Bid No. 111215-Re-roofing at Various Sites
Packet No. 1-Alpha Elementary School

SECTION 01 11 00 – SUMMARY OF WORK

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. Section includes asphalt shingle roofing, modified bituminous roofing, and metal roofing systems.

B. Related Work Specified Elsewhere:

1. Section 06 - Rough Carpentry
2. Section 07: Modified Built-up Roofing
3. Section 07: Acrylic Coating
4. Section 07: Metal Roofing
5. Section 07: Sheet Metal Flashing and Trim
6. Section 09: Painting

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Alpha Elementary School Reroofing Project

B. Project Location: Alpha Elementary School 900 Stadium Road, Madera, CA 93637

C. Owner: Madera Unified School District, 1902 Howard Road, Madera, CA 93637

D. Work described in this section includes all labor, equipment, temporary facilities, and materials to install a complete roofing system complete with new perimeter and flashing details for a complete watertight roof system, including but not limited to;

1. **Re-Coating at Equipment Wells -**
2. Preparation of existing roof system for restoration.
3. Remove approximately 12”-18”of built-up roofing membrane from the perimeter edge as part of the roof removal process.

4. Install one layer of Stressbase 80 in weatherking flashing adhesive over a new insulation board, install new low rise gravel stop and strip in then install one layer of Stressply Plus FR Mineral in weatherking flashing adhesive and match the existing insulation size, type, and thickness approximately 24" back onto the existing roofing system.

5. Install new 24 gauge ¼" low rise gravel stop and 22 gauge cleat flashing in the new SBS roofing system. Install Garla Flex mastic to the gravel stop edge around the entire perimeter after the Stressply Plus FR Mineral is installed.

6. Repair all loose membrane at edge flashing and through field along with all details.

7. Repair and three course all blisters and repair all details per specification.

8. Install one layer of silverflash mastic, apply one layer of garmesh 6" reinforcement, apply one more layer of silverflash mastic at the interior side of the new roof membrane.

9. Pressure wash existing roofing system and allow to dry for 24 hours.

10. Install Pyramic Acrylic Coating per specification at a total rate of 4 gallons per square in two coats at equipment wells.

11. <u>Classrooms Composition Shingles</u>

12. Includes removal and disposal of existing roofing system(s), insulation board, gutters, flashings, copings, etc. for a complete prepared roof surface.

13. Removal and disposal at designated areas of the existing composition shingle roofing system to the roof deck.

14. Replacement of all dryrot decking shall be done by per square foot or per lineal foot basis based on the existing decking. Costs are to be provided with the bid form. All dryrot which is found to be in need of replacement will need to be inspected by the district or the districts representative. Photos of before and after will need to be submitted with the billing.

15. Installation of one layer Aqua Shield Underlayment over the entire roof deck.

16. Prepare, Prime, and Paint all edge metal and outrigger beam caps per specification section 09 91 00. Color to be selected by the owner.

17. Install new lead flashings at all pipe penetrations. Zinc flashings can be used at the equipment fence screen. Install a counterflashing of the matching metal type, caulk with Tuff Stuff urethane sealant, and band.

18. Installation of new composition shingle roofing per specification section 07 31 01.

19. Low profile dormer vents are to be installed at all buildings a minimum of 20’ apart approximately 4’ below the site screen.

20. <u>Equipment Screen Fences</u>

21. Includes removal and disposal of existing roofing / wall system(s), insulation board, gutters, flashings, copings, etc. for a complete prepared wall surface.

22. Inspect the existing steel framing system for damage.

23. Install a complete primer coating to the existing steel framing system.

24. Install new 24 gauge kynar coated standing seam metal panels per specification section 07 41 00 to the existing framing system.

25. Frame one doorway per building, install metal panels, properly hinge, and make operable for access to the equipment well. Install a locking mechanism and handle.

26. Install all new 24 gauge kynar coated trim flashing per manufacturer’s instructions.

1.4 WORK COMPLETED BY THE DISTRICT

A. No work will be completed by the district.

1.5 TYPE OF CONTRACT

A. Work will be completed under a single prime contract.

1.6 USE OF PREMISES

A. General: Contractor will have limited use of premises for construction operations.

B. Use of site: Limit use of premises to work areas required. Do not disturb portions of the project site beyond areas in which the work is indicated.

   A. The building interior is off limits to the contractor. All access shall be from the exterior.

   B. The point of exterior access must be approved by the owner.

C. Entrances: Keep all entrances serving the building clear and available to the owner, owner’s employees, and emergency vehicles.

D. Use of existing building: Maintain existing building in a weather tight condition throughout the construction period. Repair damage caused by construction operations. Protect building and occupants during construction.

E. Vehicle Parking: Contractor parking is available on site and will need to be approved by the owner.

F. Assume full responsibility for protection and safekeeping of materials stored on premises. Coordinate the location of materials and equipment to be stored on premises. Provide barricades, barriers, and enclosures as required to ensure safety.

1.7 OWNERS OCCUPANCY REQUIRMENTS

A. The owner will occupy the building during the entire construction phase. Cooperate with the owner during construction operations to minimize owner conflicts and facilitate owner usage. Perform the work as to not interfere with owners operations.

B. A minimum of 72 hours notice is needed for all activities that will affect the owners operations.

1.8 WORK RESTRICTIONS

A. On site work hours: Work shall generally be performed from the hours of 7:00 am – 5:00 pm Monday through Friday except as otherwise indicated or approved by the owner.

1. Weekend hours, early morning hours, utility shut down, and noisy activity requires owner's authorization a minimum of 72 hours in advance.

1.9 UNIT PRICES

A. The following unit prices will be used to add or deduct from the total contract amount.

A. Unit-1 Replacement of dryrot wood roof decking, add a line items per square foot cost to proposal form.

B. Unit-2 Replacement of dryrot wood fascia board, add a line item per square foot cost to proposal form.

1.10 SCHEDULE OF ALTERNATES

A. No alternates have been identified for this project.

1.11 PROJECT CONDITIONS

A. Proceed with roofing work only when existing and forecasted weather conditions will permit a unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.

B. Do not apply roofing insulation or membrane to damp deck surface.

C. Do not expose materials subject to water or solar damage in quantities greater than can be weatherproofed during same day.

1.12 SEQUENCING AND SCHEDULING

A. Sequence installation of roofing with related units of work specified in other sections to ensure that roof assemblies, including roof accessories, flashing, trim and joint sealers, are protected against damage from effects of weather, corrosion and adjacent construction activity.

B. Complete all roofing field assembly work each day. Phased construction will not be accepted.

END OF SECTION - 01 11 00 – SUMMARY OF WORK

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

B. Related work specified elsewhere:

1. Division 01: Summary of Work
2. Division 07: Built-up Roofing Restoration
3. Division 07: Asphalt Shingle Roofing
4. Division 07: Modified Built-up Roofing
5. Division 07: Sheet Metal Flashing and Trim
6. Division 09: Painting

1.2 SUMMARY:

A. This portion of the specification sets forth the general requirements, including the quality and type of materials required for the installation of all pressure treated and non pressure treated lumber used for wood curbs, nailing strips, miscellaneous blocking material, unexposed fillers, fascia, edging strips, deck replacement, etc

1.3 STORAGE:

A. All material specified herein shall be stored (after delivery to the site) so that it will be fully protected from damage and weather, and shall be stacked to prevent damage. All lumber shall be fully protected to maintain the original required moisture content as specified in item titled "Moisture Content".

1.4 OTHER REQUIREMENTS:

A. Dimensions indicated on the drawings are nominal dimensions (except where details show actual sizes) and shall be subject to the standard reductions required for surfacing or tolerances permitted by the grading rules. Unless otherwise indicated on drawings, all material shall be S4S (surfaced four sides).

1.5 PROTECTION:

A. All finished work shall be adequately protected against damage from any source.

1.6 COORDINATION:

A. Carpenters shall coordinate their work with that of the other trades so that progress continues without interruption.

PART 2 - PRODUCTS

2.1 WOOD - FRAMING AND CURBS:

A. GRADING RULES, GRADES, AND SPECIES

1. Lumber: Southern Pine, yellow pine, Douglas fir, spruce, ponderosa pine, larch or Hemlock and shall meet the following minimum grade requirement of construction standard (75% #1 and 25% #2); free from warping and visible decay. Lumber shall be graded according to the standard grading rules of the Southern Pine Inspection Bureau, the West Coast Lumber Inspection Bureau, or the Western Wood Products Association.

B. MOISTURE CONTENT

1. All lumber shall be air-dried or kiln-dried before treatment, so that the moisture content is not more than 19%. After treatment, it shall be kiln-dried at temperatures not exceeding 160 degrees F. (71 degrees C) so that the moisture content is not more than 19% at time of shipment

C. DECAY-RESISTANT TREATMENT:

1. Lumber in contact with roofing or acting as fascias, and all other exterior lumber, shall be pressure-treated with a waterborne preservative in accordance with AWPA Specification P5. Creosote and oil-borne preservatives are not acceptable.

2. Treating processes, material conditions, plant equipment, and other pertinent requirements shall conform to AWPA Specifications C1 and C2 for specific kind of lumber and type of preservative to be used. Retention shall be as required for intended use.

3. All treated lumber shall bear the mark of a code recognized third party agency such as the AWPA.

D. PLYWOOD:

Grade: CDX or Cyme exterior Grade. Description: 5/8" thick

E. WOOD SIDING:

1. T 111 or approved equal.

2.2 MECHANICAL FASTENERS:

A. WOOD TO STEEL:

1. Acceptable Manufacturers:
   a. Roofgrip screw with Climaseal coating; plastic disc - Buildex Div. of ITW, Itasca, IL.
   b. Dekfast screw with Sentri coating: plastic disc – Construction Fasteners, Inc., Wyomissing, PA.
   c. Fabco Fastening Systems, West Newton, PA: Insul-Fixx screw with Fabcote coating; plastic plate, Plate-Fixx screw with Fabcote coat; plastic disc.
   d. Kwik-Deck screw with Oxyseal coating; plastic disc - Atlas Bolt & Screw Div., Trans Union Fastener Corp., Ashland, OH.
   e. Olympic #12-11 Standard Steel Deck Screw or #14-10 Heavy Duty All Purpose Screw with CR-10 coating; three inch diameter plastic - Olympic Manufacturing Group, Inc., Agawam, MA.
   f. Glasfast (plastic disc) - Owens-Corning Fiberglas Corp., Toledo, OH.
   g. Perma Fastener screw with permaseal coating; plastic plate - International Permalite, Inc., Oak Brook, IL.

2. Screw Length: Sufficient to engage steel, wood deck 1 inch.

B. WOOD TO WOOD:

1. Type: Galvanized, common, annular ring nail. Length: Sufficient to penetrate underlay blocking 1-1/4 inches.

2. Acceptable Manufacturers:

   a. Hillwood Manufacturing Co., Cleveland, OH.
   b. Independent Nail, Inc., Bridgewater, MA.
   c. W.H. Maze Co., Peru, IL.
   d. National Nail Corp., Grand Rapids, MI.

C. WOOD TO MASONRY:

1. Acceptable Manufacturers:

   a. Tapcon 1/4" diameter, Phillips pan head anchor - Buildex Div. of ITW, Itasca, IL.
   b. Confas - Construction Fasteners, Inc., Wyomissing, PA.
   c. Con-fixx - Fabco Fastening Systems, West Newton, PA.
   d. #14-10 Heavy Duty all Purpose Screw – Olympic Manufacturing Group, Inc., Agawam, MA.
   e. Tru-Fast fastener (stainless steel) - The Tru-Fast Corp., Bryan, OH.

2. Length: Sufficient to provide 1-1/2 inch embedment.

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D. WOOD TO HOLLOW MASONRY:

1. Acceptable Manufacturers:

   a. Sleeve Anchor by Hilti Fastening Systems, Tulsa, OK.
   b. Rawly Hollow Masonry Anchor by the Rawlplug Co., Inc., New Rochelle, NY.

2. Length: As recommended by manufacturer

PART 3 - EXECUTION

3.1 CARPENTRY:

A. At roof edge to receive metal fascia, around all roof top penetration perimeters, and under any flashing component that is to have a roof flange mechanically fastened to roofing substrate; mechanically attach wood blocking. Blocking thickness: Equal to common 1 x 4", 1 x 6" 2x4", 2x6", 2x8", 2x10", 2x12".

B. Fasteners shall be installed in two rows staggered. Spacing in any one row shall not exceed 24 inches. Within eight feet of outside corners, spacing shall not exceed twelve inches in any one row.

C. Where required, offset blocking layers twelve inches, weave corners.

D. When preservative treated wood is cut, the cut end shall be treated in accordance with AWPA Specification M4.

E. Lumber shall be accurately cut to the work requirements and shall be well fastened.

F. Bolted fastenings shall have washers of adequate size under both heads and nuts. Nails shall be of correct size and quantity for proper fastening. Oversized nails that will result in splitting shall not be used. All fasteners shall be galvanized per ASTM A 153.

END OF SECTION - SECTION 06 10 00 - ROUGH CARPENTRY

SECTION 07 31 01 – ASPHALT SHINGLE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes asphalt shingle roofing and related work as shown and specified.

B. Removal and disposal of roofing system, insulation, flashings, scuppers, and associated debris for a complete prepared roof surface.

C. Install specified underlayment per manufacturer's instructions.

D. Install specified asphalt shingles per manufacturer's instructions.

E. Prepare, Prime, and Paint all edge metal and outrigger beam caps per specification section 09 91 00. Color to be selected by the owner.

F. Install new lead flashings at all pipe penetrations. Zinc flashings can be used at the equipment fence screen. Install a counterflashing of the matching metal type, caulk with Tuff Stuff urethane sealant, and band.

G. Low profile dormer vents are to be installed at all buildings a minimum of 20' apart approximately 4' below the site screen.

H. Related Sections include the following:

1. Section 01 – Summary of Work
2. Section 06 – Rough Carpentry
3. Section 07 – Modified Bitumen Roofing
4. Section 07 – Sheet Metal Flashing and Trim
5. Section 09 – Painting

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of asphalt shingle, ridge and hip cap shingles ridge vent and exposed valley lining indicated.

1. Include similar Samples of trim and accessories involving color selection.

C. Samples for Verification: For the following products, of sizes indicated, to verify color selected.

1. Asphalt Shingle: Full-size asphalt shingle strip.
2. Ridge and Hip Cap Shingles: Full-size ridge and hip cap asphalt shingle.
3. Ridge Vent: 12-inch- (300-mm-) long Sample.
4. Exposed Valley Lining: 12 inches (300 mm) square.
5. Self-Adhering Underlayment: 12 inches (300 mm) square.

D. Qualification Data: For Installer, including certificate signed by asphalt shingle manufacturer stating that Installer is approved, authorized, or licensed to install roofing system indicated.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for asphalt shingles.

F. Maintenance Data: For asphalt shingles to include in maintenance manuals.

G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain specified products as required from warranting manufacturer as outlined in the specifications.

B. Fire-Test-Response Characteristics: Provide asphalt shingle and related roofing materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.

C. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

D. **MANUFACTURER'S INSPECTIONS**

A. When the project is in progress, the manufacturer will provide the following:

1. Keep the Owner informed as to the progress and quality of the work as observed.

2. Provide job site inspections two (2) days per week during installation.

3. Report to the Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.

4. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated, weather-tight location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double-stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt shingle roofing to be performed according to manufacturer's written instructions and warranty requirements.

1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

A. Material Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials or workmanship within specified warranty period. Materials failures include manufacturing defects and failure of asphalt shingles to self-seal after a reasonable time.

1. Material Warranty Period: 30 years
2. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds up to 130 mph.
3. Algae-Discoloration Warranty

B. Installer Warranty: Roofing Installer's warranty, on warranty form at end of this Section, signed by roofing Installer, covering Work of this Section, in which roofing

Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within the following warranty period:

1. Warranty Period: Two (2) years from date of Substantial Completion.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Asphalt Shingles: 100 sq. ft of each type, in unbroken bundles.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

A. Laminated-Strip Asphalt Shingles: ASTM D 3462, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing.

1. Available Products:
   a. GAF Materials Corporation – Timberline Ultra HD, or equal

2. Butt Edge: Straight cut.
3. Strip Size: Manufacturer's standard.
4. Algae Resistance: Granules treated to resist algae discoloration.
5. Color and Blends: Match Architect’s samples.

B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering Sheet Underlayment, Granular Surfaced: ASTM D 1970, minimum of 60-mil-thick sheet; glass-fiber-mat-reinforced, SBS-modified asphalt; mineral-granule surfaced; with release paper backing; cold applied. Provide primer for adjoining concrete or masonry surfaces to receive underlayment.

1. As recommended by:
   a. The Garland Company, Inc. – HPR Aqua Shield

2.4 VENTS

A. Vent: Manufacturer's standard low profile dormer vent.

1. Available Products:

a. CMI, Construction Metals, low profile attic vent or equal.

2.5 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

B. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized steel wire shingle nails, minimum 0.120-inch- (3-mm-) diameter, barbed shank, sharp-pointed, with a minimum 3/8-inch- (9.5-mm-) diameter flat head and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or extend at least 1/8 inch (3 mm) through OSB or plywood sheathing.

1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

C. Underlayment Nails: Aluminum, stainless-steel with low profile capped heads or disc caps, 1-inch (25-mm) minimum diameter.

2.6 METAL FLASHING AND TRIM

A. Sheet Metal Flashing and Trim: Comply with requirements in Division 7 Section "Sheet Metal Flashing and Trim."

1. Sheet Metal:

B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item.

1. Step Flashings: Fabricate with a headlap of 2 inches (50 mm) and a minimum extension of 5 inches (125 mm) over the underlying asphalt shingle and up the vertical surface.
2. Cricket Flashings: Fabricate with concealed flange extending a minimum 24 inches (600 mm) beneath upslope asphalt shingles and 6 inches (150 mm) above the roof plane.
3. Open Valley Flashings: Fabricate in lengths not exceeding [10 feet (3 m)] with 1-inch- (25-mm-) high inverted-V profile at center of valley and equal flange widths of 10 inches (250 mm).
4. Drip Edges: Fabricate in lengths not exceeding [10 feet (3 m)] with 2-inch (50-mm) roof deck flange and 1-1/2-inch (38-mm) fascia flange with 3/8-inch (9.6-mm) drip at lower edge.

C. Vent Pipe Flashings: ASTM B 749, Type L51121, at least 1/16 inch (1.6 mm) thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof and extending at least 4 inches (100 mm) from pipe onto roof.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.

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

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install over the entire roof area, lapped in direction to shed water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Roll laps with roller. Cover underlayment within seven days.

1. Prime concrete and masonry surfaces to receive self-adhering sheet underlayment.
2. Eaves: Extend from edges of eaves 36 inches beyond interior face of exterior wall.
3. Rakes: Extend from edges of rake 36 inches beyond interior face of exterior wall.
4. Valleys: Extend from lowest to highest point 18 inches on each side.
5. Hips: Extend 18 inches on each side.
6. Ridges: Extend 36 inches on each side.
7. Sidewalls: Extend beyond sidewall 18 inches and return vertically against sidewall not less than 4 inches
8. Dormers, Chimneys, Skylights, and other Roof-Penetrating Elements: Extend beyond penetrating element 18 inches and return vertically against penetrating element not less than 4 inches.
9. Roof Slope Transitions: Extend 18 inches on each roof slope.

B. Metal-Flashed Open Valley Underlayment: Install one layers of 36-inchwide self-adhering underlayment centered in valley. Stagger end laps between layers at least 72 inches. Lap ends of each layer at least 12 inches in direction to shed water, and seal with asphalt roofing cement. Fasten each layer to roof deck with roofing nails.

1. Lap roof deck felt underlayment over first layer of valley felt underlayment at least 6 inches.

3.3 METAL FLASHING INSTALLATION

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

1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.

C. Step Flashings: Install with a headlap of 2 inches and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.

D. Cricket Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.

E. Open Valley Flashings: Install centrally in valleys, lapping ends at least 8 inches in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.

1. Secure hemmed flange edges into metal cleats spaced 2 inches apart and fastened to roof deck.

F. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.

G. Eave Drip Edges: Install eave drip edge flashings below underlayment and fasten to roof sheathing.

H. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.4 ASPHALT SHINGLE INSTALLATION

A. Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip with tabs removed with self-sealing strip face up at roof edge.

1. Extend asphalt shingles 1/2 inch over fascia at eaves and rakes.
2. Install starter strip along rake edge.

C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.

D. Fasten asphalt shingle strips with a minimum of five roofing nails located according to manufacturer's written instructions.

1. When ambient temperature during installation is below 50 deg F, seal asphalt shingles with asphalt roofing cement spots.

E. Closed-Cut Valleys: Extend asphalt shingle strips from one side of valley 12 inches beyond center of valley. Use one-piece shingle strips without joints in the valley. Fasten with extra nail in upper end of shingle. Install asphalt shingle courses from other side of valley and cut back to a straight line 2 inches short of valley centerline. Trim upper concealed corners of cut-back shingle strips.

1. Do not nail asphalt shingles within 6 inches of valley center.
2. Set trimmed, concealed-corner asphalt shingles in a 3-inch-wide bed of asphalt roofing cement.

F. Vents: Install vents over within the asphalt shingle roofing system according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing. Install vents at the eve and ridge as needed to promote proper air flow and meet the current building code in regards to attic venting.

G. Ridge and Hip Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.

3.5 OWNER SUPPLIED MATERIALS

A. Contractor must submit all quantities of owner supplied materials; per the list supplied below required to complete the project per specification section 07 31 01 with their bid.

1. Contractor must provide all labor and incidental materials to install owner supplied materials as part of their bid.
2. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07 31 01.
3. Contractor must provide an accurate list of owner supplied materials to the Owner, overages will be returned to the owner and under estimated quantities will be the full responsibility of the contractor to supply and install in full compliance with this section.
4. Freight charges of owner supplied materials will be the responsibility of the owner. Contractor must take delivery of materials, properly protect, cover and store at jobsite.
5. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07 31 01.

B. Materials specifically provided by the Owner;

- HPR Aqua Shield SA Underlayment (200 sq ft per roll)
- Silver Flash Mastic (5 gal pail)
- Garmesh (150’ x 6”)
- Freight to jobsite

END OF SECTION - SECTION 07 31 01 – ASPHALT SHINGLE ROOFING

SECTION 07 41 00.003 - MANUFACTURED METAL ROOF PANELS

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

A. Section includes pre-formed metal roof system complete with perimeter and flashing details.

1. Includes removal and disposal of existing roofing / wall system(s), insulation board, gutters, flashings, copings, etc. for a complete prepared wall surface.
2. Inspect the existing steel framing system for damage.
3. Install a complete primer coating to the existing steel framing system.
4. Install new 24 gauge kynar coated standing seam metal panels per specification section 07 41 00 to the existing framing system.
5. Frame one doorway per building, install metal panels, properly hinge, and make operable for access to the equipment well. Install a locking mechanism and handle.
6. Install all new 24 gauge kynar coated trim flashing per manufacturer's instructions.

B. Related Sections:

1. Refer to General Conditions Section Price and Payment Procedures for requirements related to unit prices, measurement, and payment.

2. Division 07 Section Reroof Preparation

3. Division 07 Section Asphalt Shingle Roofing

4. Division 07 Section Sheet Metal Flashing and Trim

1.3 REFERENCES

A. American Iron and Steel Institute (AISI):

1. Specification for the Design of Cold-Formed Steel Structural Members.

B. American Society of Civil Engineers (ASCE):

1. ASCE 7-05 Minimum Design Loads for Buildings and Other Structures.

C. American Society for Testing and Materials (ASTM):

1. ASTM A792 Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

2. ASTM A875 Specification for Steel Sheet, Zinc-5% Aluminum Alloy-Coated by the Hot Dip Process.

3. ASTM B209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

4. ASTM D1056 Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.

5. ASTM D3575 Test Methods for Flexible Cellular Materials made from Olefin Polymers.

6. ASTM E283 Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

7. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

8. ASTM E1592 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

9. ASTM E1646 Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.

10. ASTM E1680 Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.

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

1. Architectural Sheet Metal Manual.

E. Underwriters' Laboratories (UL):

1. UL-263 Fire Tests of Building Constructions and Materials.

2. UL-580 Tests for Uplift Resistance of Roof Assemblies.

3. UL-790 Tests for Fire Resistance of Roof Covering Materials.

1.4 SUBMITTALS FOR REVIEW

A. Shop Drawings showing layout of every roof panel and structural supporting member required in the installation with side laps and end laps marked within 1% deviation of their actual location.

1. Provide details for edge conditions, seams, joints, corners, panel profiles, assembly anchoring techniques, round and square flashings and counter flashings.

B. Samples illustrating thickness, finish, color and textures of materials.

C. Product Data: Include manufacturer's detailed material and system description, panel and field seam installation instructions, engineering performance and finish specifications. Indicate hat channel and fastener spacing.

D. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.

E. Any material submitted as equal to the specified material must be accompanied by a report signed and sealed by a professional engineer licensed in the state in which the installation is to take place. This report shall show that the submitted equal meets the Design and Performance criteria in this specification. Substitution requests submitted without licensed engineer approval will be rejected for non-conformance.

1.5 SUBMITTALS FOR INFORMATION

A. Design and Test Reports: Provide the following certified test reports from an independent testing laboratory:

1. Independent laboratory testing report for system design load and seam integrity.

2. Professional engineer's documentation that roofing system incorporates sufficient allowance for stress and movement.

3. A letter from an officer of the manufacturing company certifying that the materials furnished for this project are the same as represented in tests and supporting data.

4. Manufacturer's verifications that the panels are factory roll formed.

5. ASTM E1592: Test results must clearly demonstrate compliance with the following requirements:

   a. The ultimate test failure load shall be reduced by the safety factor specified in article 1.9 to determine the allowable working load for the panel system.

   b. The proposed system has been tested to insure that the allowable working load of the panel system meets or exceeds the specified negative wind uplift pressures listed in article 1.9 of this specification for all roof zones.

   c. The test results are applicable for the thickness, width, and profile specified. Results are not applicable for systems that are thicker or wider than the system which was tested. If the tested material was not the specialty material specified herein (for instance, the tested material was galvalume steel), then the test results shall be reduce by the ratio of the yield strength (Fy) of the specified material to the tested material.

   d. The results must clearly show that the allowable clip spacing meets or exceeds the requirements specified in article 3.3 C for all roof areas. Clip spacing shall not be reduced for any roof zone from that which is specified.

6. ASTM E283 and E331: Test results must clearly demonstrate compliance with the performance requirements specified in article 1.9.

7. ASTM E1646 and E1680: Test results must clearly demonstrate compliance with the performance requirements specified in article 1.9. Results are not applicable for systems that are thinner, wider, lower grade, or different material/profile than the system which was tested. The differential test pressures must be identical to those specified in article 1.9.

8. UL 580: The proposed roof panel shall be listed as UL 580, Class 1-90.

9. UL 790: The proposed roof panel shall be listed as a non-combustible roof covering material and be approved for use in a UL classification assembly.

10. UL 263: The proposed roof panel shall be listed for use in a UL fire rated construction assembly.

B. Mill production reports certifying that the steel thicknesses are within allowable tolerances of the nominal or minimum thickness or gauge specified.

C. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7-10, Method 2 for Components and Cladding. In no case shall the design loads be taken to be less than those detailed in Design and Performance Criteria article.

D. Qualification Data for Roofing Installer. Refer to Quality Assurance Article below.

E. Certification of work progress inspection frequency. Refer to Quality Assurance Article below.

F. Pre-installation Roofing Conference Proceedings. Refer to Quality Assurance Article below.

G. Test Reports: Submit third party validation of environmental claims, prepared UL Environment, for all metal roof panels containing recycled content and/or bio based content.

1.6 CONTRACT CLOSEOUT SUBMITTALS

A. General: Comply with Requirements of Division 01 Section Closeout Submittals.

B. Special Project Warranty: Provide specified warranty for the Project, executed by the authorized agent of the Manufacturer.

C. Roofing Maintenance Instructions: Provide a manual of manufacturer's recommendations for maintenance of installed roofing systems.

D. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

E. Demonstration and Training Schedule: Provide a schedule of proposed dates and times for instruction of Owner's personnel in the maintenance requirements for completed roofing work. Refer to Part 3 for additional requirements.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Engage an Installer who has completed the Manufacturer's Approved Roofing Contractor course and is currently certified for the installation of this roof system.

B. If required, fabricator/installer shall submit work experience and evidence of adequate financial Responsibility. The Owner's representative reserves the right to inspect fabrication facilities in determining qualifications.

C. Source Limitations: Obtain all components of roof system from a single manufacturer, including roll goods materials if required. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer.

1. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

2. Manufacturer shall have direct authority and control over all fabrication of steel components as well as the raw materials used in their fabrication.

D. Source Quality Control: Manufacturer shall have in place a documented, standardized quality control program such as ISO-9001 approval.

E. Engage the Manufacturer's Field Representative to conduct required periodic inspections of work in progress as described herein and shall furnish written documentation of all such inspections.

F. Manufacturer shall provide the Owner project with a written statement that they will provide a site inspection two (2) day's per week that confirms that the project is being constructed as specified, by an experienced, full time employee of the company.

G. Alternate Manufacturers: The following manufacturer criteria must be submitted. Alternate systems will not be considered for approval unless each of these items has been submitted for review at least 10 business days prior to bid opening:

1. Submit each item listed in article 1.4 (A through E) for evaluation of the proposed system.

2. Tests shall have been made for identical systems within the ranges of specified performance criteria.

3. Empirical calculations for roof performance shall only be acceptable for positive loads.

4. A list of a minimum of five (5) jobs where the proposed alternate material was used under similar conditions. The reference list shall include date of project, size of project, project address, and telephone number of architect/owner contact.

5. A financial statement demonstrating a minimum of a 3:1 ratio of assets to liabilities.

6. A written statement from the manufacturer stating that they will provide the building owner with a daily site inspection for a minimum of one (1) hour per day by an experienced, full time employee of the company.

7. A written statement from the manufacturer stating that they will provide the engineer of record with a daily site inspection by an experienced full time employee of the company.

8. A written statement from a corporate officer of the manufacturing company stating that he or she has reviewed the specifications and confirms that the proposed system meets or exceeds all performance requirements listed as well as meets the panel size, gauge, weight, clip design, sealant design, uplift pressures and height of the vertical seam

9. A copy of manufacturer's 30 year warranty. Warranty must include coverage for all trim, flashing, and penetrations associated with this roof.

10. Proof that the manufacturer has been in business for a minimum number of years equal to the warranty period required for this project.

1.8 PRE-INSTALLATION CONFERENCE

A. Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of roofing system installation and associated work.

B. Require attendance of installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing which must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, testing agencies and governing authorities.

C. Objectives of conference to include:

1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.

2. Tour representative areas of roofing substrates (decks); inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.

3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.

4. Review roofing system requirements (drawings, specifications and other contract documents).

5. Review required submittals both completed and yet to be completed.

6. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

7. Review required inspection, testing, certifying and material usage accounting procedures.

8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not mandatory requirement).

9. Record discussion of conference including decisions and agreements (or disagreements) reached. Furnish a copy of records to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

10. Review notification procedures for inclement weather or non-working days.

D. The Owner's Representative will designate one of the conference participants to record the proceedings and promptly distribute them to the participants for record.

E. The intent of the conference is to resolve issues affecting the installation and performance of roofing work. Do not proceed with roofing work until such issues are resolved the satisfaction of the Owner and Engineer of Record. This shall not be construed as interference with the progress of Work on the part of the Owner or Engineer of Record.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Manufacturer's responsibilities:

1. All roof panels shall be shipped from the manufacturer with strippable film or similar packaging material separating the individual panels to minimize flexing, stressing, scratching or otherwise damaging the material during transit to the job.

2. Fully cover steel with tarpaulins or similar protective cover during transit to prevent dirt and debris from coming in contact with the finished goods.

B. Installer's responsibilities:

1. Stack pre-finished materials to prevent twisting, bending, abrasion and denting and elevate one end to facilitate moisture run-off.

2. Unload roof panels using a boom or crane, supporting the panels in at least two locations during lifting, and never lift more than three panels at a time.

3. Protect moisture-sensitive materials and water-based from the weather.

4. Inspect materials upon delivery. Reject and remove physically damaged or marred material from project site.

1.10 PROJECT CONDITIONS

A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage and protection requirements for roofing system.

1. Protection:

a. Protect completed roofing from subsequent construction operations. Comply with Manufacturer's recommendations.

b. Do not overload roof with stored materials.

c. Support no roof-mounted equipment directly on the roofing system.

B. Ascertain that work of other trades which penetrates the roof or is to be made watertight by the roof is in place an approved prior to installation of roofing.

1.11 DESIGN AND PERFORMANCE CRITERIA

A. Thermal Expansion and Contraction.

1. Completed metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.

2. The design temperature differential shall be not less than 200 ºF.

3. Interface between panel and clip shall provide for unlimited thermal movement in each direction along the longitudinal direction.

4. Location of metal roofing rigid connector shall be at roof ridge unless otherwise approved by the Project Architect. Metal ridge connector may require design as per job conditions by specified manufacturer.

B. Uniform Wind Uplift Load Capacity.

1. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria. Anchor clips shall be installed exactly as spacing given in Part 3.

a. Design Code: ASCE 7-10, Method 2 for Components and Cladding.

2. Capacity shall be determined using pleated airbag method in accordance with ASTM E 1592, testing of sheet metal roof panels. Allowable safe working loads shall be determined by dividing the ultimate test load by the safety factor specified above. In order to comply with the building code, panel system must be tested to withstand these listed pressures at clip spacing no closer than those listed in Part 3.

C. Uniform Positive Load Capacity:

1. The installed roof system shall be capable of resisting the following positive uniform roof loads: Roof Live Load of 20 psf.; Roof Snow Load of n/a psf.

2. Capacity to resist positive loads shall be determined by empirical calculations in accordance with AISI. Calculation shall be sealed by a registered professional engineer.

3. Installed roof system shall carry positive uniform design loads with a maximum system deflection of L/180 as measured at the rib (web) of the panel.

D. Underwriters' Laboratories, Inc., (UL) fire resistance P ratings for roof assemblies: If applicable, panel system shall be approved for use in an appropriate Construction Assembly, as defined by UL 263.

E. Underwriters' Laboratories, Inc., (UL), wind uplift resistance classification: Roof assembly shall be classified as Class 1-90, as defined by UL 580.

F. Underwriters' Laboratories, Inc., (UL) Class A fire rating per UL 790.

G. ASTM E283: Static pressure air infiltration (doors, windows, curtain walls):

1. Pressure Leakage Rate:

a. 6.24 PSF 0.006 cfm/sq.ft.

b. 12.0 PSF 0.012 cfm/sq.ft.

c. 15.0 PSF 0.015 cfm/sq.ft.

H. ASTM E331: Static pressure water infiltration (doors, windows, curtain walls):

1. Pressure Result:

a. 5 Gal/Hr per S.F. and Static No Leakage

b. Pressure of 20.0 Psf. for 15 minutes

I. ASTM E1680: Static pressure air infiltration (roof panels):

1. Pressure Leakage Rate:

a. 1.57 PSF 0.0054 cfm/sq.ft.

b. 6.24 PSF 0.0054 cfm/sq.ft.

c. 20.0 PSF 0.0027 cfm/sq.ft.

J. ASTM E1646: Static pressure water infiltration (roof panels):

1. Pressure Result:

a. 5 Gal/Hr per S.F. and Static No Leakage

b. Pressure of 20.0 Psf. for 15 minutes

K. Capacities for gauge, span, or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolation for conditions outside the test range is not acceptable.

1.12 MANUFACTURER'S INSPECTIONS

A. When the project is in progress, the roofing system manufacturer will provide the following:

1. Keep the Architect or Owner informed as to the progress and quality of the work as observed.

2. Provide job site inspections a minimum of two (2) days per week.

3. Report to the Architect in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.

4. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.13 WARRANTIES

A. Owner shall receive one (1) warranty from manufacturer of roof panels covering all of the following criteria. Multiple warranties are unacceptable.

1. Manufacturer's thirty (30) year watertight warranty, including coverage for all trim, flashings, and penetrations associated with the standing seam roof area.

2. Twenty (20) year coverage on finish including checking, crazing, peeling, chalking, fading and/or adhesion.

3. Twenty (20) year material coverage.

4. Warranty shall commence on date of substantial completion or final payment, whichever is agreed by contract.

5. Installer shall provide manufacturer with two (2) year warranty covering roofing system installation and watertightness.

6. One manufacturer shall provide a single warranty for standing seam roof areas, membrane roof areas, and transitions between the two material types.

PART 2 — PRODUCTS

2.1 PRODUCTS, GENERAL

A. Refer to Division 01 Section "Common Product Requirements."

B. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.

C. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.

1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.

2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.

3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.

4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 ACCEPTABLE MANUFACTURERS

A. The design is based upon roofing systems engineered and manufactured by

The Garland Company
3800 East 91st Street
Cleveland, Ohio 44105
Telephone: (800) 762-8225 ext. 720
Local Representative: Richard Jones
Website: www.garlandco.com

2.3 STANDING SEAM ROOFING SYSTEM

A. General.

1. Basis of Design: R-MER Loc System manufactured by the Garland Company, Cleveland, OH.

B. Materials.

1. Panel material: 24 ga, Galvalume steel, type AZ-55 smooth as per ASTM A792-96.

2. Flashing and flat stock material: Fabricate in profiles indicated on drawings of same material, thickness, and finish as roof system, unless indicated otherwise.

C. Finish on surfaces:

1. Exposed surfaces for coated panels:

a. Two coat coil applied, baked-on full-strength (70% resin) fluorocarbon coating system (polyvinylidene fluoride, PVF2), applied by manufacturer's approved applicator.

b. Coating system shall provide nominal 1.0 mil dry film thickness, consisting of primer and color coat.

c. Color shall be GARLAND standard selection color classification].

2. Unexposed surfaces for coated panels shall be baked-on polyester coating with .20 - .30 dry film thickness (DFT).

D. Characteristics:

1. Panels shall be factory roll-formed from specified metal. Field rolled panels are unacceptable.

2. Provide the same panel profile from a single manufacturer for all standing seam roof areas.

3. Provide interlocking standing seam panels incorporating concealed anchor clips allowing unlimited thermal movement. Snap-on separate seam caps are unacceptable.

4. Seam must be one and three-fourths (1-3/4) inch minimum height and three-eighths (3/8) inch wide with a male leg one and five-eighths (1-5/8) inch high. Seam shall allow for unlimited expansion and contraction of panels due to thermal changes.

5. Seam shall have a factory applied hot melt sealant bead. Sealant shall be a SIS (Styrene-Isoprene-Styrene) block copolymer type thermoplastic rubber adhesive, non-fatigue water barrier.

6. Panel and clip shall be designed to prevent clip contact with the seam sealant, so that normal expansion and contraction of panel will not cause damage to integrity of the seal. Systems with contact between clip and sealant will not be allowed.

7. Panel shall have an internal gutter/anti-siphon feature on the male leg as additional protection against water infiltration.

8. The panel shall not have mechanical finishes present in the flat of the panel.

9. A three-sixteenth (3/16) inch high clearance between the panel and substrate is required to properly vent the system.

10. Standing Seam Panel Width: 18".

11. Panel clips shall be minimum eighteen (18) gauge, Galvanized steel designed to allow for unlimited thermal movement of the panel in each direction along the longitudinal dimension. Two-piece clips are unacceptable.

E. Accessories.

1. Gable anchor clips shall be minimum eighteen (18) gauge, Galvanized steel.

2. Fasteners:

a. Concealed fasteners: Corrosion resistant steel fasteners (zinc plated or equal) designed to meet structural loading requirements. Provide #14 as minimum fastener size.

b. Exposed fasteners: Series 410 stainless steel fasteners or one-eighth (1/8) inch diameter stainless steel waterproof rivets. All exposed fasteners shall be factory painted to match the color of the standing seam panels.

3. Closures: Factory precut closed cell foam meeting ASTM D1056 or ASTM D3575, with metal trim matching panels when used at hip, ridge, jamb, and rake.

4. Provide all miscellaneous accessories for complete installation.

2.4 ACCESSORY PRODUCTS

A. Sealant:

1. Acceptable product:

a. Concealed Application: Non-curing butyl sealant or equal.

b. Exposed Application: Exposed Application: Garland SS sealant or equal.

2. Colors: As selected by architect from sealant manufacturer's standard selection.

B. Underlayment:

1. Not applicable to this project.

2.5 FABRICATION

A. Shop fabricate metal roofing and flashing components to the maximum extent possible, forming metal work with clear, sharp, straight, and uniform bends and rises. Hem exposed edges of flashings.

B. Form flashing components from full single width sheet in minimum ten (10) foot lengths. Provide shop fabricated, mitered corners, joined using closed end pop rivets and joint sealant.

C. Fabricate roofing and related sheet metal work in accord with approved shop drawings and applicable standards.

PART 3 — EXECUTION

3.1 EXECUTION, GENERAL

A. Comply with requirements of Division 01 Section "Common Execution Requirements."

3.2 PREPARATION

A. Design system so that the panel installation may be started and/or terminated at any given point in the area.

1. It is understood that the ongoing operations of the Owner are of a critical nature as to leak sensitivity. Do not work on more roof area than can be restored completely watertight in one day.

B. Remove existing loose material, dirt and debris from the roof area. All accumulations of asphalt or other repair materials shall be removed to

provide a smooth, flat substrate without imperfections that will be evident in the finished work.

1. Existing metal details and other metal accessories specified for re-use that interfere with the installation of the new roof system shall be carefully removed and set aside for re-use.

2. Any metal described above that will come in contact with the new roof shall be checked for type and replaced or protected if galvanic action may be a problem.

C. Strip existing contaminating material from all metal components that are indicated to be re-utilized. Protect these metal components. Replace damaged components with new of similar type and dimension.

D. Replace wood blocks and/or sleepers indicated to be replaced with new pressure-treated wood, redwood, or other form of blocking acceptable to the Manufacturer.

1. Do not use pressure-treated wood containing salt-based preservatives or materials corrosive to steel. Provide Material Safety Data Sheets to the roofing manufacturer for verification prior to installation.

E. Remove pipes, conduits or equipment indicated to be abandoned and removed.

F. All curbs, soil stacks, and other interior flashing surfaces shall be extended to a minimum of 8" above the new horizontal roof surface or shall be pressure sealed at the top edge.

3.3 INSTALLATION, GENERAL

A. Install roof system when the atmospheric dry bulb temperature is minimum 40°F and rising.

B. Install all components of the roof system in exact accordance with the manufacturer's standard published procedures as applicable to these project conditions and substrates.

C. Install all required vapor retarder, air seals and preliminary tapered, insulating substrates required per enclosed specifications.

D. Lay out and anchor all roof framing sections or purlins according to the approved roof plan.

E. Inspection: Examine the alignment and placement of the building structure and substrate. Correct any objectionable warp, waves or buckles in the substrate before proceeding with installation of the pre-formed metal

roofing. The installed roof panels will follow the contour of the structure and may appear irregular if not corrected.

F. Establish straight side and crosswise benchmarks.

G. Use proper size and length fastener for strength requirements. Approximately five-sixteenths (5/16) inch, is allowable for maximum fastener head size beneath the panel.

H. Rectangular shaped roofs shall be checked for square and straightness. Gable ends may require setting a true line for the gable clips and setting with string line.

I. Measure the roof lengthwise to confirm panel lengths, overhangs, coverage of flashings at eaves and ridges and verify clearances for thermal movement.

J. Pre-roofing conference:

1. Prior to beginning metal roofing work, a pre-roofing conference shall be held to review work to be accomplished.

2. Architect, contractor, metal roofing subcontractor, metal roofing system manufacturer's representative and all other subcontractors who have equipment penetrating roof or whose work involves access to roof shall be present.

3.4 ROOFING AND FLASHING INSTALLATION

A. Comply with all details and installation of roofing materials and flashings in accordance with approved shop drawings and manufacturer's product data, within specified erection tolerances.

B. Prepare roof for the installation of standing seam panels, including:

1. Install all decking, framing, and/or furring members as indicated in this specification and bid documents.

2. Install all insulation, vapor retarder, and/or air infiltration barriers as indicated in this specification and bid documents.

3. Install all underlayments and/or temporary water proofing materials as required in this specification and bid documents.

C. Directly over the completed roof substrate, install one (1) piece panel anchor clips. [All anchor clips will be set on sixteen (16) gauge galvanized pre-punched bearing plates to distribute the loads on the board insulation or All anchor clips will be fastened into the structural roof substrate based on the following spacing pattern]:

1. Clip spacing must be 4’ for Zone 1 (field)

2. Clip spacing must be 4’ for Zone 2 (eave, <ridge, hip>and rake).

3. Clip spacing must be 4’ for Zone 3 (corners)

D. Installation of Roof Panels: Due to the asymmetrical design of the specified panel system, installation of panels must begin at one end of the roof and work toward the opposite end.

1. Two (2) stainless steel pop rivets shall be secured through the male panel leg and the panel clip located at the ridge of the system. The female panel leg will conceal these fasteners.

a. Be sure to capture all drilling debris during this operation with a rag or cloth placed on the panels at the drilling operation.

b. Panels are not securely attached to the roof until fixed to the anchor clip. To avoid damage and injury, all panels shall be fixed to the anchor clip immediately as they are installed.

2. Un-installed panels which are temporarily stored on the ground or roof shall be secured in place at the end of each day's work to prevent possible damage or injury.

E. Isolate dissimilar metals and masonry or concrete from metals with bituminous coating. Use gasketed fasteners where required to prevent corrosive action between fastener, substrate, and panels.

F. Limit exposed fasteners to extent indicated on shop drawings.

G. Anchorage shall allow for temperature expansion/contraction movement without stress or elongation of panels, clips, or anchors. Attach clips to structural substrate using fasteners of size and spacing as determined by manufacturer's design analysis to resist specified uplift and thermal movement forces.

H. Seal laps and joints in accordance with roofing system manufacturer's product data.

I. Provide for temperature expansion/contraction movement of panels at roof penetrations and roof mounted equipment in accordance with system manufacturer's product data and design calculations.

J. Installed system shall be true to line and plane and free of dents, and physical defects. In light gauge panels with wide flat surfaces, some oil canning may be present. Oil canning does not affect the finish or structural integrity of the panel and is therefore not cause for rejection.

K. Maximum variation from true planes or lines shall be one-fourth (1/4) inch in twenty (20) feet and three-eighth (3/8) inch in forty (40) feet of more.

L. Form joints in linear sheet metal to allow for one-fourth (1/4) inch minimum expansion at twenty (20) feet on center maximum and eight (8) feet from corners.

M. At joints in linear sheet metal items, set sheet metal items in two (2) one-fourth (1/4) inch beads of butyl sealant. Extend sealant over all metal surfaces. Mate components for positive seal. Allow no sealant to migrate onto exposed surfaces.

N. Remove damaged work and replace with new, undamaged components.

O. Touch up exposed fasteners using paint furnished by roofing panel manufacturer and matching exposed panel surface finish.

P. Clean exposed surfaces of roofing and accessories after completion of installation. Leave in clean condition at date of substantial completion. Touch up minor abrasions and scratches in finish.

3.5 CLEANING

A. Clean installed work in accordance with the manufacturer's instructions.

B. Replace damaged work than cannot be restored by normal cleaning methods.

3.6 CONSTRUCTION WASTE MANAGEMENT

A. Remove and properly dispose of waste products generated during roofing procedures. Comply with requirements of authorities having jurisdiction

3.7 FINAL INSPECTION

A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.

B. Inspect roofing work and flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

C. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

D. Notify the Owner upon completion of corrections.

E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

F. Immediately correct roof leakage during construction. If the Contractor does not respond within twenty four (24) hours, the Owner will exercise rights to correct the Work under the terms of the Conditions of the Contract.

3.8 DEMONSTRATION AND TRAINING

A. At a time and date agreed to by the Owner, instruct the Owner's facility manager, or other representative designated by the Owner, on the following procedures:

1. Roof troubleshooting procedures.

2. Notification procedures for reporting leaks or other apparent roofing problems.

3. Roofing maintenance.

4. The Owner's obligations for maintaining the roofing warranty in effect and force.

5. The Manufacturer's obligations for maintaining the roofing warranty in effect and force.

3.9 OWNER SUPPLIED MATERIALS

A. Contractor must submit all quantities of owner supplied materials; per the list supplied below required to complete the project per specification section 07 41 00 with their bid.

6. Contractor must provide all labor and incidental materials to install owner supplied materials as part of their bid.

7. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07 41 00.

8. Contractor must provide an accurate list of owner supplied materials to the Owner, overages will be returned to the owner and under estimated quantities will be the full responsibility of the contractor to supply and install in full compliance with this section.

9. Freight charges of owner supplied materials will be the responsibility of the owner. Contractor must take delivery of materials, properly protect, cover and store at jobsite.

10. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07 41 00.

11. Materials specifically provided by the Owner;

    1. R-Loc 18", 24 gauge, Standing Seam Metal Panel, measurements by contractor.

    2. Field Clips

    3. Head Closure Trim 10'

    4. Rivets (Color Match)

    5. Flat Stock 4' x 10 ' (Contractor fabricated sill trim, ridge trim, and cap flashing)

    6. Freight to jobsite

END OF SECTION 07 41 00.003 - MANUFACTURED METAL ROOF PANELS

SECTION 07 56 31 - ROOFING RESTORATION – ACRYLIC

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

A. Section includes:

1. Preparation of existing roof system for restoration.

2. Remove approximately 12”-18”of built-up roofing membrane from the perimeter edge as part of the roof removal process.

3. Install one layer of Stressbase 80 in weatherking flashing adhesive over new insulation board, install new low rise gravel stop and strip in and then install one layer of Stressply Plus FR Mineral in weatherking flashing adhesive and match the existing insulation size, type, and thickness approximately 24” back onto the existing roofing system.

4. Install new 24 gauge ¼” low rise gravel stop and 22 gauge cleat flashing in the new SBS roofing system. Install Garla Flex mastic to the gravel stop edge around the entire perimeter after the Stessply Plus FR Mineral is installed.

5. Repair all loose membrane at edge flashing and through field along with all details.

6. Repair and three course all blisters and repair all details per specification.

7. Install one layer of silverflash mastic, apply one layer of garmesh 6” reinforcement, apply one more layer of silverflash mastic at the interior side of the new roof membrane.

8. Pressure wash existing roofing system and allow to dry for 24 hours.

9. Install Pyramic Acrylic Coating per specification at a total rate of 4 gallons per square in two coats at equipment wells.

B. Related Sections:

1. Section 01 – Summary of Work

2. Section 07 – Asphalt Composition Shingles

3. Section 07 – Modified Bituminous Membrane Roofing

4. Sheet Metal Flashing and Trim: Section 07 - Sheet Metal Flashing and Trim.

5. Sheet Metal Roof Accessories: Section 07 - Roof Specialties.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D1079, Terminology Relating to Roofing, Waterproofing, and Bituminous Materials.

B. National Roofing Contractors Association (NRCA):

1. Roofing and Waterproofing Manual.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.

B. Documentation of Existing Conditions: Document existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces that might be misconstrued as having been damaged by re-coating operations. Submit before work begins. Use high-resolution digital photographs or video tape supplemented by written commentary for preparing reports.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Installer: Company specializing in roof restoration with a minimum 5 years experience and certified by roofing system manufacturer as qualified to install manufacturer's roofing materials.

C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work and at any time roofing work is in progress. Maintain proper supervision of workmen. Maintain a copy of the specifications in the possession of the Supervisor/Foremen and on the Site at all times.

D. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.7 PRE-INSTALLATION CONFERENCE

A. Preliminary Re-roofing Conference: Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of reproofing installation and associated work.

B. Require attendance of installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing which must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer s representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, testing agencies and governing authorities. Objectives of conference include:

1. Review foreseeable methods and procedures related to re-roofing work.

2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.

3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.

4. Review re-roofing system requirements (drawings, specifications and other contract documents).

5. Review required submittals both completed and yet to be completed.

6. Review and finalize construction schedule related to re-roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

7. Review required inspection, testing, certifying and material usage accounting procedures.

8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not mandatory requirement).

9. Record discussion of conference including decisions and agreements (or disagreements) reached and furnish a copy for record to each party

attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

10. Review notification procedures for weather or non-working days.

1.8 PROJECT CONDITIONS

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

1. Coordinate work activities daily with Owner so Owner implement protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area.

2. Before working over structurally-impaired areas of deck, notify Owner to evacuate occupants from below the affected area. Verify that occupants below the work area have been evacuated prior to proceeding with work over the impaired deck area.

B. Protect building whose roof is to be restored, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from coating operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

D. Owner assumes no responsibility for condition of areas to be restored. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.

E. Weather Condition Limitations: Do not apply roofing restoration materials during inclement weather or when a 40% chance of precipitation is expected.

F. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.

G. Materials shall be stored at room temperature until immediately prior to application. Discontinue the application if the material cannot be stored at a temperature, which permits even distribution during application.

H. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

I. When applying materials with spray equipment, take precautions to prevent over spray and/or solvents from damaging or defacing surrounding walls, building surfaces, vehicles or other property. Care should be taken to do the following:

1. Close air intakes into the building.

2. Have a dry chemical fire extinguisher available at the jobsite.

3. Post and enforce "No Smoking" signs.

J. Do not inhale spray mist; take precautions to ensure adequate ventilation.

K. Protect completed roof sections from foot traffic for a period of at least 48 hours at 75°F (24°C) and 50% relative humidity or until fully cured.

L. Take precautions to ensure that materials do not freeze.

M. Minimum temperature for application is 60°F and rising.

1.9 WARRANTY

A. Upon completion of installation, and acceptance by the Owner and Architect, the manufacturer will supply to the Owner the specified warranty.

B. Installer will submit a two (2) year warranty to the membrane manufacturer with a copy directly to Owner.

C. Manufacturer will provide the Owner with a materials warranty.

D. Warranty shall commence on date of substantial completion or final payment, whichever is agreed by contract.

E. Manufacturer will provide the following services at no cost to the owner at years 5, & 10.

a. Inspection by a technical service representative and delivery of a written inspection report documenting roof conditions.

b. General rooftop housekeeping and clean-up, subject to limits, but generally including removal of incidental debris.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.

B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to ensure no possibility of significant moisture exposure. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end. Cover roll goods with a canvas tarpaulin or other breathable material (not polyethylene).

C. Do not leave unused materials on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.

D. It is the responsibility of the contractor to secure all material and equipment on the job site. If any material or equipment is stored on the roof, the contractor must make sure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the contractor will be the sole responsibility of the contractor and will be repaired or replaced at his expense.

1.11 MANUFACTURER'S INSPECTIONS

A. When the project is in progress, the roofing system manufacturer will provide the following:

1. Keep the Owner and Architect informed as to the progress and quality of the work as observed.

2. Provide job site inspections a minimum of two (2) days a week.

3. Report to the Architect in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.

4. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

PART 2 — PRODUCTS

2.1 PRODUCTS, GENERAL

A. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.

B. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.

1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.

2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.

3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.

4. The Architect and Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 ACCEPTABLE MANUFACTURERS

A. The design is based upon roofing systems engineered and manufactured by The Garland Company or approved equal:

The Garland Company
Telephone: (800) 762-8225 ext. 720
Website: www.garlandco.com
Local Representative: Richard Jones

2.3 DESCRIPTION

A. Restoration work including but not limited to:

1. White Elastomeric Roof Coating: Pyramic; Energy Star, CRCC, & Title 24 approved white acrylic roof coating:

1. Weight/Gallon 12 lbs./gal. (1.44 g/cm3)
2. Non-Volatile % (ASTM D 1644) 66 min
3. Reflectance 81%
4. Emmitance 89%
5. SRI 101

2.4 WASHES FOR MEMBRANE PREPARATION

A. Cleaner wash for preparing surface for coating.

1. TSP (Tri Sodium Phosphate): A heavy duty degreaser and all purpose cleaner

2. Simple Green: All-purpose Industrial degreaser/cleaner

2.5 RELATED MATERIALS

A. Sealants and Repair Materials for use in field and flashing repairs.

1. Silverflash Mastic: Cold Applied, Silver trowel grade mastic used in three course applications as approved and furnished by the membrane manufacturer for moving joints.

2. Garmesh Reinforcement: SBR Coated fiberglass scrim used as reinforcement for roof repairs.

3. Polyester Soft Reinforcement: Strong elastic polyester reinforcement

4. Urethane Sealant: One part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.

    A. Tensile Strength (ASTM D412): 250 psi

    B. Elongation (ASM D412): 950%

    C. Hardness, Shore A (ASTM C920): 35

    D. Adhesion-in-Peel (ASTM C920): 30 pli

PART 3 — EXECUTION

3.1 EXAMINATION

A. Examine substrate surfaces to receive coating and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.

B. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.

C. Protect other work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore other work damaged by installation of the roofing system.

D. Acrylic coating rate: Acrylic coating shall be applied at no less than four (4) gallons per square in a two coat application.

E. Apply roofing materials as specified herein unless recommended otherwise by manufacture's instructions. Keep roofing materials dry during application. Do not permit phased construction.

3.3 CLEANING AND SURFACE PREPARATION

A. All defects such as deteriorated roof decks must be repaired; saturated insulation board must be replaced, etc. per manufacturer's specifications prior to application of the coating materials. Verify that existing conditions meet the following requirements:

1. The existing membrane is either fully adhered or that the membranes mechanical fasteners are secured and functional.

2. Application of roofing materials over a brittle roof membrane is not recommended.

B. Remove all loose dirt and foreign debris from the roof surface.

C. Do not damage roof membrane in cleaning process.

D. Clean and seal all parapet walls, gutters and coping caps, and repair any damaged metal where necessary. Seal watertight all fasteners, pipes, drains, vents, joints and penetrations where water could enter the building envelope.

E. Clean the entire roof by removing all dirt, algae, paint, oil, talc, rust or foreign substance. Use a 10% solution of TSP (tri-sodium phosphate), Simple Green and warm water. Scrub heavily soiled areas with a brush. Rinse with fresh water to remove all TSP solution. In ponding areas be sure to rinse at least twice to make sure all cleaning solution is rinsed clean. Cleaning residue will act as a bond breaker if not properly rinsed. Allow roof to dry before continuing.

F. Repair existing roof membrane as necessary to provide a sound substrate for the liquid membrane. All surface defects (cracks, blisters, tears) must be repaired with similar cured material.

G. Repair existing roof membrane as necessary to provide a sound substrate for the liquid membrane. Repair all surface defects (cracks, blisters, tears):

H. Blister Repairs & General Repairs

1. Clean the repair area.

2. All blisters must be cut and opened. Use a roofer's knife to open the blister with an "X" or "H" cut. Fold the flaps and remove any existing moisture. Permit the area to dry before applying repair materials.

3. After positioning the six (6) inch reinforcement to roll out, apply acrylic coating about 8 in (20 cm) wide to surface where reinforcement ply is going to be applied. Do not apply acrylic coating too far ahead of fabric or coating may dry before fabric can be embedded. The minimum application rate should be 1.5 gallons/square (0.61 liters/m^2). Immediately roll 6 in (15 cm) width reinforcement into coating. Care should be taken to lay the

fabric tight to the roof surface without air pockets, wrinkles, fishmouths, etc.

4. Apply acrylic coating about 8 in (20 cm) wide to surface where the repair was made. The minimum application rate should be 2.0 gallons/square (0.82 liters/m^2). Care should be taken to avoid air pockets, wrinkles, fishmouths, etc. Allow to dry for a minimum of 24 hours before applying finish coats.

5. After embedding reinforcement into the acrylic coating, apply additional coating to completely saturate the fabric at minimum application rate of 1.0 gallon/square (0.41 liters/m^2). This saturation coat should be applied as soon as possible after embedding reinforcement into the coating.

3.4 PRE-TREATMENTS

A. Known Growth - General Surfaces: After areas of moss, mold, algae and other fungal growths or vegetation have been removed and surfaces have been thoroughly cleaned, apply a biocidal wash (TSP, Simple Green) at a maximum spread rate of 0.2 gallons/square (0.1 liters/m^2), to guard against subsequent infection. Allow to dry onto absorbent surfaces before continuing with the application. On non-absorbent surfaces, allow to react before thoroughly rinsing to remove all traces of the solution. Note: See Health & Safety data before use.

3.5 SYSTEM APPLICATION

A. Application of Pyramic Acrylic Base & Finish Coats:

1. Before application of base coat then again prior to finish coat contact your local Garland Representative needs to inspect application.

2. After repair applications have been completed and allowed to dry, apply Pyramic Acrylic Coating in a uniform manner at minimum application rate of two (2) gallons per square over the entire roof, back roll entire base coat. Allow base coat to completely dry a minimum of 24 hours and then apply acrylic top coat at a minimum rate of two (2) gallons per square over the entire roof.

3. During final application of the coating special attention should be given to coating flashings and other critical areas to build adequate membrane thickness. Multiple coats may be necessary on verticals to prevent sagging. In any event all specified material must be applied and minimum membrane thickness achieved.

C. Membrane Deterioration:

1. It is recommended that fiberglass/polyester mat be used over areas of the membrane that are in deteriorated condition.

D. Coating shall be applied in strict accordance with manufacture's published directions and instructions.

1. Manual Application:

a. Pour coating onto roof in 24 in. rows and spread with ½ in. nap or foam roller.

b. Back roll coating with an 18 in. (45 cm) wide ½ in. nap roller for even application. Quality check that coating meets 2 gallons per square, 32 mil wet film thickness.

1. Spray Application:

a. Spray across roof, back-roll to ensure uniform coverage, then back spray across the same area to complete application.

b. Spray Pump Recommendations:

1) Pump Ratio 45:1

2) Hose ¾ ID Hose first 100 ft. (30 m) with swivel connections and ½ in. ID Hose for second 100 ft. (30 m).

3) Pressure 5000 psi.

4) Working pressure is 2700 to 3000 at the gun. Depending on equipment setup, you may be able to spray the coating as low as 1800 psi. Based on tip size, raise pressure to remove fingers in spray pattern.

5) High pressure fittings.

6) Input flow 100 psi.

7) Tip = .032 - .037 for a 8 in. (20 cm) pattern at 12 in. (30 cm) distance.

8) Recommended 12 in. (30 cm) extension with swivel tip.

9) Tip and pump sizes will change depending on temperature and pattern concerns.

c. Keep wet film gauges on-hand at all times during the application process to ensure proper coverage. Coverage rates below will designate gallons, wet mils, and dry mils.

1) 1.0 gallons will equal 16 wet mils and 12 dry mils

2) 1.5 gallons will equal 24 wet mils and 19 dry mils

3) 2.5 gallons will equal 40 wet mils and 32 dry mils

4) 4.5 gallons will equal 72 wet mils and 57 dry mils

3.6 FIELD QUALITY CONTROL

A. Require attendance of roofing materials manufacturers' representatives at site during installation of the roof coating system. Perform field inspection a minimum of two (2) days per week.

B. Correct defects or irregularities discovered during field inspection.

3.7 CLEANING

A. Remove dirt and debris from all walls, windows, floors, ladders and finished surfaces.

B. In areas where finished surfaces are soiled by dirt, debris or any other sources of soiling caused by work of this section, consult manufacturer of surfaces for cleaning instructions and conform to their instructions.

C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.8 CONSTRUCTION WASTE MANAGEMENT

A. Remove and properly dispose of waste products generated during roofing procedures. Comply with requirements of authorities having jurisdiction

3.9 FINAL INSPECTION

A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.

B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

C. The roofing system manufacturer reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the Roofing Contractor.

D. If core cuts verify the presence of damp or wet materials, the Roofing Contractor shall be required to replace the damaged areas at his own expense.

E. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

F. Notify the Contractor, Architect, Owner upon completion of corrections.

G. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

H. Immediately correct roof leakage during construction. If the Contractor does not respond within twenty four (24) hours, the Owner will exercise rights to correct the Work under the terms of the Conditions of the Contract.

3.10 DEMONSTRATION AND TRAINING

A. At a time and date agreed to by the Owner, instruct the Owner's facility manager, or other representative designated by the Owner, on the following procedures:

1. Roof troubleshooting procedures.

2. Notification procedures for reporting leaks or other apparent roofing problems.

3. Roofing maintenance.

4. The Owner's obligations for maintaining the roofing warranty in effect and force.

5. The Manufacturer's obligations for maintaining the roofing warranty in effect and force.

3.11 OWNER SUPPLIED MATERIALS

A. Contractor must submit all quantities of owner supplied materials; per the list supplied below required to complete the project per specification section 07 56 31 with their bid.

B. Contractor must provide all labor and incidental materials to install owner supplied materials as part of their bid.

C. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 07 56 31.

D. Contractor must provide an accurate list of owner supplied materials to the Owner, overages will be returned to the owner and under estimated quantities will be the full responsibility of the contractor to supply and install in full compliance with this section.

E. Freight charges of owner supplied materials will be the responsibility of the owner. Contractor must take delivery of materials, properly protect, cover and store at jobsite.

F. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07 56 31.

G. Materials specifically provided by the Owner;

- Stressply Plus FR Mineral (75 square feet per roll)
- Stressbase 80 (150 square feet per roll)
- Weatherking Flashing Adhesive (5 gallon pail)
- Garla Flex Mastic (10.1 oz tube)
- SilverFlash Mastic (5 gal pail)
- Tuff Stuff Urethane Sealant (10.1 oz tube)
- Garla-Prime VOC (5 gal pail)
- Garmesh (150’ x 6”)
- Pyramic Acrylic Coating, Base Coat (55 gal drum)
- Pyramic Acrylic Coating, Top Coat (55 gal drum)
- WhiteKnight Plus WC, Urethane Top Coat (5 gallon pail)
- Freight to jobsite

END OF SECTION - SECTION 07 56 31 - ROOFING RESTORATION – ACRYLIC

SECTION 07 59 01 - MEMBRANE REROOFING PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Existing roof tear-off.
2. Removal of existing base flashings.

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site and disposed of legally.

1.4 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Existing Membrane Roofing System: Built-up asphalt roofing membrane, surfacing, and components and accessories between deck and roofing membrane.

C. Substrate Board: Rigid board or panel products placed over the roof deck that serve as thermal barriers, provide a smooth substrate, or serve as a component of a fire-resistance-rated roofing system.

D. Roof Tear-Off: Removal of existing membrane roofing system from deck.

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

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.6 PROJECT CONDITIONS

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

1. Coordinate work activities daily with Owner so Owner can place protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area if desired.

B. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not block required exits or path from required exit to public right-of-way. Coordinate with requirements of authorities having jurisdiction.

D. Owner assumes no responsibility for condition of areas to be reroofed.

E. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.

F. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

PART 2 - PRODUCTS

2.1 TEMPORARY ROOFING MATERIALS

A. Refer to Division 07 Section “Built-Up Asphalt Roofing.”

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate with Owner to shut down air intake equipment in the vicinity of the Work. Cover air intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

B. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

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

1. If roof drains will be temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

3.2 ROOF TEAR-OFF

A. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing.

B. Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.

1. Remove any existing roof insulation.

C. Hazardous Materials have been identified in portions of the existing roofing system where roofing is designated to be removed. Refer to the appendix of the Project Manual for additional information and requirements.

3.3 DECK REMOVAL / REPLACEMENT

A. Remove existing plywood substrate as directed by owner or owner's representative. Replacement of damaged or dryrot sheathing shall be performed on a per square foot basis.

3.4 EXISTING BASE FLASHINGS

A. Remove existing base flashings around parapets, curbs, walls, and penetrations.

1. Clean substrates of contaminants such as sheet materials, dirt, and debris.

3.5 DISPOSAL

A. Collect and place demolished materials in containers. Dispose of demolished materials daily. Do not allow demolished materials to accumulate on-site.

B. Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION - SECTION 07 59 01 - MEMBRANE REROOFING PREPARATION

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

A. Provide all labor, equipment, and materials to fabricate and install all related sheet metal flashing components for a complete roofing assembly.

B. Related Sections:

1. Division 07 Section Common Work Results for Thermal and Moisture Protection.

C. Related Work Specified Elsewhere:

1. Division 01: Section Summary of Work

2. Division 07: Built-up Roofing Restoration

3. Division 07: Asphalt Shingle Roofing

4. Division 09: Painting

5. Division 07: Modified Built up Roofing

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (galvannealed) by the Hot-Dip Process.

2. ASTM A792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process.

3. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

4. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

5. ASTM D692 Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.

B. American National Standards Institute and Single Ply Roofing Institute (ANSI/SPRI)

1. ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal.

C. Warnock Hersey International, Inc., Middleton, WI (WH)

D. Factory Mutual Research Corporation (FMRC

E. Underwriters Laboratories (UL)

F. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

1. 1993 Edition Architectural Sheet Metal Manual

G. National Roofing Contractors Association (NRCA)

1. Roofing and Waterproofing Manual

H. American Society of Civil Engineers (ASCE)

1. ASCE 7-05 Minimum Design Loads for Buildings and Other Structures.

1.4 SUBMITTALS FOR REVIEW

A. Product Data:

1. Provide manufacturer's specification data sheets for each product.

2. Metal material characteristics and installation recommendations.

3. Submit color chart prior to material ordering and/or fabrication so that equivalent colors to those specified can be approved.

B. Samples: Submit two (2) samples, illustrating typical metal edge, coping, gutters, fascia extenders for material and finish.

C. Shop Drawings

1. For manufactured and ANSI/SPRI approved shop fabricated gravel stops, fascia, scuppers, and all other sheet metal fabrications.

2. Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, terminations, and installation details.

3. Indicate type, gauge and finish of metal.

D. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.

1.5 SUBMITTALS FOR INFORMATION

A. Design Loads: Any material submitted as equal to the specified material must be accompanied by a report signed and sealed by a professional engineer licensed in the state in which the installation is to take place. This report shall show that the submitted equal meets the wind uplift and perimeter attachment requirements according to ASCE 7-05 and ANSI/SPRI ES-1. Substitution requests submitted without licensed engineer approval will be rejected for non-conformance.

B. Factory Mutual Research Corporation's (FMRC) wind uplift resistance classification: The roof perimeter flashing shall conform to the requirements as defined by the FMRC Loss Prevention Data Sheet 1-49.

C. A letter from an officer of the manufacturing company certifying that the materials furnished for this project are the same as represented in tests and supporting data.:

C. Mill production reports certifying that the steel thicknesses are within allowable tolerances of the nominal or minimum thickness or gauge specified.

D. Certification of work progress inspection. Refer to Quality Assurance Article below.

E. Certifications:

1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.

2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

F. Test Reports: Submit third party validation of environmental claims, prepared UL Environment, for all metal flashing and trim containing recycled content and/or bio based content.

1.6 CONTRACT CLOSEOUT SUBMITTALS

A. General: Comply with Requirements of Section 01 78 00 - Closeout Submittals.

B. Special Project Warranty: Provide specified warranty for the Project, executed by the authorized agent of the Manufacturer.

C. Roofing Maintenance Instructions. Provide a manual of manufacturer's recommendations for maintenance of installed roofing systems.

D. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.7 QUALITY ASSURANCE

A. Engage an experienced roofing contractor specializing in sheet metal flashing work with a minimum of five (5) years experience.

B. Maintain a full-time supervisor/foreman who is on the job-site at all times during installation. Foreman must have a minimum of five (5) years experience with the installation of similar system to that specified.

C. Source Limitation: Obtain components from a single manufacturer. Secondary products which cannot be supplied by the specified manufacturer shall be approved in writing by the primary manufacturer prior to bidding.

D. Upon request fabricator/installer shall submit work experience and evidence of financial responsibility. The Owner's representative reserves the right to inspect fabrication facilities in determining qualifications.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.

B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials which may cause discoloration or staining.

1.9 PROJECT CONDITIONS

A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for pre-formed metal edge system.

1.10 DESIGN AND PERFORMANCE CRITERIA

A. Thermal expansion and contraction:

1. Completed metal edge flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.

1.11 WARRANTIES

A. Owner shall receive one (1) warranty from manufacturer of roofing materials covering all of the following criteria. Multiple warranties are not acceptable.

1. Pre-finished metal material shall require a written twenty (20)-year non-prorated warranty covering fade, chalking and film integrity. The material shall not show a color change greater than 5 NBS color units per ASTM D2244 or chalking excess of 8 units per ASTM D659. If either occurs material shall be replaced per warranty, at no cost to the Owner.

2. Changes: Changes or alterations in the edge metal system without prior written consent from the manufacturer shall render the system unacceptable for a warranty.

3. Warranty shall commence on date of substantial completion or final payment, whichever is agreed by contract.

4. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of two years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.

5. Installing roofing contractor shall be responsible for the installation of the edge metal system in general accordance with the membrane manufacturer's recommendations.

6. Installing contractor shall certify that the edge metal system has been installed per the manufacturer's printed details and specifications.

7. One manufacturer shall provide a single warranty for all accessory metal for flashings, metal edges and copings, along with the warranty for metal roof areas, membrane roof areas, and any transitions between two different material types.

PART 2 — PRODUCTS

2.1 PRODUCTS, GENERAL

A. Refer to Division 01 Section "Common Product Requirements."

B. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.

C. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.

1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.

2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.

3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.

4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 MATERIALS

A. Materials:

1. Minimum gauge of steel or thickness of Aluminum to be specified in accordance with Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contractor's National Association, Inc. recommendations

   A. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 24 gauge, commercial or lock-forming quality.

2. Exposed and unexposed surfaces for mill finish flashing, fascia, and coping cap, shall be as shipped from the mill.

3. Exposed and unexposed surfaces for anodized aluminum flashing, fascia, and coping cap, shall be as shipped from mill.

2.4 RELATED MATERIALS AND ACCESSORIES

A. Metal Primer: Zinc chromate type.

B. Plastic Cement: ASTM D 4586

C. Sealant: Specified in Section 07900 or on drawings.

D. Underlayment: ASTM D2178, No15 asphalt saturated roofing felt.

E. Slip Sheet: Rosin sized building paper.

F. Fasteners:

1. Corrosion resistant screw fastener as recommended by metal manufacturer. Finish exposed fasteners same as flashing metal.

2. Fastening shall conform to Factory Mutual requirements or as stated on section details, whichever is more stringent.

G. Gutter and Downspout Anchorage Devices: Material as specified for system.

PART 3 — EXECUTION

3.1 EXECUTION, GENERAL

A. Refer to Division 07 Section Common Work Results for Thermal and Moisture Protection.

3.2 PROTECTION

A. Isolate metal products from dissimilar metals, masonry or concrete with bituminous paint, tape, or slip sheet. Use gasketed fasteners where required to prevent corrosive reactions.

3.3 GENERAL

A. Secure fascia to wood nailers at the bottom edge with a continuous cleat.

B. Fastening of metal to walls and wood blocking shall comply with building code standards.

C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.

D. Allow sufficient clearances for expansion and contraction of linear metal components. Secure metal using fasteners as required by the system. Exposed face fastening will be rejected.

3.4 INSPECTION

A. Verify that curbs are solidly set and nailing strips located.

B. Perform field measurements prior to fabrication.

C. Coordinate work with work of other trades.

D. Verify that substrate is dry, clean and free of foreign matter.

E. Commencement of installation shall be considered acceptance of existing conditions.

3.5 MANUFACTURED SHEET METAL SYSTEMS

A. Furnish and install manufactured fascia and coping cap systems in strict accordance with manufacturer's printed instructions.

B. Provide factory-fabricated accessories including, but not limited to, fascia extenders, miters, scuppers, joint covers, etc. Refer to Source limitation provision in Part 1.

3.6 SHOP-FABRICATED SHEET METAL

A. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.

B. Hem exposed edges.

C. Angle bottom edges of exposed vertical surfaces to form drip.

D. Lap corners with adjoining pieces fastened and set in sealant.

E. Form joints for gravel stop fascia system, coping cap with a 3/8" opening between sections. Back the opening with an internal drainage plate formed to the profile of fascia piece.

F. Install sheet metal to comply with referenced ANSI/SPRI, SMACNA and NRCA standards.

3.7 FLASHING MEMBRANE INSTALLATION

A. Scupper Through Roof Edge

1. Install scupper box in a one fourth (1/4) inch bed of mastic. Assure all box seams are soldered and have minimum four (4) inch flange. Make sure all corners are closed and soldered.

2. Prime metal edge at a rate of one hundred (100) square feet per gallon and allow to dry.

B. Drip Edge Detail

1. Position base plies of the Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

2. Install continuous cleat on face of nailer and fasten six (6) inches on center.

3. Install new Drip Edge hooked to continuous cleat. Set metal flange into roofing cement, nail every three (3) inches on center, and prime at a rate of one hundred (100) square feet per gallon.

4. Drip Edge flange with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

C. Gravel Stop Detail

1. Position base plies of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

2. Install continuous cleat on face of nailer and fasten six (6) inches on center.

3. Install new Gravel Stop hooked to continuous cleat. Set metal flange into roofing cement, nail every three (3) inches on center, and prime at a rate of one hundred (100) square feet per gallon.

4. Strip in Gravel Stop flange with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

D. Edge Metal With Gutter

1. Position base plies of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

2. Install gutter and strapping fastening six (6) inches on center.

3. Install continuous cleat on face of nailer and fasten six (6) inches on center.

4. Install new edge metal hooked to continuous cleat. Set metal flange into roofing cement, nail every three (3) inches on center, and prime at a rate of one hundred (100) square feet per gallon.

5. Strip in edge metal with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

E. Snap-On Coping Cap Detail

1. Install Miters first.

2. Position base flashing of the Built-Up and/or Modified Roofing membrane over the wall edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

3. Install minimum sixteen (16) gauge, sixteen (16) inch long by specified width anchor chair at [Contact Garland Representative] feet on center.

1. 4. Install six (6) inch wide splice plate by centering over sixteen (16) inch long by specified width anchor chair. Apply two beads of

sealant to either side of the splice plate's center. Approximately two (2) inches from the coping cap joint. Install Coping Cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.

3.8 CLEANING

A. Clean installed work in accordance with the manufacturer's instructions.

B. Replace damaged work than cannot be restored by normal cleaning methods.

3.9 CONSTRUCTION WASTE MANAGEMENT

A. Remove and properly dispose of waste products generated. Comply with requirements of authorities having jurisdiction

3.10 FINAL INSPECTION

A. At completion of installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.

B. Inspect work and flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

C. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

D. Notify the Owner upon completion of corrections.

E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

F. Immediately correct roof leakage during construction. If the Contractor does not respond within twenty-four (24) hours, the Owner will exercise rights to correct the Work under the terms of the Conditions of the Contract.

3.11 DEMONSTRATION AND TRAINING

A. At a time and date agreed to by the Owner, instruct the Owner's facility manager, or other representative designated by the Owner, on the following procedures:

1. Troubleshooting procedures.

2. Notification procedures for reporting leaks or other apparent roofing problems.

3. Maintenance.

4. The Owner's obligations for maintaining the warranty in effect and force.

5. The Manufacturer's obligations for maintaining the warranty in effect and force.

END OF SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

SECTION 09 91 00 – PAINTING

PART 4 - – GENERAL

SCHEDULE 0 - SECTION INCLUDES

PRODUCT DATA SHEET 0 - Surface preparation and field painting of fascia board and sheet metal items and surfaces as specified, including mechanical and electrical equipment that do not have a factory-applied finish.

PRODUCT DATA SHEET 1 - Surface preparation and field painting of exposed exterior items and surfaces.

SCHEDULE 1 - RELATED SECTIONS

PRODUCT DATA SHEET 0 - Section 06 Rough Carpentry

PRODUCT DATA SHEET 1 - Section 07 Modified Bitumen Roofing

PRODUCT DATA SHEET 2 - Section 07 Modified Roofing Restoration

PRODUCT DATA SHEET 3 - Section 07 Asphalt Shingle Roofing

PRODUCT DATA SHEET 4 - Section 07 Sheet Metal Flashing and Trim

SCHEDULE 2 - REFERENCES

PRODUCT DATA SHEET 0 - American Society for Testing and Materials (ASTM) D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

PRODUCT DATA SHEET 1 - Steel Structures Painting Council (SSPC) SP6 - Commercial Blast Cleaning Procedures.

PRODUCT DATA SHEET 2 - Steel Structures Painting Council (SSPC) SP10 - Near White Blast Cleaning Procedure.

SCHEDULE 3 - SUBMITTALS

PRODUCT DATA SHEET 0 - Submit under provisions of General Conditions.

PRODUCT DATA SHEET 1 - Product Data: Manufacturer's data sheets on each product to be used, including:

4.1 Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

4.2 Preparation instructions and recommendations.

4.3 Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying

each coating material.

PRODUCT DATA SHEET 2 - Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

PRODUCT DATA SHEET 3 - Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

SCHEDULE 4 - QUALITY ASSURANCE

PRODUCT DATA SHEET 0 - Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

PRODUCT DATA SHEET 1 - Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

PRODUCT DATA SHEET 2 - Paint exposed surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

PRODUCT DATA SHEET 3 - Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

PRODUCT DATA SHEET 4 - Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

4.1 Finish areas designated by Architect.

4.2 Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.

4.3 Refinish mock-up area as required to produce acceptable work.

SCHEDULE 5 - DELIVERY, STORAGE, AND HANDLING

PRODUCT DATA SHEET 0 - Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label.

PRODUCT DATA SHEET 1 - Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 degree F (7 degree C). Maintain storage containers in a clean condition, free of foreign materials and residue.

PRODUCT DATA SHEET 2 - Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PRODUCT DATA SHEET 3 - Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 degree F (10 and 32 degree C), unless manufacturer's instructions specifically states.

PRODUCT DATA SHEET 4 - Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 degree F (7 and 35 degree C).

PRODUCT DATA SHEET 5 - Do not apply paint in or when snow, rain, fog, or mist; or when relative humidity exceeds 85 percent or is imminent; or at temperatures less than 5 degree F (3 degree C) above the dew point; or to damp or wet surfaces.

4.1 Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PRODUCT DATA SHEET 6 - Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

SCHEDULE 6 - PROJECT CONDITIONS

PRODUCT DATA SHEET 0 - Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

SCHEDULE 7 - EXTRA MATERIALS

PRODUCT DATA SHEET 0 - Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

PRODUCT DATA SHEET 1 - Quantity: Furnish Owner with an additional three percent, but not less than 1 gal (3.8 l) or 1 case, as appropriate, of each material and color applied.

PART 5 - PRODUCTS

SCHEDULE 0 - MANUFACTURERS

PRODUCT DATA SHEET 0 - Acceptable Manufacturer: BEHR Process Corporation, which is located at: 3400 W. Segerstrom Ave.; Santa Ana, CA 92704; Tel: 714-545-7101; Fax: 714-241-1002

PRODUCT DATA SHEET 1 - Or owner and architect approved equal.

SCHEDULE 1 - PAINT MATERIALS - GENERAL

PRODUCT DATA SHEET 0 - Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

PRODUCT DATA SHEET 1 - VOC Classification: Provide materials, including primers, undercoats, and finish-coat materials, that meet local air quality management district regulations.

PRODUCT DATA SHEET 2 - Color: Refer to Finish Schedule and Paint Legend for paint colors.

PRODUCT DATA SHEET 3 - Application Rate: Coating thickness for primer, intermediate, barrier and finish coats shall be measured as Dry Film Thickness (DFT) and comply with manufacturer's published recommendations.

SCHEDULE 2 - EXTERIOR PAINT SYSTEMS

PRODUCT DATA SHEET 0 - Ferrous Metal - Steel / Iron:

5.1 One Prime Coat:

A. BEHR PREMIUM PLUS Interior/Exterior Oil-Based Primer & Sealer No. 434.

5.2 Two finish coats:

A. BEHR PREMIUM PLUS ULTRA Exterior Paint.

PRODUCT DATA SHEET 1 - Non-Ferrous Metal - Galvanized / Aluminum:

5.1 One Prime Coat: (If primer is required per product instruction)

A. BEHR PREMIUM PLUS Exterior Water-Based Primer & Sealer No. 436.

5.2 Two finish coats:

A. BEHR PREMIUM PLUS ULTRA Exterior Paint.

PRODUCT DATA SHEET 2 - Wood - Stain-Blocking / Tannin Bleed (i.e. Cedar and Redwood) - Solid Color Staining (If primer is required per product instruction)

5.1 One Prime Coat:

A. BEHR PREMIUM PLUS Exterior Water-Based Primer & Sealer No. 436.

PRODUCT DATA SHEET 3 - Wood - Floors, Decks and Steps:

5.1 One Prime Coat: (If primer is required per product instruction)

A. BEHR PREMIUM PLUS Exterior Water-Based Primer & Sealer No. 436.

5.2 Two finish coats:

A. BEHR PREMIUM SOLID COLOR DECK, FENCE & SIDING

PART 6 - EXECUTION

SCHEDULE 0 - EXAMINATION

PRODUCT DATA SHEET 0 - Do not begin installation until substrates have been properly prepared.

PRODUCT DATA SHEET 1 - If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

PRODUCT DATA SHEET 2 - Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various

substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

6.1 Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

6.2 If a potential incompatibility of primers applied by others exists, obtain the following from the primer Applicator before proceeding:

A. Confirmation of primer's suitability for expected service conditions.

B. Confirmation of primer's ability to be top coated with materials specified.

SCHEDULE 1 - PREPARATION

PRODUCT DATA SHEET 0 - General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

6.1 After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

PRODUCT DATA SHEET 1 - Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

6.1 Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

PRODUCT DATA SHEET 2 - Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

6.1 Provide barrier coats over incompatible primers or remove and reprime.

6.2 Provide barrier coats over incompatible primers or remove primers and re-prime substrate.

6.3 Cementitious Substrates: Prepare concrete, brick, concrete masonry block, and cement plaster surfaces to be coated. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods to prepare surfaces.

A. Use abrasive blast-cleaning methods if recommended by coating manufacturer.

B. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not coat surfaces if moisture content exceeds that permitted in manufacturer's written instructions.

6.4 Wood Substrates: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Smoothly sand surfaces exposed to view and dust off.

A. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer, before applying primer.

B. Immediately on delivery, prime edges, ends, faces, undersides, and backsides of wood to be coated.

C. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
D. Determine moisture content of surfaces by performing a moisture test. Do not coat if moisture content exceeds 15 percent.

6.5 Ferrous-Metal Substrates: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.

A. Blast-clean steel surfaces as recommended by coating manufacturer and according to SSPC-SP 10.
B. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
C. Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, solvent clean, and touch up with same primer as the shop coat.

6.6 Nonferrous-Metal Substrates: Clean nonferrous and galvanized surfaces according to manufacturer's written instructions for the type of service, metal substrate, and application required.

A. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

PRODUCT DATA SHEET 3 - Material Preparation: Carefully mix and prepare coating materials according to manufacturer's written instructions.

6.1 Maintain containers used in mixing and applying coatings in a clean condition, free of foreign materials and residue.

6.2 Stir materials before applying to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.

6.3 Use only the type of thinners approved by manufacturer and only within recommended limits.

6.4 Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

SCHEDULE 2 - APPLICATION

PRODUCT DATA SHEET 0 - General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

PRODUCT DATA SHEET 1 - General: Apply high-performance coatings according to manufacturer's written instructions.

6.1 Use applicators and techniques best suited for the material being applied.

6.2 Do not apply high-performance coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.

6.3 Coating surface treatments, and finishes are indicated in the coating system descriptions.

6.4 Provide finish coats compatible with primers used.

6.5 The term "exposed surfaces" includes areas visible when permanent or

built-in fixtures, convector covers, grilles, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

PRODUCT DATA SHEET 2 - Application Procedures: Apply coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

6.1 The number of coats and film thickness required is the same regardless of application method.

6.2 Completed Work: Match approved Samples for color, texture, and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.

SCHEDULE 3 - FIELD QUALITY CONTROL

PRODUCT DATA SHEET 0 - Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:

6.1 Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.

6.2 Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove non-complying paint from Project site, pay for testing, and repaint surfaces previously coated with the non-complying paint. If necessary, Contractor may be required to remove non-complying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

SCHEDULE 4 - CLEANING

PRODUCT DATA SHEET 0 - After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

SCHEDULE 5 - PROTECTION

PRODUCT DATA SHEET 0 - Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

PRODUCT DATA SHEET 1 - Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

PRODUCT DATA SHEET 2 - After work of other trades is complete, touch up and restore damaged or defaced painted surfaces.

END OF SECTION- SECTION 09 91 00 – PAINTING