparation and primers for proper adhesion, and solvents for cleaning.
3. Field reports from the sealant manufacturer representative for periodic site visits made to review the work in-progress. The field report should provide information regarding type of work in-progress during the visit, whether the meets manufacturer guidelines and the requirements of this Section, recommendations for future work, and required repairs/corrections (if any). The field report should also include results and comment from "in-progress" field adhesion testing of sealant previously installed.

B. Materials List:

1. List of materials proposed to be furnished and installed under this portion of the Work.
2. This shall in no way be construed as permitting substitution of materials for those specified.

C. Manufacturer's Information:

1. Installation Instructions: Submit special procedures for perimeter conditions requiring special attention.
2. Manufacturer's Certificate: Certify submitted products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

A. Qualifications: Not less than five (5) years successful experience with comparable projects and employing personnel that are skilled in specified work of this Section.

B. Regulatory Requirements: Properly dispose of all waste materials resulting from this work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Sealant materials are to be provided from one manufacturer to maintain consistent quality and color. Provide accessory materials recommended by the sealant manufacturer, pending approval by the Owner and Consultant, based on job-site adhesion testing.

B. Deliver and store materials on job site in a manner that prevents damage, contamination or breakage and with packages intact displaying labels identifying manufacturer, product name, and lot numbers when appropriate.

C. Store materials in accordance with manufacturer's recommendations. Comply with manufacturer's recommendations for minimum and maximum time and temperature limits for storage. Protect liquid components from freezing.

D. Store flammable materials in a cool dry, protected area away from sparks and open flames.

E. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life.

1.06 SITE 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.
2. When joint substrates are wet.
3. Where joint widths are less or more than those allowed by joint-sealant manufacturer for applications specified.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

B. Do not proceed with installation of new sealants during threatening or unfavorable weather conditions. If sealant work cannot be performed, provide the necessary protection to keep building watertight.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General: Listed are primary products and materials for the specified repair work. Provide all incidental items and materials required for completion of the work in accordance with these documents.

B. Sheet Metal

1. FS TT-S-00230C (2), single component, gun grade, non-sag urethane and/or polyether sealant.

a. “Vulkem 116” by Mameco
b. “Dynatrol l” by Pecora
c. “Sonolastic NP 1” by Sonneborn
d. “Dymonic” by Tremco
e. “Sikaflex-1a” by Sika Corp.

C. Non-exposed compression sealant

1. TT-S-001657, Type l single component, low viscosity, self-wetting, butyl blend mastic.

a. Butyl Sealant by Tremco, Inc.
b. Water Block Seal by Firestone Building Products
c. Water-Cut Off Mastic by Carlisle Syntec

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine existing conditions in the area of work and verify that no conditions are present that prevent or otherwise interfere with the installation of the specified work.

B. Adverse conditions are to be reported in writing within three calendar days upon identification. Absence of such notification will constitute the Contractor's acceptance of existing conditions.

C. Before ordering materials or performing work, obtain and verify all measurements at the project site. Exact measurements are the Contractor’s responsibility.

3.02 PREPARATION

A. General

1. Saw-cut existing pre-cast concrete components as required to provide a minimum 1/4-inch depth to receive sealant, or as recommended by the sealant manufacturer.

3.03 INSTALLATION

A. General:

1. Comply with the manufacturer's requirements for correct sizing and installation of sealant with respect to anticipated joint movement and material temperatures.
2. Masking: Apply masking tape along joints in areas of high visibility or areas where the appearance of sealant on wall/glass surfaces is objectionable.
3. Joint Design:
   a. Sealant bead depth should be less than the joint width. Maintain a 2:1 ratio of joint width to sealant depth in accordance with the manufacturer's requirements.
   b. For joint widths greater than 1-inch, submit installation recommendations from the manufacturer for approval by the Consultant.
4. Methods:
   a. Apply sealants using a cartridge-type caulking gun or bulk-loading gun, following the manufacturers written instructions.
   b. Apply sealants in a continuous operation to eliminate air voids throughout the entire joint cross-section.
5. Finishing:
   a. Tool or strike the sealant joint to a concave profile with a light pressure to spread the material against the back-up material and ensure adhesion to joint surfaces.
   b. Complete tooling in one continuous stroke within 10 minutes of sealant application and before skin forms. Perform dry tooling only. The use of soaps, oils, water and/or alcohols as tooling aids are not permitted.
   c. If masking materials are used, remove immediately after tooling the sealant.

B. Outdoor lights, signs, and wall penetrations: Provide weather tight application of new elastomeric sealant at all other conditions and penetrations through exterior walls.

3.04 FIELD QUALITY CONTROL

A. Make provision to assist and coordinate progress reviews of the work by the Consultant.

B. Field Adhesion Tests of Sealants: After work commences, perform sealant adhesion tests at representative locations as directed by the Consultant, using methods approved by the sealant manufacturer. Replace any sealant that fails to develop proper adhesion.

3.05 CLEANING

A. Remove excess sealant or other soiling due to caulking operations on adjacent surfaces as the work progresses.

B. On non-porous surfaces, remove excess sealant and clean with xylene or mineral spirits before the sealant cures.

C. On porous surfaces, allow excess sealant to cure and then remove by light abrasion or other mechanical means.

D. Leave finished work in neat, clean condition with no evidence of spills onto adjacent surfaces.

3.06 PROTECTION

A. Protect sealed joints from being disturbed for a minimum of 48 hours.

END OF SECTION