

**CONSTRUCTION DOCUMENTS
PARTIAL ROOF REPLACEMENT SPECIFICATIONS**

ROCKDALE COUNTY JAIL

**911 CHAMBERS DRIVE NE,
CONYERS, GA 30012**



PREPARED FOR:

ROCKDALE COUNTY GENERAL SERVICES

**958 MILSTED AVE NE,
CONYERS, GA 30012**

BY



**Raymond Global Project No.: 1184.029
May 20, 2025**

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**SECTION 01 11 00
SUMMARY OF WORK****PART 1 - GENERAL****1.1 Work Covered by Contract Documents:**

1.1.1 Work under this Contract consists of furnishing all labor, materials, and equipment necessary to perform the quality remedial roofing of Rockdale County Jail, Roof Areas A, B, D and F at 911 Chambers Dr NW, Conyers, GA 30012 as shown on Drawings. The work will include, but is not necessarily limited to, the following:

- 1.1.1.1 Remove the existing roofing and roof insulation down to the existing metal deck, and discard.
- 1.1.1.2 Remove all existing flashings, expansion joint flashings, metal flashings, and miscellaneous items as specified herein, and discard.
- 1.1.1.3 Remove all existing gutters, downspouts, scupper liners, and conductor heads and discard.
- 1.1.1.4 Remove existing PVC condensation lines, and discard. Associated P-traps shall remain.
- 1.1.1.5 Remove abandoned rooftop equipment, penetrations, stands, and roof curbs identified on the roof plan and/or the roof, and close the openings in the roof deck.
- 1.1.1.6 At Roof Areas A, B, D, and F, furnish and install new wood blocking at roof eaves as needed to match the height of the new roof system. Attach new wood blocking to existing in accordance with FM-149.
- 1.1.1.7 At Roof Areas A, B, D, and F, furnish and install new mechanically secured polyisocyanurate (ISO) insulation, new fully adhered ISO, fully adhered coverboard, and fully adhered 80-mil TPO membrane roof system as specified herein.
 - (a) Furnish and install new insulation to meet the minimum energy code requirement of R-25.
 - (b) At Roof Area F furnish and install a new ¼" per foot tapered isocyanurate system beneath the coverboard.
- 1.1.1.8 Raise curbs associated with roof top units or other equipment to achieve a minimum 8-inch base flashing height.
- 1.1.1.9 Furnish and install new membrane flashings, expansion joint covers and preformed pipe flashings.
- 1.1.1.10 Furnish and install new flashings and metal flashings including edge metal, gutters, downspouts, scupper liners, conductor heads, and counterflashings, as specified herein.
- 1.1.1.11 Furnish and install new condensation lines and new non-penetrating supports. Condensation lines shall extend to the nearest drainage facility.
- 1.1.1.12 Scrape, prime and paint existing gas lines safety yellow. Raise gas lines to a minimum of 12" above the new roof surface. Furnish and install new non-penetrating gas line supports.
Furnish and install new walkway pads around all roof mounted equipment, roof hatches, and roof access ladders.
- 1.1.1.13 Furnish and install new 30-pound recycled rubber splash blocks at all on roof downspouts.
- 1.1.1.14 Furnish and install any miscellaneous items, as specified herein.

1.2 Description of the Existing Roof System:

1.2.1 Information in this Section is provided only to establish general description the Contractor is responsible for visiting the site and satisfying themselves to the existing conditions, size of Roof Areas, etc. before submitting the Bid.

1.2.2 The roof assembly at Areas A, B, and F is composed of the following:

- 1.2.2.1 The roof surfacing is Bituminous
- 1.2.2.2 The coverboard is 1-1/2-inch thick perlite
- 1.2.2.3 The roof insulation is 2-inch thick polyisocyanurate insulation.
- 1.2.2.4 The roof deck is a metal deck.
 - (a) The roof deck at Roof Area A & B is structurally sloped.
 - (b) The roof deck at Roof Area F is flat.

1.2.3 The roof assembly at Area D is composed of the following:

- 1.2.3.1 The roof surfacing is Bituminous
- 1.2.3.2 The coverboard is 1-1/2-inch thick perlite
- 1.2.3.3 The roof insulation is 3-inch-thick polyisocyanurate insulation.
- 1.2.3.4 The roof deck is structurally sloped metal.

1.2.4 The approximate size of each area is as follows:

1.2.4.1	Roof Area A:	5,170 square feet
1.2.4.2	Roof Area B:	46,086 square feet
1.2.4.3	Roof Area D:	2,843 square feet
1.2.4.4	Roof Area F:	<u>1,090 square feet</u>
	Total:	55,189 square feet

1.2.5 The contractor shall provide asbestos testing of the Rockdale County Jail roof areas by a licensed third party. Results shall be provided to the owner prior to beginning work.

1.2.6 Only request for substitutions received from bidders prior to bid shall be considered.

PART 2 - PRODUCTS: Not used.

PART 3 - EXECUTION: Not used.

END OF SECTION

DIVISION 2
EXISTING CONDITIONS

**SECTION 02 41 13
SELECTIVE DEMOLITION AND PREPARATIONS****PART 1- GENERAL**

- 1.1 Related Work:
 - 1.1.1 Temporary Facilities and Controls - Section 01 50 00
 - 1.1.2 Product Requirements - Section 01 60 00
 - 1.1.3 Storage and Protection - Section 01 66 00
 - 1.1.4 Miscellaneous Rough Carpentry - Section 06 10 53
- 1.2 Protection: Refer to Section 01 66 00.
- 1.3 Materials Ownership
 - 1.3.1 Unless otherwise indicated, demolition waste becomes property of Contractor.
 - 1.3.2 Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1.3.3 Carefully salvage in a manner to prevent damage and promptly return to Owner.
- 1.4 Submittals
 - 1.4.1 Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
 - 1.4.2 Schedule of Selective Demolition Activities: Indicate the following:
 - 1.4.2.1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 1.4.2.2 Interruption of utility services. Indicate how long utility services will be interrupted.
 - 1.4.2.3 Coordination for shutoff, capping, and continuation of utility services.
 - 1.4.2.4 Mode of roof access.
 - 1.4.2.5 Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
 - 1.4.3 Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
- 1.5 Field Conditions

- 1.5.1 Owner will occupy portions of building immediately beneath the selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- 1.5.2 Notify Designer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- 1.5.3 Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1.5.3.1 Hazardous materials will be removed by the contractor before start of the Work.
 - 1.5.3.2 If suspected hazardous materials are encountered, do not disturb; immediately notify Designer and Owner. Hazardous materials will be removed by the contractor under a separate contract.
- 1.5.4 Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1.5.4.1 Maintain fire-protection facilities in service during selective demolition operations.
- 1.6 Coordination
 - 1.6.1 Arrange selective demolition schedule so as not to interfere with Owner's operations.
- 1.7 Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- 1.8 Standards: Comply with ASSE A10.6 and NFPA 241.

PART 2- PRODUCTS

- 2.1 Sheet Metal: 20-gauge galvanized steel.
- 2.2 Metal Deck Primer: Kem Kromik as manufactured by Sherwin Williams, or approved equal.
- 2.3 Metal Deck: ASTM A 653, galvanized G-90 deck, manufactured in accordance with the requirements of the Steel Deck Institute, Inc. for wide rib (Type B, Contractor to field verify). Minimum section properties:
 - 2.3.1 Yield strength = 33 ksi.
 - 2.3.2 Thickness: 22 gauge.
 - 2.3.3 Panel Coverage: minimum 36 inches.
- 2.4 Deck-To-Joist Fastener: ASTM A240, 410 stainless steel, self-drilling minimum #12 stainless steel screw with a nominal head diameter of 0.430 inches. Screws shall penetrate the substrate a minimum of 1-1/2 inch.
- 2.5 Deck Side Lap Screws: ASTM A240, 410 stainless steel, self-drilling minimum #10 stainless steel screw with a nominal head diameter of 0.415 inches. Screws shall penetrate the substrate a minimum of 1 inch.

- 2.6 Masonry Fastener:
- 2.6.1 Masonry Anchor, minimum 1-1/4 inch into substrate, as manufactured by OMG Roofing Products
 - 2.6.2 Tapcon 1/4" x minimum 1-1/4" in the substrate, as manufactured by Buildex.
 - 2.6.3 Roofing Spike, minimum 1-1/4 inch into substrate, as manufactured by Powers Fasteners.
 - 2.6.4 approved equal prior to bid.
- 2.7 Wood Screws: #12 double-coated galvanized steel screws or stainless steel self-tapping wood screws that shall be able to resist any galvanic action that may be able to develop between the nail and the pressure treatment. The use of a lesser quality screw will not be approved. Screws shall be of sufficient length to penetrate a minimum of 1-1/2-inches into the substrate.
- 2.8 Wood Nails: For securing new lumber to new lumber or new plywood/OSB to new lumber, double-coated galvanized steel or stainless-steel ring shank nails to penetrate a minimum of 1-1/2 inches into the substrate but not smaller than 8d nails. Use 16d nails where material being secured is 1-1/2-inches to 2-inches thick.
- 2.9 Toggle Bolts: Nominal 1/2-inch diameter threaded fasteners with steel toggle-type clamps. Fasteners and toggles to have factory-applied corrosion resistant coating. Lengths as required to allow engagement of the toggle clamp

PART 3- EXECUTION

- 3.1 Examination:
- 3.1.1 Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner and Designer do not guarantee that existing conditions are the same as those indicated in Project Record Documents.
 - 3.1.2 Verify that hazardous materials have been remediated before proceeding with building demolition operations.
 - 3.1.3 Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 3.1.3.1 Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
- 3.2 Protection
- 3.2.1 Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 3.2.1.1 Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 3.2.1.2 Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.

3.2.2 Remove temporary barricades and protections where hazards no longer exist.

3.3 Demolition:

3.3.1 Refer to Section 01 11 00 Summary of Work.

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

- 3.3.2.1 Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- 3.3.2.2 Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
- 3.3.2.3 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
- 3.3.2.4 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
- 3.3.2.5 Maintain fire watch during and for at least one hour after flame-cutting operations.
- 3.3.2.6 Maintain adequate ventilation when using cutting torches.
- 3.3.2.7 Remove equipment and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- 3.3.2.8 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

3.3.3 The removal of roof-mounted equipment and/or curbs, as identified either on plans and/or marked on the roof, shall be included in the Base Bid.

3.3.4 The Contractor shall document the actual quantities removed for materials bid on a unit price basis.

3.3.5 Raising curbs, associated roof top units or other equipment as required to achieve minimum 8-inch base flashing height and obtain specified manufacturer's warranty shall be included in the base bid.

3.3.6 All existing roof mounted equipment shall be lifted or removed so that existing flashings can be totally removed.

3.3.7 Remove only as much material as can be totally replaced in the same day.

3.3.8 Demolition shall be performed by personnel familiar with the replacement of materials being

used.

- 3.3.9 Demolition adjacent to areas to remain shall be performed in a neat manner with straight lines to facilitate tie-ins of replacement materials. Contractor shall review tie-in methods with the Designer for approval. Designer has final approval of such methods.
- 3.3.10 Excessive demolition, as determined by the Owner's representative, shall be replaced with equal materials at the Contractor's expense in accordance with the General Conditions of the Contract.
- 3.3.11 No demolition shall be performed if the chance of precipitation is 40% or more as reported by the nearest office of the National Weather Service.

3.4 Preparations:

- 3.4.1 Prior to the installation of any new roofing, flashings, metal flashings, any other miscellaneous items, the Contractor shall clean surfaces of all dust, dirt, and other foreign materials.
- 3.4.2 Inspect the deck carefully. If, in the Contractor's opinion, there are metal deck areas that require repair and/or replacement, notify the Owner. Do not proceed with any repairs or replacement until directed by the Owner.
- 3.4.3 Prior to the installation of any new roofing materials, extend all existing soil pipe vents through the roof to a minimum height of 8 inches (or as required by local plumbing codes) above the finished roof surface. Furnish a piece of PVC piping that will fit snugly into the existing soil pipe vent and shall extend into the pipe a minimum of 12 inches. Provide a second PVC pipe that fits snugly around the smaller PVC pipe and shall provide a minimum 8" height above the finished roof surface. The smaller pipe height shall match the outer pipe. Cement the two PVC pipes together with an approved pipe solvent/glue. Insert the extension into the existing soil pipe vent.

Note: The placement of a PVC pipe extension directly on top of the existing soil pipe vent without the support method described above shall be removed by the Contractor and new extensions approved by the Designer shall be installed at no additional cost to the Owner.

- 3.4.4 **(Unit Price No. 1)** Where wood blocking or curbs are damaged or deteriorated, remove existing wood blocking to a point 6 inches beyond the damage and/or deterioration, and repair and/or replace with new wood blocking to match existing. Secure new blocking to the substrate using specified screws at spacings not to exceed 12 inches on-center, staggered. Pattern.
 - 3.4.4.1 **(Allowance No. 1)** Contract shall include 150 board feet of wood blocking replacement in the Base Bid.
- 3.4.5 **(Unit Price No. 2)** Where steel decking is rusted but remains structurally sound, wire brush deck units so that all rust is removed. Paint with specified metal primer, or approved equal, and allow to dry before proceeding with the installation of new materials.
 - 3.4.5.1 **(Allowance No. 2)** Contract shall include 2,500 square feet of metal deck priming in the Base Bid.
- 3.4.6 **(Unit Price No. 3)** Where steel decking is damaged or rusted through in small areas (less than 6-inches in any direction), clean deck of rust with a wire brush. Paint with specified metal primer or approved equal. Install over the damaged area the specified sheet metal that shall be

secured to the existing steel deck with specified deck screws located 1 inch from the perimeter of the plate, and at 6 inches on center. Extend the new steel plate a minimum of 6 inches onto the surface of the existing steel deck beyond the damaged area.

- 3.4.6.1 **(Allowance No. 3)** Contract shall include 1,000 square feet of sheet metal installation in the Base Bid.
- 3.4.7 **(Unit Price No. 4)** Where steel decking is severely damaged or has deteriorated over large areas (greater than 6-inches in any direction), remove the entire existing deck unit and install new specified decking. Lap new deck units over the existing in the same manner as originally installed. Secure to structural framing with specified screws at Steel Deck Institute 36/4 patterns each available framing member and not more than 24 inches on center at side laps using specified side lap screws. At the perimeter, specified deck fasteners shall be applied at spacings not to exceed 6 inches on-center along the parapet framing.
- 3.4.7.1 **(Allowance No. 4)** Contract shall include 20 square feet of deck replacement in the Base Bid
- 3.4.8 **(Unit Price No. 5)** At those locations where side lap screws have not been installed or side lap screws exceed 30-inches on-center, furnish and install new self-tapping sheet metal screws at spacings not to exceed 30-inches on-center. Contractor shall submit technical data on the proposed screws before the start of this phase of the work.
- 3.4.8.1 **(Allowance No. 5)** Contract shall include the installation of 300 side laps screws in the Base Bid.
- 3.4.9 **(Unit Price No. 6)** At those locations where existing welds have broken from the top of the supporting members or have not been installed, furnish and install new screws in flutes adjacent to broken welds. Welding is not an acceptable means of attaching/re-attaching the deck to the supporting member. Fasteners shall penetrate the structural membrane a minimum of 1-1/2 inches
- 3.4.9.1 **(Allowance No. 6)** Contract shall include the installation of 300 deck-to-joist fasteners in the Base Bid.
- 3.4.10 Contractor shall include allowances as indicated on the Bid Form in the Base Bid. Contract will be increased at unit price rates for unit price work that exceeds allowances. Contract will be reduced for unused unit price work at the bid unit price rate. Owner reserves the right to negotiate lump sum modifications to the contract for bulk unit price work.
- 3.4.11 Abandoned Penetrations at Metal Roof Decks:
- 3.4.11.1 At all abandoned roof penetrations, less than 6 inches in diameter, secure a piece of 20 ga. galvanized steel to the existing deck at spacings not to exceed 6 inches on center and located approximately one inch from the edge of the opening. Sheet metal shall be secured to the deck with specified deck screws. The sheet metal shall extend onto the existing deck a minimum of 6 inches.
- 3.4.11.2 At abandoned openings, larger than 12 inches on any side but less than 24 inches, furnish and install new steel decking which matches the existing and install so that the ends and sides extend past the edges of the existing deck a minimum of 12 inches. The ends of the new steel deck shall extend over a structural member. Secure the new deck to the existing deck with specified deck screws at spacings not to exceed 6 inches on-center located approximately 6 inches from the opening on all sides. The ends of the new deck shall be secured to the existing structural supports using specified deck

- screws at Steel Deck Institute 36/7 patterns. Install specified side lap screws along the side laps at spacings not to exceed 30 inches on-center.
- 3.4.11.3 At abandoned openings, larger than 24 inches on any side, furnish and install new steel decking which matches the existing and install so that the new deck unit is supported by a minimum of three structural supports. Insure that the new deck section is "nested" tightly in the existing, which may require the removal of existing deck fasteners or grinding down existing welds. Secure the new deck to each structural member with specified deck screws at Steel Deck Institute 36/7 patterns. At side laps, furnish and install a minimum of 3 specified side lap screws between each structural member.
- 3.4.12 Cost associated with the removal of any abandoned equipment as identified on plans and/or on the roof shall be included in the Base Bid.

END OF SECTION

DIVISION 7
THERMAL AND MOISTURE PROTECTION

**SECTION 07 22 16
ROOF BOARD INSULATION****PART 1- GENERAL**

- 1.1 Summary: Installation of new roof insulation, as specified herein.
- 1.2 Related Work:
 - 1.2.1 Rough Carpentry - Section 06 10 53.
 - 1.2.2 Thermoplastic Polyolefin (TPO) Roofing - Section 07 54 23.
- 1.3 Submittals: Refer to Section 01 33 00 of this Specification.
- 1.4 Environmental Conditions: Materials installation shall proceed only when weather conditions are in compliance with the applicable manufacturer's recommendations for installation and no precipitation is imminent. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Owner.
- 1.5 Warranty: Refer to Section 01 78 36 of this Specification.
- 1.6 Code Requirements: Minimum R-25. Ensure thickness of insulation matches Specified insulation thickness as described in the "Installation" section of this section. Notify Designer if specified thickness does not meet the Code required minimum.

PART 2- PRODUCTS

- 2.1 Polyisocyanurate Roof Insulation: Flat and tapered, as specified, ASTM C1289, Type II, Class I. Board size shall not exceed 4' x 8' for mechanically attached insulation. Board size of tapered insulation shall not exceed 4' x 4'. The Long-Term Thermal Resistance shall be a minimum of 5.7 per inch. Insulation compressive strength shall be minimum 20 psi. Insulation density shall be 2 pcf minimum. Thermal insulating factor as specified; however, thicknesses of each layer of insulation shall not exceed 2 inches.
- 2.2 Wood Fiber Tapered Edge Strips: ASTM C208, Type II, Grade 1 (Built-Up Roofs), C209. Approved for use by approved roofing system manufacturer.
- 2.3 Cover Board:
 - 2.3.1 Gypsum Fiber Board, Nominal 1/2" thick, ASTM C 1177, 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E 84, nominal 900 psi minimum compressive strength, Class A, non-combustible, 4' x 8' board size.
- 2.4 Separator Board: Gypsum Fiber Board, nominal 1/4" thick, ASTM C 1177 or C1278, 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E 84, nominal 900 psi minimum compressive strength, Class A, non-combustible, 4' x 8' board size. Approved for use by the roofing system manufacturer to adhere membrane flashings.
- 2.5 Fasteners & Plates:
 - 2.5.1 Insulation Fastener: Minimum #12 steel screw roof insulation fastener for steel decking as approved by the roofing materials manufacturer and Factory Mutual requirements. Fasteners must pass a minimum of 15 cycles in the Kesternich SFW 2.0s DIN 50018 test with less than 15

- % red rust.
- 2.5.2 Insulation Fastener Plate: 3" ribbed, galvalume coated steel plate as approved by the roofing materials manufacturer and Factory Mutual requirements.
- 2.5.3 Low-Rise Adhesive Fastener: double or single-component low-rise polyurethane adhesive as approved by the roofing system manufacturer

PART 3- EXECUTION

3.1 Coordination and Inspection

- 3.1.1 The substrate shall be clean, smooth, dry, and free of debris and all foreign matter prior to receiving insulation and cover board. Application of new materials shall constitute approval of the substrate by the Contractor.
- 3.1.2 The contractor bears the responsibility to locate any conduits that are in the decking flutes prior to the start of the work. The contractor shall to the full extent possible, not engage these conduits with screws, fasteners, etc. Should power be lost due to penetrate a conduit, the Contractor bears the responsibility to locate and repair the conduit and/or enclosed wiring to the original condition so as to restore power to the Owner. Cost associated with these repairs shall be borne by the Contractor at no additional cost to the Owner.
- 3.1.3 Repairs to conduit, wiring, electrical equipment, and accessories under this paragraph shall be performed by an electrical contractor licensed to perform such work in the state of Georgia with a minimum of 5 years experience in this type of work.

3.2 General Installation: Roof Insulation and Cover Board

- 3.2.1 Apply insulation with end joints staggered approximately one-half the length of the units.
- 3.2.2 Offset insulation joints from the preceding layer a minimum of six (6) inches.
- 3.2.3 Fit insulation units snugly to each other and to all vertical surfaces.
- 3.2.4 Low-Rise Foam Adhesive: Secure each board to the substrate using low-rise adhesive beads at spacings in accordance with the manufacturer's requirements to resist the uplift pressures and/or ratings shown on drawings for each zone and the approved tested assembly. Ensure insulation contact with adhesive by weighting units.
- 3.2.5 Mechanical Attachment: Secure each board to the metal deck using plates and fasteners in accordance with the manufacturer's requirements to resist the uplift pressures and/or ratings shown on drawings for each zone and the approved tested assembly. Partial units less than 4 square feet shall be secured with a minimum of 4 fasteners/plates. Provide insulation fastener of length to penetrate the roof deck a minimum of ¾ inch and a maximum of 1-1/2 inch.
- 3.2.6 Replace damaged units as required to provide a smooth surface and uniform insulation thickness.

3.3 General Requirements: Crickets/Saddles

- 3.3.1 Cricket/Saddles shall also meet the requirements of Paragraph 3.2 above.
- 3.3.2 Cricket/Saddles shall be constructed of factory tapered insulation double the slope of the roof.
- 3.3.2.1 Example: ¼-inch-per-foot tapered insulation shall be used on a 1/8-inch per foot roof

slope.

- 3.3.3 Minimum cricket/saddle length to width ratio shall be 3:1 or comply with "NRCA L:W Ratios for Saddles and Crickets." Refer to figure 4-13 of the NRCA Roofing Manual, Membrane Roof Systems.

3.3.3.1 Example: A 12-foot long cricket shall be a minimum of 4-feet wide.

3.3.3.2 Contractor may adjust cricket/saddle length to width ratio to prevent ponding at roof curbs or other penetrations based on field conditions. Contractor is responsible for preventing ponding.

- 3.3.4 Start cricket construction by striking chalk lines for outer edges of tapered units. Install the first row along the chalk lines, mitering and fitting at the points where lines break.

- 3.3.5 Complete the cricket assembly using tapered isocyanurate and isocyanurate fill units. Fill unit shall not exceed 2 inches in thickness.

- 3.3.6 The thin edge of the tapered insulation shall be ½" and shall be located at the valley created by the tapered insulation and the roof insulation.

- 3.3.7 Remove and replace damaged units with new insulation or repair to provide a smooth surface and uniform insulation thickness.

- 3.3.8 Utilize tapered wood fiber edge strips that transition from 0" to 1/2" as the first layer of tapered insulation to provide a smooth transition. Set wood fiber on top of the insulation in one continuous band of low-rise foam adhesive.

3.4 Installation – Roof Area A, B, D, F:

- 3.4.1 Apply one layer of isocyanurate insulation to the roof deck and secure by mechanical attachment. Apply an additional layer of isocyanurate insulation to the first layer and secure using low-rise adhesive.

3.4.1.1 At Roof Area F, furnish and install ¼" per foot tapered insulation roof system. Tapered insulation and associated fill units shall occur between the top layer of flat insulation and the coverboard. Secure tapered insulation and associated fill units using low rise foam adhesive.

- 3.4.2 At the gutter eave, furnish and install one row of new tapered isocyanurate over the first layer of isocyanurate insulation. Tapered insulation shall have a height that is approximately 1/4-inch-thick located along the inside edge of the eave wood blocking and shall match the height of the new flat insulation system. Apply the tapered insulation to the flat insulation and secure using low-rise adhesive.

- 3.4.3 Furnish and install tapered insulation to move water from walls, form valleys/crickets, as shown on roof plans, using factory-tapered units and isocyanurate fill units.

- 3.4.4 Furnish and install one layer of nominal 1/2-inch-thick cover board over all isocyanurate insulation and secure using low-rise adhesive.

- 3.5 Separator Board: At curbs and walls above roof level where bituminous flashings have been removed and new plywood or metal is not installed, furnish and install a new separator board over the substrate where new membrane flashings will be applied. Secure the board to the substrate using specified fasteners and insulation plates at spacings not to exceed 18 inches on-center, in every direction and a minimum of 2 rows of fasteners. Fasteners shall penetrate the substrate a minimum of 1 inch.

END OF SECTION

**SECTION 07 54 23
THERMOPLASTIC POLYOLEFIN (TPO) ROOFING****PART 1- GENERAL**

- 1.1 Work Included: Installation of a thermoplastic polyolefin (TPO) roof membrane, as specified herein.
- 1.2 Related Work
 - 1.2.1 Selective Demolition and Preparations - 02 41 13
 - 1.2.2 Roof Board Insulation - Section 07 22 16
 - 1.2.3 Flashing and Sheet Metal -Section 07 60 00
- 1.3 Submittals: In accordance with Section 01 33 00 of this Specification
 - 1.3.1 Contractor shall submit to Owner for approval membrane roofing system that is identical to systems that have been successfully tested by a qualified testing agency or has been engineered by the manufacturer to resist uplift pressure calculated according to ASCE/SEI 7 and meets ASTM E 108 or UL 790 Class A fire rating. Wind up lift requirements can be found on drawings.
 - 1.3.2 Provide method of perimeter and corner enhancement, picture framing is not permissible.
- 1.4 Environmental Conditions: Material installation shall proceed only when weather conditions are in compliance with the applicable manufacturer's recommendations for installation and no precipitation is imminent. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Owner.
- 1.5 Preconstruction Testing
 - 1.5.1 **The contractor shall retain the services of a licensed third-party testing firm to perform mechanical fastener pull out tests prior to installing mechanically attached TPO membrane. The contractor shall repair openings in the roof to a watertight condition. Perform test at each type of roof deck requiring mechanical fasteners. Perform test in accordance with ANSI/SPR FX-1. Test results and photographs shall be composed into a report that shall be issued to the Owner and Designer within 48 hours of the test. Submit manufacturer's tested assembly to comply with results of the pull test.**
- 1.6 Warranty:
 - 1.6.1 Term length of the manufacturer's guarantee shall be thirty (30) year No Dollar Limit at Roof Areas A, B, D, and F
 - 1.6.2 Warranty shall include a 72-mph wind rider
 - 1.6.3 The warranty shall include edge metal, gutters, and copings.
 - 1.6.4 It is the sole responsibility of the contractor to ensure prior to bidding the project that the system he is proposing meets the noted warranty requirements without exceptions.

- 1.6.5 Note: There have been instances where a problem has arisen with the material performance of a product that has been approved by the roofing system manufacturer, but is not manufactured by the roof system manufacturer. In those instances where a product defect or failure occurs, even if the failure/defect does not result in leaks through the membrane and/or facility, the roofing system manufacturer shall work in concert with the roofing contractor to resolve such issues to the satisfaction of the Owner at no additional cost to the Owner.

1.7 Wind Uplift Resistance: Refer to Drawings.

1.8 Fire Resistance: ASTM E10/8 or UL 790, Class A.

PART 2- PRODUCTS

2.1 Acceptable Roofing System Manufacturers:

- 2.1.1 Carlisle Syntec: Sure-Weld, 80 mil.
- 2.1.2 Johns Manville: JM TPO, 80 mil.
- 2.1.3 Elevate: Ultraply TPO, 80 mil.
- 2.1.4 Approved alternative prior to bid.

2.2 Thermoplastic Polyolefin Roofing Materials

- 2.2.1 Thermoplastic Polyolefin Membrane. ASTM D6878, Nominal 80 mil overall thickness with minimum 24 mil polymer thickness above the scrim. A minimum tearing strength of 120 pounds as tested in accordance with ASTM D751. A minimum puncture resistance of 400 pounds as tested in accordance with FTM 101C, Method 2031.

2.2.1.1. Maximum sheet width of 12-feet for fully adhered membrane.

2.2.1.2. Membrane color: White.

- 2.2.2 **Deductive Alternate No.1:** Thermoplastic Polyolefin Membrane. ASTM D6878, Nominal 60 mil overall thickness with minimum 21 mil polymer thickness above the scrim. A minimum tearing strength of 120 pounds as tested in accordance with ASTM D751. A minimum puncture resistance of 300 pounds as tested in accordance with FTM 101C, Method 2031.

2.2.1.3. Maximum sheet width of 12-feet for fully adhered membrane.

2.2.1.4. Membrane color: White.

- 2.2.3 Membrane Base Flashing: Thermoplastic Polyolefin Membrane. ASTM D6878, Nominal 60 mil overall thickness with minimum 21 mil polymer thickness above the scrim. A minimum tearing strength of 120 pounds as tested in accordance with ASTM D751. A minimum puncture resistance of 300 pounds as tested in accordance with FTM 101C, Method 2031

- 2.2.4 Membrane Adhesive (Solvent-Based), as manufactured by the approved roofing system manufacturer.

- 2.2.5 General Purpose Sealant (White). As manufactured by the approved roofing system manufacturer.

- 2.2.6 T-Joint Covers. As manufactured by the approved roofing system manufacturer.

- 2.2.7 Inside/Outside Molded Corners. As manufactured by the roofing system manufacturer. The use of field-fabricated inside/outside corners is not acceptable.

- 2.2.8 Large and Small Pipe Flashing. As manufactured by the roofing system manufacturer.
- 2.2.9 Universal Pipe Boot. As manufactured by the roofing system manufacturer. Pre-fabricated flashing boot shall include a draw band for securing the top of the flashing boot to the pipe.
- 2.2.10 Unsupported Membrane. As manufactured by the approved roofing system manufacturer. Minimum 55 mil thickness.
- 2.2.11 Cut Edge Sealant. As manufactured by the approved roofing system manufacturer.
- 2.2.12 Membrane Cleaner: As manufactured by the approved roofing system manufacturer. For use in removing foreign debris from the membrane prior to welding.
- 2.2.13 Membrane-Clad Metal: As manufactured by the approved roofing system manufacturer, ASTM A653, minimum 24 ga. galvanized steel clad with membrane.
- 2.2.14 Termination Bar. As manufactured or approved by the approved roofing system manufacturer.
- 2.2.15 Polyurethane Caulk: As manufactured and/or approved by the roofing system manufacturer. To be applied at those locations identified by the manufacturer.
- 2.2.16 Water Cut-Off Mastic: As manufactured and/or approved by the roofing system manufacturer. To be applied at those locations identified by the manufacturer.
- 2.3 Membrane Welding Machines: As approved by the roofing system manufacturer. Contractor shall provide written documentation that operators have received the roofing system manufacturer's required training to operate equipment. Welders shall be maintained in good working order and shall be operated and maintained in accordance with the welding machine manufacturer's written instructions.
- 2.4 Walkway Pads: As manufactured by the approved roofing system manufacturer. Nominal 30" wide.
- 2.5 Foam Core: Compression tube that is a minimum of 1.5 times larger than the expansion joint opening, as approved for use by the approved roofing system manufacturer.
- 2.6 Roofing Nails: With minimum 1" head, such as Simplex nails or approved equal.
- 2.7 Fasteners
 - 2.7.1 Membrane Fastener: Minimum #15 steel screw roof fastener for steel decking as approved by the approved roofing materials manufacturer to resist uplift requirements shown on plans. Minimum pull-out in new Grade C, 22 gauge decking is 640 lbs. Fasteners must pass a minimum of 15 cycles in the Kesternich SFW 2.0s DIN 50018 test with less than 15% red rust. Provide fasteners of lengths to penetrate the top of the roof deck a minimum of 1-inch and no more than 1-1/2-inch.
 - 2.7.2 Seam Plate: Minimum 2-3/8" grooved, galvalume steel plate. As approved by the roofing materials manufacturer to use in conjunction with the specified membrane fasteners to attach thermoplastic membrane.
- 2.8 Hangers and Supports:
 - 2.8.1 Acceptable manufacturers:
 - 2.8.1.1 Miro Industries, 844 South 430 West Suite 100, Heber City, Utah

- 2.8.1.2 CADDY, a registered trademark of Eric International Corporation, 31700 Solon Road, Solon, Ohio
- 2.8.1.3 PHP Systems, 5534 Harvey Wilson Drive, Houston, Texas
- 2.8.2 3-RAH-12 with polycarbonate base and roller for piping up to 3" in diameter.
- 2.8.3 6-RAH-12 with polycarbonate base and roller for piping up to 6" in diameter
- 2.8.4 Model 1.5 for condensation lines.
- 2.9 Masonry Anchor:
 - 2.9.1 Masonry Anchor, minimum 1-1/4 inch into substrate, as manufactured by OMG Roofing Products
 - 2.9.2 Tapcon 1/4" x minimum 1-1/4" in the substrate, as manufactured by Buildex.
 - 2.9.3 Roofing Spike, minimum 1-1/4 inch into substrate, as manufactured by Powers Fasteners.
 - 2.9.4 Approved equal prior to bid.

PART 3- EXECUTION

- 3.1 Inspection
 - 3.1.1 The substrate shall be clean, smooth, dry, free of debris and all foreign matter prior to installation of the roof membrane. Application of new materials shall constitute approval of the substrate by the Roofing Contractor.
 - 3.1.2 Insulation joints with gaps greater than 1/4" shall be filled with roof insulation in order to provide a smooth surface.
 - 3.1.3 Prior to installation, confirm deck orientation. TPO membrane sheets shall be installed perpendicular to the deck flutes.
- 3.2 Fully Adhered Roof Membrane Installation
 - 3.2.1 Unroll the membrane sheets and allow them to relax in accordance with the roofing system manufacturer's recommendations and ambient temperature at the time of this phase of the work.
 - 3.2.2 Remove any damaged or creased membrane sections, and discard.
 - 3.2.3 All membrane surfaces to be welded shall be clean and dry. No adhesive shall be present within the lap areas.
 - 3.2.4 Solvent-Based Adhesive
 - 3.2.4.1 Fold the sheet back evenly without wrinkles onto itself to expose the underside. Position the sheet at any field splices by overlapping the membrane approximately 5 inches, unless the manufacturer has a more stringent requirement. Once the membrane is in place, mark the bottom sheet 1/2" - 3/4" from the edge of the top sheet every 4' - 6' with a lumber crayon or similar type marking device.

- 3.2.4.2 Sweep the substrate with a stiff broom to remove materials that will interfere with the proper installation of the membrane.
- 3.2.4.3 Apply the manufacturer's bonding adhesive to both the exposed underside of the sheet and the substrate to which it will be adhered to allow approximately the same drying time. Apply adhesive to provide an even and uniform film thickness. Care shall be taken not to apply adhesive over an area that is to be later cleaned and spliced to another sheet of flashing.
- 3.2.4.4 Allow adhesive to flash off until tacky. Touch the adhesive surface with a clean dry finger to be certain that the adhesive does not stick or string. Also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness.
- 3.2.4.5 Starting at the fold, roll the previously coated portion of the sheet into the coated substrate slowly and evenly to minimize wrinkles. Compress the bonded half of the sheet to the substrate with a stiff push broom.
- 3.2.4.6 Fold the unadhered half of the membrane sheet back onto itself, and repeat the bonding procedure to complete the bonding of the sheet.
- 3.2.5 At eaves, the membrane shall be mechanically fastened to the eave wood blocking using membrane fasteners and plates spaced no more than 12 inches on-center. Extend an additional membrane over the wood blocking a distance to match the depth of the gutter at gutter eaves or the rake flashing at rake eaves. Extend the additional membrane a minimum of 5 inches onto the roofing past the eave membrane fasteners. Fully adhere the membrane to the wood blocking and fasten to the vertical face of the wood blocking using roofing nails spaced no more than 12 inches on-center. Fully weld the membrane to the roofing. Set the edge of the membrane in continuous multi-purpose tape.
- 3.2.6 Vertical Surfaces:
 - 3.2.6.1 At vertical surfaces, turn the membrane up the vertical surface a minimum of 2 inches and fully adhere using the manufacturer's approved adhesive. Secure the membrane to the substrate using the roofing system manufacturer's approved termination bar or fasteners/plates, and secure in accordance with their written instructions. Fasteners shall penetrate the substrate at spacings and depths approved by the roofing system manufacturer.
 - 3.2.6.2 At the base of curbs, parapets, and other vertical surfaces, the membrane shall be mechanically fastened to the metal decking using membrane fasteners and plates spaced no more than 12 inches on-center.
- 3.2.7 Furnish and install the roofing system manufacturer's patches at all required locations such as intersecting field seams. Apply the manufacturer's approved seam caulk, as required, at locations specified by the roofing system manufacturer.
- 3.2.8 Prior to final inspection, the surface of the membrane shall be cleaned of all debris, dust, and foreign material. This may require the use of water, detergents, and other cleaning agents approved by the roofing system manufacturer. Contractor will be responsible for providing the necessary items to perform this task. Do not use any abrasive pads that can score the polymer.
- 3.3 Base Flashings Installation
 - 3.3.1 Roll out the membrane to be used for base flashings and allow to relax in accordance with the roofing system manufacturer's written instructions.

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- 3.3.2 Flashing pieces shall extend onto the roof a minimum 3 inches past the roof membrane fasteners at the edge of the sheet and up the vertical surface a minimum of 8 inches.
- 3.3.3 Fully adhere the flashing to the substrate using the roofing system manufacturer's approved flashing adhesive.
- 3.3.4 Base flashing shall be smooth to the substrate, and wrinkles in base flashing shall be grounds for rejection.
- 3.3.5 If base flashings terminate at a corner and edges would be exposed, furnish and install new 4-inch x 4-inch L-type membrane-clad metal closures with an exterior edge caulking cove. If base flashings terminate at walls and edges would be exposed, furnish and install new 4-inch-wide L-type membrane-clad metal closures with an exterior edge caulking cove. The closure shall be set in water cut-off mastic or butyl tape, and fastened to the substrate using appropriate fasteners at spacings not to exceed 12 inches on center. Completely hot air weld the base flashings to the membrane-clad metal. Apply a non-shrinking sealant, such as NP-1 or approved equal, to the caulking cove at the exterior edge of the closure. Completely remove all residual asphalt from the substrate prior to installing any sealant or caulking.
- 3.3.6 At inside and outside corners of curbs and parapets, Contractor shall use the roofing system manufacturer's pre-fabricated corner pieces. The use of field-fabricated pieces is not acceptable. Pre-fabricated pieces shall be installed in accordance with the roofing system manufacturer's written instructions.
- 3.3.7 At locations where base flashing seam transition from vertical to horizontal, the contractor shall furnish and install new unsupported patches at these locations shall extend a minimum of 3 inches past the transition, centered over the seams in all directions.
- 3.3.8 Use the roofing system manufacturer's termination bar at base flashing that exceed 36 inches in height. Install rows of termination equally spaced up the wall. Fastener spacings not to exceed 8 inches on center. Set flashing in water cut-off mastic, set the bar over the edge of the base flashing, and apply caulk at the top of the flashing.
- 3.3.9 At a minimum, extend base flashings up and over the top horizontal surface of curbs and inside the curb a minimum of 1 inch, unless otherwise stated in specification.
- 3.3.10 Extend the base flashing over the top of the parapet and down the outside face of the wood blocking. Base flashing shall extend down past the outside face of the parapet wood blocking a minimum of 1 inch. Fully adhere the membrane to the wood blocking and fasten to the vertical face of the wood blocking using roofing nails at spacings not to exceed 12 inches on-center. Set the edge of the membrane in continuous multi-purpose tape.
- 3.4 Expansion Joints: Install new membrane expansion joints at locations where the existing is removed. Secure the field membrane at the base of curbs as specified herein. Form a membrane envelope that matches the depth of the curb and roof insulation. Fill envelope with batt insulation. Furnish a continuous foam core over the opening. Cover the joint and foam core with the base flashings and/or additional membrane. Reinforce the seams over the expansion joint with additional membrane that shall extend a minimum of 3 inches past the expansion joint seams in every direction.
- 3.5 Heat Welding
- 3.5.1 Hot air weld all sheet seams using either a machine or hand-held hot air welder approved by the roofing system manufacturer. A copy of the operating instructions shall be provided to the Designer prior to the start of the project.

- 3.5.2 Monitor the temperature of the hot air welder so as to minimize the amount of smoke that should develop and to ensure that the material from the bottom of the sheet begins to soften and flow from the seam. Hand held welders shall insure that membrane welding is immediately followed by a hand roller to press the heated membrane surfaces together with slow, even movements.
- 3.5.3 All seams shall be manually probed using a blunt rounded instrument daily. Any fishmouths or other seam defects where the seam is not fully adhered shall be repaired in accordance with the roofing system manufacturer's instructions.
- 3.5.4 After seams have set for approximately 8 hours, the Contractor shall make a minimum of 3, 2" x 12" test cuts across the seam, with at least one of the test cuts taken from the first seam of the day. If multiple welders are used, the minimum test cuts are applicable to each welder used. Test cuts shall be repaired by the Contractor daily and shall be done at no additional cost to the Owner. In lieu of test cuts, the contractor may perform peel tests. Peel test shall be performed with two 4" x 12" pieces of membrane that shall be welded together 1-1/2 inch for the machine welder and 2 inches for hand welders. The membrane shall be pulled apart across the seam. Test shall be dated, and one test shall be performed every time a welding device is turned on. An archive of test shall be available for Designer inspection.

Peel-test shall only be considered successful if:

- i there is a complete cohesion failure in a polymer layer, and/or
 - ii there is an adhesion failure between a polymer layer and the scrim.
 - iii Other instances as stated in writing by the membrane manufacturer.
- 3.5.5 Seams shall be tested in accordance with the roofing system manufacturer's instructions and evaluated for seam integrity. Seams that fail this test shall be subject to additional test cuts, as directed by the Designer and/or roofing system manufacturer, in order to further quantify the extend of the deficient condition. Repairs to deficient seams and/or test cut locations shall be performed by the Contractor at no additional cost to the Owner.
- 3.5.6 Seal the edges of the membrane where the reinforcing fabric is cut with the roofing system manufacturer's approved seam sealant. Such work shall be done on a daily basis.

3.6 Pipe Flashing Installation

- 3.6.1 Pipe penetrations shall be flashed using pre-manufactured pipe flashings. Cut the pipe flashing so that it will fit tight to the pipe penetration. Ensure that the field membrane is secured at the base of the pipe as required herein. Fully weld the pipe flashing flange to the field membrane in accordance with membrane manufacturer written instruction. Set the pipe flashing in water block against the pipe penetration, and secure the top of the pipe flashing to the pipe using a draw-band clamp. Seal the top of the pipe flashing to the pipe penetration using NP-1 sealant, or approved equal.
- 3.6.2 At locations where pre-manufactured pipe flashing cannot be installed, the contractor may field flash the pipe penetration. Field flashing shall extend onto the roofing membrane a minimum of 2 inches past the membrane fasteners. Field flashing shall extend up of the pipe penetration a minimum of 6 inches. The top of the field flashing shall receive water block, draw-band clamp, and sealant in accordance with Paragraph 3.5.1 above. At square penetrations, secure the top edge of the field flashing using a self-adhering membrane stripping membrane. Prime the penetration and membrane prior to applying the self-adhering membrane.

- 3.6.3 Install any necessary pre-molded pitch pans in accordance with manufacturer written instructions. Prior to applying pourable sealer, seal the penetration through the membrane with sealant.

3.7 Walkway Pad

- 3.7.1 Apply one row of walkway pads around all roof access hatches, at the base of roof access doors, at the top and bottom of ship ladders, and around mechanical roof top units. Install walkway pads in accordance with the roofing system manufacturer's written instructions.
- 3.7.2 Walkway pads shall be spaced approximately 1 inch apart. Leave small opening on the downslope side of walkway pads to allow for any water beneath the pads to exit.
- 3.7.3 Clean the surface of the membrane to receive the walkway pads in accordance with the roofing system manufacturer's written instructions. Fully adhere the walkway pad to the membrane and hot-air weld all sides of the pads to the surface of the membrane in accordance with the roofing system manufacturer's written instructions.

3.8 Field Quality Requirements:

- 3.8.1 Manufacturer's Field Services: Upon Owner's request, provide material manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.
- 3.8.2 Minimum Manufacturer Inspections: Provide inspections by a Technical Representative employed by the roofing system manufacturer whom shall not perform any sales functions. Contractor shall complete any necessary repairs required for issuance of warranty. Minimum schedule of material manufacturer inspections:
 - 3.8.2.1 Pre-Construction Conference
 - 3.8.2.2 Mock-Up Evaluation
 - 3.8.2.3 25% Completion
 - 3.8.2.4 50% Completion
 - 3.8.2.5 Final Completion
- 3.8.3 Contractor shall provide Owner and Designer a copy of the manufacturer's inspection report within 48-hours of each inspection.

- 3.9 Prior to final inspection, the surface of the membranes shall be cleaned of all debris, dust, and foreign material. This may require the use of water, detergents, and other cleaning agents approved by the roofing system manufacturer. Contractor will be responsible for providing the necessary items to perform this task. Do not use any abrasive pads that can score the polymer.

END OF SECTION

**SECTION 07 60 00
FLASHING AND SHEET METAL****PART 1- GENERAL**

- 1.1 Summary: Includes the fabrication and installation of sheet metal and related accessories associated with roofing membranes, providing physical protection to membrane, base flashings and membrane terminations, as specified herein.
- 1.2 Related Work:
 - 1.2.1 Rough Carpentry - Section 06 10 53
 - 1.2.2 Thermoplastic Polyolefin (TPO) Roofing - Section 07 54 23
- 1.3 Submittals: In accordance with Section 01 33 00 of this Specification
 - 1.3.1 Submit metal flashing fabricator's ANSI/SPRI ES-1 certifications.
- 1.4 Environmental Conditions: Material installation shall proceed only when weather conditions are in compliance with the applicable manufacturer's recommendations for installation and no precipitation is imminent. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Owner.
- 1.5 Warranty: In accordance with Section 01 78 36 of this Specification.

PART 2- PRODUCTS

- 2.1 Stainless Steel: Type 316 (16% chromium, 10% nickel, and 2% molybdenum) ASTM A240, mill finished.
- 2.2 Aluminum: ASTM B209, minimum 0.040" thick.
- 2.3 Flat Bar: ¼" x 1" (stiffener for gutter and counter flashing), 1/8" x 1" (gutter spacers) and 1/4" x 2" (gutter brackets) flat stock galvanized steel.
- 2.4 Termination Bar: ¼" x 1" aluminum.
- 2.5 Kynar 500-Based Finish: Shall be factory applied, oven-finish. Finish and primer shall be applied in strict accordance with the formulator's specifications and shall meet the performance criteria of AAMA 605.2-90 specification. Finish coat thickness shall be a minimum of 1.0 mil. Primer coat thickness shall be a minimum of 0.3 mil. Color to match the existing color to be selected by owner.
- 2.6 Solder: ASTM D32-66T with 50% lead and 50% tin unless otherwise specified. Follow manufacturer's recommended soldering procedures.
- 2.7 Non-Shrinking Sealant: ASTM C920, Type S or M, Grade NS, Class 25, for Use NT, M, A, and O.
- 2.8 Two-Piece Fascia: Fascia cover to be 24-gauge galvanized steel with Kynar 500-based finish, color as selected by Owner. Retainer to be formed from minimum 0.050-inch-thick minimum. Fascia product assembly shall be approved for FM ratings shown on drawings and in compliance with ANSI/SPRI ES-1. Face height to match existing.
 - 2.8.1 Anchor-Tite Fascia, as manufactured by Metal-Era, Inc.
 - 2.8.2 PAC-Tite WT Fascia, as manufactured by Peterson Aluminum Corporation.

2.8.3 TermiEdge Roof Edging, as manufactured by W.P. Hickman Company

- 2.9 Two-Piece Fascia with Integral Water Dam: Fascia cover shall be minimum 24-gauge galvanized steel with Kynar 500-based finish, color as selected by Owner. Spring cleat shall be minimum 22-gauge galvanized steel. Fascia product assembly shall be approved for uplift pressures shown on drawings and in compliance with ANSI/SPRI ES-1. Face height to match existing.

2.9.1 Snap-On Perma-Tite System 200 Fascia, as manufactured by Metal-Era, Inc.

2.9.2 PAC-LOC, as manufactured by Peterson Aluminum Corporation.

2.9.3 EconoSnap Fascia, as manufactured by OMG Edge Systems.

- 2.10 Minimum Acceptable Metal Weights (All metal to be finished with Kynar 500 coating, or approved equal prior to bid unless otherwise specified).

A-Style Eave Flashing:	24-gauge galvanized steel
A-Style Eave Flashing:	24-gauge galvanized steel (membrane-clad)
A-Style Eave Flashing Cleat:	22-gauge galvanized steel
Conductor Head:	24-gauge galvanized steel
Coping:	24-gauge galvanized steel
Coping Cleat:	22-gauge galvanized steel
Counterflashing:	24-gauge galvanized steel
Downspout:	24-gauge galvanized steel
Expansion Joint Cover:	24-gauge galvanized steel
Expansion Joint Cleat:	24-gauge galvanized steel
Face Extender:	24-gauge galvanized steel
Face Extender Cleat:	22-gauge galvanized steel
Gutter:	24-gauge galvanized steel
L-Style Eave Flashing:	24-gauge galvanized steel (membrane-clad)
L-Style Eave Flashing Cleat:	22-gauge galvanized steel
Primary Scupper:	24-gauge stainless steel
Primary Scupper:	24-gauge galvanized steel (membrane-clad)
Primary Scupper Exterior Flange:	24-gauge galvanized steel

PART 3- EXECUTION

3.1 General Installation Requirements:

- 3.1.1 Inspect all surfaces to which metal is to be applied. Do not install metal unless surfaces are even, sound, clean, dry and free from defects which might affect the application.
- 3.1.2 Follow recommendations of the National Roofing Contractors' Association (NRCA) and Sheet Metal and Air Conditioning Contractors National Association Architectural Sheet Metal Manual (7th Edition) for fabricating in-shop and on-site, and for installation, unless otherwise specified herein.
- 3.1.3 Metal flashings installed at edges and/or parapets of low-sloped roofing shall adhere to ANSI/SPRI ES-1 wind uplift requirements, as necessary. Specified fastening along with metal flashing thicknesses, gauges, and/or weights listed herein are the minimum required. In the event additional fastening or thicker, lower gauge, or heavier metal flashings are required, the contractor shall satisfy the requirements of ANSI/SPRI ES-1. In some instances, shop-formed metal flashings cannot satisfy ANSI/SPRI ES-1 requirements without additional testing or proprietary systems are necessary. Such cost for testing and/or propriety systems shall be included in the Bid as required.

- 3.1.4 Follow published instructions of the product manufacturer for installation of extruded or proprietary metal products, unless otherwise specified herein.
- 3.1.5 Use nails, screws, bolts, cleats or other fasteners of the same material or of material chemically compatible with the contacted metal.
- 3.1.6 Fabricate cleats to be a minimum of one gauge heavier than fascia metal.
- 3.1.7 Do not place dissimilar metals in direct contact or in positions where water sheds across both metals.
- 3.1.8 Install metal to be water and weather tight with lines, arises and angles sharp and true and with paint surfaces free of waves and buckles.
- 3.1.9 Install shop-formed metal flashings in 10-foot lengths maximum with a minimum number of pieces in each straight run.
- 3.1.10 Shop form all metal shapes, which are to be formed of prefinished metal, with protective plastic film in place. Do not remove plastic film until just prior to (or, if possible, after) installation.
- 3.1.11 At all corners, shop form corner pieces of fascia and drip edge flashing from a single section of metal with minimum 36-inch legs on either side of the corner.
- 3.1.12 Cleats: Cleats shall be secured with nails that penetrate the wood a minimum of 1 inch at spacings not to exceed 6 inches on center. Nails shall be applied along the vertical face of the wood blocking and located approximately 1-3/4-inch from the bottom of the cleat. Metal flashing drip legs shall be fold snugly over the cleat.
- 3.1.13 Flat Drive Cleats: Refer to NRCA Detail SM-01. Lap vertical sections a minimum of 3-inches and hem the top of the sections. Apply the flat drive cleat and fold down the outside face of both sides of the coping 1 inch, snug to the vertical flange of the coping. Trim excess flat drive cleat from the vertical face of the coping.
- 3.1.14 Lapped Metal: Refer to NRCA Detail SM-01. Apply a continuous bead of caulk between any lapped metal sections, except for counterflashing lapped joints. The application of caulk after metal components have been lapped is unacceptable and will be grounds for rejection.

3.2 A-Style Flashing:

- 3.2.1 At locations where the existing is removed, furnish and install new A-type flashing. The flashing shall extend a minimum of 1 inch above the roof level. The flashing shall have a 4-inch horizontal flange. Refer to NRCA Details SM-14 and UL-25. The flashing shall cover the exterior wall cladding a distance to match the existing; however, the vertical flange of the flashing shall not be more than 8 inches. If additional area of wall needs to be covered with flashing to match the existing, furnish and install new face extenders. Install face extender prior to installing flashing.
- 3.2.2 Single-Ply Roofing:
 - 3.2.2.1 Prior to installing the flashing or gutter, ensure the roofing ends down the exterior face of the wall a distance to match the flashing or gutter, whichever is greater.
 - 3.2.2.2 Set horizontal flange in a continuous bead of sealant on top of the roofing.
 - 3.2.2.3 At low and high eaves, join sections using cover plates.

3.2.2.4 At rake eaves, join sections by lapping.

3.2.3 Install gutters before flashing. Flashing shall extend into gutter a minimum of 2 inches.

3.2.4 A continuous cleat is not required at gutter locations. At other locations, flashing shall engage a continuous cleat.

3.2.5 Form new A-style closures using similar to existing metal.

3.2.6 Strip in the flange as specified elsewhere.

3.3 L-Style Flashing:

3.3.1 At locations where the existing is removed, furnish and install new L-type flashing. The flashing shall extend a minimum of 1 inch above the roof level. The flashing shall have a 4-inch horizontal flange. Refer to NRCA Details SM-14 and UL-31. The flashing shall cover the exterior wall cladding a distance to match the existing; however, the vertical flange of the flashing shall not be more than 8 inches. If additional area of wall needs to be covered with flashing to match the existing, furnish and install new face extenders. Install face extender prior to installing flashing.

3.3.2 Single-Ply Roofing:

3.3.2.1 Prior to installing the flashing or gutter, ensure the roofing ends down the exterior face of the wall a distance to the match the flashing or gutter, whichever is greater.

3.3.2.2 Set horizontal flange in a continuous bead of sealant on top of the roofing.

3.3.2.3 At low and high eaves, join sections using cover plates.

3.3.2.4 At rake eaves, join sections by lapping.

3.3.3 Install gutters before flashing. Flashing shall extend into gutter a minimum of 2 inches.

3.3.4 A continuous cleat is not required at gutter locations. At other locations, flashing shall engage a continuous cleat.

3.3.5 Form new A-style closures similar to existing metal.

3.3.6 Strip in the flange as specified elsewhere.

3.4 Coping Installation:

3.4.1 Form new coping at locations where the existing is removed. Refer to NRCA Details SM-06 and UL-12. The flashing shall cover the exterior wall cladding a distance to match the existing; however, the exterior vertical flange and interior vertical flange of the coping shall not be more than 5 inches and 3 inches, respectively. If additional area of wall needs to be covered with flashing to match the existing, furnish and install new face extenders. Install face extender prior to installing flashing.

3.4.2 Single-Ply Roofing: Prior to the installation of the coping cap, ensure the base flashing extends up and over the parapet. The membrane shall extend down the outside of the wood blocking over the existing cladding a distance to match the vertical face of the metal flashing and minimum of 1 inch past the wood blocking.

- 3.4.3 Secure both vertical legs of the coping with a continuous cleat.
- 3.4.4 Join sections with flat drive cleats.
- 3.4.5 At locations where coping intersects at corners, the Contractor shall join sections with flat drive cleats.
- 3.4.6 At locations where coping intersects existing coping, the Contractor shall join sections with flat drive cleats.
- 3.4.7 Install preformed sheet metal closures.

3.5 Counterflashing Installation

- 3.5.1 Form new metal surface-mounted counterflashing from 24 ga. galvanized steel with Kynar 500 finish or approved equal. Install surface-mounted counterflashings around all RTU curbs and base flashings. Refer to SMACNA Architectural Sheet Metal Manual Figures 4-6.
- 3.5.2 Notch and lap sections a minimum of 3 inches.
- 3.5.3 Set flange against vertical surface in a solid bed of caulk. Furnish and install a nominal 1" x ¼" flat bar and secure over the counterflashing using appropriate fasteners at spacings not to exceed 12 inches on center. At places where the counterflashing is being installed behind a frame or existing sheet metal flashing, slide counterflashing behind frame/existing flashing a minimum of one inch.
- 3.5.4 Notch and lap joints and inside corners. Notch and seam outside corners. Do not rivet or otherwise secure joints and corner.
- 3.5.5 Fill the cove at the top of the counterflashing with a non-shrink caulk.

Note: A cove is not required where counterflashing is behind a frame and/or existing sheet metal flashing.

3.6 Scupper Liner Installation

- 3.6.1 Form new primary scupper. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-26A and 1-26B.
- 3.6.2 Cover all masonry surfaces to be in contact with scupper with a minimum 1/8" thick bed of black plastic roof cement. Set the flange over the roofing felts and wall in a minimum 1/8" thick bed of black plastic roof cement.
- 3.6.3 Install scupper. Install closure flanges at both sides of wall, lock and solder closure flange seams.
- 3.6.4 Set the exterior flange against the wall in a bead of non-shrinking sealant. Secure the exterior flange to the wall with a row of fasteners located approximately one inch from the edge, at spacings not to exceed 6 inches on center.
- 3.6.5 Apply over the exposed surfaces Sherwin Williams Chem Chromex primer or approved equal, and allow to thoroughly dry. Apply two coats of the coating manufacturer's approved paint to match the coping in accordance with the written instructions provided by the manufacturer.

- 3.6.6 Furnish and install a section of surface mounted counterflashing above the exterior scupper flange in accordance with Section 07 60 00 Paragraph 3.3 of the Specification. The counterflashing shall extend a minimum of 1" beyond the ends of the scupper flange.
- 3.6.7 Flash the interior flange with membrane flashings per manufacturer's written instructions that shall extend to the edge of the scupper opening and a minimum of 6 inches past the scupper liner interior flange.

3.7 Conductor Installation

- 3.7.1 Furnish and install new 24 ga. Galvanized steel with Kynar 500 coating or approved equal conductors at all through-wall scupper locations. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-27A. The conductor shall be fabricated with overflow openings.
- 3.7.2 Size the conductor in accordance with the following requirements:
 - Face Width: 4 times downspout width
 - Face Depth: 2 times downspout width
 - Height: 4 times downspout width
- 3.7.3 Caulk shall be applied between all lapped joints. The application of caulk at lapped joints after sections are joined is not acceptable.
- 3.7.4 Install conductor so that scupper passes through the back. Secure to the wall with a minimum of 2 concrete friction fasteners near the top corners. Outside edges of the scupper shall be turned out onto the back of the conductor a minimum of one inch.
- 3.7.5 The outlet tube shall be fabricated so as to extend into the downspout a minimum of 4 inches.

3.8 Gutter Installation

- 3.8.1 Form new gutter from 24 ga. Galvanized steel with Kynar 500 coating or approved equal. Refer to Drawing No. RD-3. This detail is applicable for shingle installation.
- 3.8.2 Gutter size shall box-style and shall be a minimum of 5" x 5". The back of the gutter shall be a minimum of 1 inch higher than the front. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-2, Style A.
- 3.8.3 Provide butt type expansion joints in gutters at spacings required for the type material used to fabricate gutters. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-7.
- 3.8.4 Provide gutter spacers at 3'-0" on center. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-12. Spacers shall be formed from minimum 1/16" x 1" flat stock aluminum. Continuous nominal 1/4" x 1" galvanized steel or aluminum flat bar shall be installed at the front of the gutter and secured with stainless steel bolts and nuts at spacer locations.
- 3.8.5 Provide gutter brackets at 3'-0" on center, and alternating in location from gutter spacers. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-12. Brackets shall be formed from minimum 1/4" x 1 - 1/2" flat stock galvanized steel and secured with stainless steel screws through pre-drilled holes. Brackets should be primed and double coated with an approved field-applied Kynar 500 paint prior to installation.

- 3.8.6 Furnish and install a gutter baffle that extends 12 inches from either side of the gutter corners made from the same material as the gutter and using material not less than 1 gauges heavier in accordance with SMACNA Architectural Sheet Metal Manual Figure No. 1-24A.
- 3.8.7 Furnish and install gutter outlet tubes in accordance with SMACNA Architectural Sheet Metal Manual Figure No. 1-24C.
- 3.8.8 Furnish and install stainless steel downspout strainers in accordance with SMACNA Architectural Sheet Metal Manual Figure No. 1-24D.

3.9 Downspout Installation

- 3.9.1 Form new downspouts from 24 ga. Galvanized steel with Kynar 500 coating finish or approved equal. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-32B and 1-32F.
- 3.9.2 Downspouts be box-style and shall match existing downspouts in size, unless otherwise specified.
- 3.9.3 Lap sections a minimum of 3 inches and secure sections with a minimum of 2 stainless steel sheet metal screws.
- 3.9.4 Form 45° elbow where water discharges onto the roof or ground.
- 3.9.5 Form or provide new round to rectangular downspout metal transition pieces to tie into existing underground drainage system formed from the same material as the downspouts.
- 3.9.6 Form downspout hangers from the same material as downspouts using material not less than 2 gauges heavier than downspouts. Secure downspouts to wall with hangers spaced not more than 5 feet on center. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-35G. Apply one coat of metal primer and two coats of field-grade Kynar 500 paint to all hangers. Color shall match the downspouts.
- 3.9.7 Form new downspout protection covers from 10 ga. galvanized steel. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1- 32I. Cover shall be a minimum of 4 feet in length and shall be installed so that the bottom is no higher than 3 inches above grade. Apply one coat of metal primer and two coats of field-grade Kynar 500 paint to all exposed metal. Color shall match the downspouts.
- 3.9.8 Furnish and install new concrete splash blocks where water discharges onto new roofing or grounds. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1- 36.

3.10 Roof-To-Wall Expansion Joint Cover

- 3.10.1 Complete any curb modifications, as required in Section 06 10 53 of the Specification.
- 3.10.2 At all eaves, walls and vertical surfaces, if new or existing wood blocking and/or cants are continuous, cut blocking and/or cants completely through its thickness. Remove a section the same width as the space between the expansion joint curbs, blocking or cants.
- 3.10.3 Form new metal roof-to-wall expansion joint covers and closures from 24 ga. galvanized steel with Kynar 500 coating or approved equal. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 5-1 and 5-6B and an 'E' that matches the width of the existing joint.
- 3.10.4 Fill cavity between curb and wall with fiber glass batt insulation in a TPO envelope.

- 3.10.5 Prior to the installation of the expansion joint cover, apply over the joint a strip of TPO stripping, extending across the joint and terminating at the bottom edge of the joint cover flange. Lap sections a minimum of 3 inches and seal with black plastic roof cement.
 - 3.10.6 Use maximum 10-foot lengths and a minimum number of pieces in each straight run.
 - 3.10.7 Engage horizontal leg of cover to a continuous cleat formed from metal to match the cover, which shall be secured to the top of the curb with appropriate nail fasteners at spacing's not to exceed 12 inches on center.
 - 3.10.8 Set the vertical flange against the wall in a solid application sealant. Fasten the flange using appropriate fasteners at spacing's not to exceed 12 inches on center and located approximately 1 inch from the edge of the flange. Install counter flashings in accordance with Paragraph 3.4 above.
 - 3.10.9 Lap sections a minimum of 3 inches. Apply two beads of sealant, such as NP-1 between lapped sections. Application of sealant at the joint after sections have been lapped is not acceptable.
 - 3.10.10 Furnish and install new metal closures using 24 ga. galvanized steel with Kynar 500 finish.
- 3.11 Roof-To-Roof Expansion Joint Cover
- 3.11.1 Complete any curb modifications, as required in Section 06 10 53 of the Specification.
 - 3.11.2 Fill cavity between curbs with fiber glass batt insulation in a TPO envelope.
 - 3.11.3 Form new metal roof-to-roof expansion joint cover from 24 ga. galvanized steel with Kynar 500 coating or approved equal. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 5-1 and 5-5A and an 'E' that matches the width of the existing joint.
 - 3.11.4 Prior to the installation of the expansion joint cover, apply over the joint a strip of TPO stripping, extending across the joint and terminating at the bottom edge of the joint cover flange. Lap sections a minimum of 3 inches and seal with black plastic roof cement.
 - 3.11.5 Use minimum 10 foot lengths and a minimum number of pieces in each straight run.
 - 3.11.6 Engage horizontal leg of cover to a continuous cleat formed from metal to match the cover, which shall be secured to the top of the curb with appropriate nail fasteners at spacing's not to exceed 12 inches on center.
 - 3.11.7 Join sections with flat drive cleats. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 3-2, Detail No. 4.
 - 3.11.8 Furnish and install new metal closures using 24 ga. galvanized steel with Kynar 500 finish.

END OF SECTION

Raymond Global

Rockdale County Jail Roof
Replacement

Raymond Project No.
1184.029

END OF SPECIFICATION