BID SECTION NO. 1 MADISON ELEMENTARY SCHOOL

SECTION 07 52 00 - MODIFIED BITUMINOUS MEMBRANE ROOFING

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 modified bituminous roofing system.

B. Related Work Specified Elsewhere:

1. Summary of Work: Refer to Division 01 Section – Summary of Work
2. Rough Carpentry: Section 06 10 00 - Rough Carpentry
3. Roof Restoration Acrylic Coating: Section 07 56 31 – Restoration Coating
4. Sheet Metal Flashing and Trim: Section 07 62 00 - Sheet Metal Flashing and Trim.
5. Sheet Metal Roof Accessories: Section 07 71 00 - Roof Specialties.

1.3 REFERENCES

A. American Society of Civil Engineers (ASCE):

1. ASCE 7-10, Minimum Design Loads for Buildings and Other Structures.

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

1. ASTM D41 Standard Specification for Asphalt Primer Used in Roofing, Dampproofing and Waterproofing.
2. ASTM D312 Standard Specification for Asphalt Used in Roofing.
3. ASTM D451 Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
4. ASTM D1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.

5. ASTM D1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.

6. ASTM D1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.

7. ASTM D2178 Standard Specification for Asphalt Glass Felt Used as a Protective Coating for Roofing.

8. ASTM D2822 Standard Specification for Asphalt Roof Cement.

9. ASTM D4601 Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.

10. ASTM D5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.

11. ASTM D6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.

12. ASTM D6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.

13. ASTM E108 Standard Test Methods for Fire Test of Roof Coverings.

C. Factory Mutual Research (FM):

1. Roof Assembly Classifications.

D. National Roofing Contractors Association (NRCA):

1. Roofing and Waterproofing Manual.

E. Underwriters Laboratories, Inc. (UL):

1. Fire Hazard Classifications.

F. Warnock Hersey (WH):

1. Fire Hazard Classifications.

G. 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. RE-1, RE-2, RE-3.

2. ANSI/SPI FX-1 2001 Standard Field Testing Procedure for determining the withdrawal resistance of roofing fasteners.

1.4 SUBMITTALS FOR REVIEW

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. Samples: Submit two (2) samples of the following:

1. Rosin Sheet
2. Base Sheet
3. Ply Sheet Membrane
4. SBS Modified Surface Membrane
5. Insulation Board
6. Cover Board
7. Mechanical Fastener – All Types

C. 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.

D. 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.

E. LEED Certification: Provide a roof system to achieve or aid in the qualification of points satisfying;

1. SSC7.2 - Heat Island Effect
2. MRC4 - Recycled Content

1.5 SUBMITTALS FOR INFORMATION

A. Manufacturer's Installation Instructions: Submit installation instructions and recommendations indicating special precautions required for installing the membrane.

B. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual, Underwriters Laboratories, Warnock Hersey or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.

C. Manufacturer's Certificate: Certify that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.

D. Manufacturer's Certificate: Submit a certified copy of the roofing manufacturer's ISO 9001 compliance certificate.

E. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147.

F. Wind uplift calculations per California Building Code (CBC), Chapter 15, Section 1504, ASCE 7-10 reviewed by the roofing systems manufacturer’s California licensed structural engineer.

G. Written certification from the roofing system manufacturer certifying the applicator is currently authorized for the installation of the specified roof system to achieve the required warranty term.

H. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7-10, Method 2 for Components and Cladding, professional engineer employed by the system manufacturer as a full-time staff engineer. In no case shall the design loads be taken to be less than those detailed in Design and Performance Criteria article of this specification.

I. Qualification data for firms and individuals identified in Quality Assurance Article below.

J. Perform in field fastener pull testing and provide results for review and acceptance. Supply letter from manufacturer stating securement materials, methods, and spacing required to achieve the required uplift resistance.

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. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with not less than 12 years documented experience and have ISO 9001 certification.

B. Installer Qualifications: Company specializing in modified bituminous roofing installation with not less than 5 years experience and authorized 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 while roofing work is in progress. Maintain proper supervision of workmen.

D. Maintain a copy of the Contract Documents in the possession of the Supervisor/Foreman and on the roof at all times.

E. Source Limitations: All major roof components to be supplied by warranty manufacturer. Major components to include: base ply, plies, adhesives, mastics, modified membranes, reinforcing membranes and reflective coatings.

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.

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

1.8 PRE-INSTALLATION CONFERENCE

A. Pre-Installation Roofing Conference: Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of modified bituminous 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 that 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 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 and furnish copy of 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.

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

D. 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 to the Owner and Architect of Record. This shall not be construed as interference with the progress of Work on the part of the Owner or Architect of Record.

1.9 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 prevent moisture exposure. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end. Remove factory plastic wrappings to avoid condensation accumulating materials. 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. Secure all material and equipment on the job site. If any material or equipment is stored on the roof, assure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the Contractor's actions will be the sole responsibility of the Contractor, and the deck will be repaired or replaced at his expense.

1.10 MANUFACTURER'S INSPECTIONS

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

1. Report progress and quality of the work as observed.

2. Provide job site inspections two (2) days per week and provide electronic documentation of progress, problems, & solutions to Architect and Owner sent on a weekly basis throughout the course of construction.

3. Report to the Architect and 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 application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

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.

D. All slopes greater than 2:12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank one (1) inch cap nails, or screws and plates at a rate of one (1) fastener per ply (including the membrane) at each insulation stop. Place insulation stops at 16 ft o.c. for slopes less than 3:12 and four (4) ft o.c. for slopes greater than 3:12. On non-insulated systems, nail each ply directly into the deck at the rate specified above. When slope exceeds 2:12, install all plies parallel to the slope (strapping) to facilitate backnailing. Install four (4) additional fasteners at the upper edge of the membrane when strapping the plies.

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.

C. Provide manufacturer approved water cut offs at the end of the days application. Cut out and discard these materials prior to re-starting work.

1.13 WARRANTY

A. Upon completion of installation, and acceptance by the Owner and Architect, the Manufacturer will supply to the Owner a thirty (30) year No Dollar Limit (NDL) watertight warranty.

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

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

D. Manufacturer will provide the following services at no cost to the owner at years 2, 5, 10, 15 & 20.

   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.

E. Leak responsibilities from the manufacturer to the owner in the event a roof leak should occur.

   A. Provide a toll free (800) number for owner to call in leak report. Number will be monitored (24) hours per day (365) days per year.

   B. Provide a response to owner within (24) hours of when call is made.

   C. Provide a repair crew, at the building site, within two (2) business days of the call.

   D. Provide follow up inspection to ensure repairs were completed properly.

1.14 DESIGN AND PERFORMANCE CRITERIA

A. Uniform Wind Uplift Load Capacity

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

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

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: Not permitted, per district standard.

2.2 ACCEPTABLE MANUFACTURERS

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

1. The Garland Company
   3800 East 91st Street
   Cleveland, Ohio 44105
   Telephone: 559-647-1196
   Local Representative: Rich Jones
   Website: www.garlandco.com

2.3 DESCRIPTION

A. Modified bituminous sheet roofing work including but not limited to:

1. Install one layer Red Rosin over entire roof substrate prior to installation of insulation board.

2. Install flat and/or tapered insulation board as specified.

3. Cold Applied Adhesive: V.O.C. compliant, non-asbestos containing cold applied adhesive for roof slopes up to 3:12.

4. Install one layer of Stressbase 80 SBS 20% pre consumer recycled content, LEED 10% MR 4 recycled content, UL Environment Certified, modified ply and flashing membrane in cold applied adhesive.

5. Install one layer modified membrane & flashing membrane: (Stressply Plus FR Mineral) - Environmentally Friendly; 145 mil SBS (Styrene-Butylene-Styrene) mineral surfaced, rubber modified roofing membrane incorporating recycled rubber, fire retardant characteristics and reinforced with a fiberglass and polyester composite scrim. Recycled content 6 percent, LEED MR 4 recycled content, UL Certified. Install in cold applied adhesive.

6. Surfacing: Pyramic; Title 24, CRRC, & Energy Star approved white acrylic coating ASTM G26

7. LEED Certification: Provide a roof system to achieve or aid in the qualification of points satisfying;

   a. SSC7.2 - Heat Island Effect

   b. MRC4 - Recycled Content

2.4 BITUMINOUS MATERIALS

A. Asphalt Primer: V.O.C. compliant, ASTM D41.

B. Asphalt Roofing Mastic: V.O.C. compliant, ASTM D4586

C. Cold Applied Membrane Adhesive: VOC compliant, Performance Requirements:

1. Non-Volatile Content ASTM D4479 70%
2. Density ASTM D1475 7.89 lbs./gallon
3. Viscosity Brookfield ASTMD 652 16-20 sec
4. Flash Point ASTM D93 100°F min.
5. Slope: up to 3:12

D. Cold Applied Flashing Adhesive. VOC compliant: Performance Requirements:

1. Non-Volatile Content ASTM D4479 70%
2. Density ASTM D1475 8.6 lbs./gal.
3. Flash Point ASTM D93 100°F

2.5 SHEET MATERIALS

A. Fiberglass Base Sheet (HPR Glasbase): ASTM 4601, Type II

B. Base & Base Flashing Ply (StressBase 80 Sheet): Fiberglass scrim with the following minimum performance requirements according to ASTM D5147. Properties (Finished Membrane):

1. Tensile Strength
   a. 2 in/min. @ 73.4 ± 3.6°F MD 100 lbf/in CMD 100 lbf/in
   b. 50mm/min. @ 23 ± 3°C MD 39 kN/m CMD 39 kN/m
2. Tear Strength
   a. 2 in/min. @ 73.4 ± 3.6°F MD 110 lbf CMD 110 lbf
   b. 50mm/min. @ 23 ± 3°C MD 1335 N CMD 1335 N
3. Elongation at Maximum Tensile
   a. 2 in/min. @ 73.4 ± 3.6°F MD 2.5 % CMD 2.5 %
4. Low Temperature Flexibility (ASTM D5147): Passes -20°F (-28.8°C)

D. Modified Membrane & Flashing Ply Properties: Stressply Plus FR Mineral; ASTM D6163, Type III Grade G per the minimum performance requirements of ASTM D5147.

1. Tensile Strength

    a. 2 in/min. @ 73.4 ± 3.6°F MD 310 lbf/in CMD 310 lbf/in

    b. 50 mm/min. @ 23 ± 3°C MD 54.2 kN/m CMD 54.2 kN/m

2. Tear Strength

    a. 2 in/min. @ 73.4 ± 3.6°F MD 500 lbf CMD 500 lbf

    b. 50 mm/min. @ 23 ± 3°C MD 2224 N CMD 2224 N

3. Elongation at Maximum Tensile

    a. 2 in/min. @ 73.4 ± 3.6°F MD 3.5% CMD 3.5%

    b. 50 mm/min. @ 23 ± 3°C MD 3.5% CMD 3.5%

4. Low Temperature Flexibility (ASTM D5147): Passes -30°F (-34°C)

2.6 SURFACINGS

A. White Elastomeric Roof Coating: Pyramic; Energy Star, Cool Roof Rating Council, & Title 24 approved white acrylic roof coating: ASTM D4798

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

2.7 RELATED MATERIALS

A. Roof Insulation base layer: (ASTM C 1289) polyisocyanurate rigid insulation board; minimum (thickness per approved plans), square edges; (minimum R factor per approved plans.). All sizes thicker than 2” are to be installed in multiple layers and have all edges stagger to the maximum dimension possible.

B. Roof Insulation top layer: Knight – Celotex Structodeck or equal, (ASTM C 208) High Density ½” wood fiber board 4’ x 8’, six side primed.

C. Tapered Insulation (as required and shown on drawings for primary slope, cricket slope, or as otherwise shown on drawings): Tapered insulation board to be used as required for tapered insulation system with a minimum (slope per approved drawings) per foot slope or per approved plans. Provide sufficient crickets or saddles to ensure water does not pond on the new roof installation.

D. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel, I addition plates should be used. Fasteners shall be self-clinching type of penetrating type as recommended by the manufacturer of the deck material. Nails and fasteners shall be flush-driven through flat metal discs of not less than one (1) inch diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than one (1) inch diameter are used.

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FMG 4470, designed for fastening roofing insulation to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

F. Metal Discs: Flat discs or caps of zinc-coated sheet metal not lighter than twenty eight (28) gauge and not less than three (3) inch in diameter. Form discs to prevent dishing. Bell or cup shaped caps are not acceptable.

G. Termination bar should be extruded aluminum .125 x 1"

H. Walkway Pads: Factory formed asphalt, APOC or equal. Install per approved plans.

1. ¾" for use in high traffic areas.

I. Walkway Pad Adhesive: Adhesive used to adhere approved walk way pads as recommended and furnished by the membrane manufacturer

1. Walkway pads to be installed after final roof coating.

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

1. Tensile Strength (ASTM D412): 250 psi
2. Elongation (ASM D412): 950%
3. Hardness, Shore A (ASTM C920): 35
4. Adhesion-in-Peel (ASTM C920): 30 pli

K. Glass Fiber Cant: Continuous triangular cross Section made of inorganic fibrous glass used as a cant strip as recommended and furnished by the membrane manufacturer.

L. Drain Flashings should be 4lb (1.8kg) sheet lead formed and rolled. To be supplied and installed by the roofing contractor.

M. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled. All plumbing stacks are to have the factory lead cap installed. Field fabricated roof jacks are to have separate lead collar caulked and banded. To be supplied and installed by the roofing contractor.

PART 3 — EXECUTION

3.1 EXECUTION, GENERAL

A. Comply with all requirements and manufacturer recommendations.

3.2 EXAMINATION

A. Verify that deck surfaces and project conditions are ready to receive work of this section.

B. Verify that deck is supported and secured to structural members.

C. Verify that deck is clean and smooth, free of depressions, projections or ripples, and is properly sloped to drains.

D. Verify that adjacent roof substrate components do not vary more than 1/4 inch in height.

E. Verify that deck surfaces are dry.

F. Confirm that moisture content does not exceed twelve (12) percent by moisture meter tests.

G. Verify that openings, curbs, pipes, conduit, sleeves, ducts, and other items which penetrate the roof are set solidly, and that and reglets are set in place.

3.3 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 modified bituminous roofing system.

D. Coordinate installation of roofing system components so that insulation and roofing plies are not exposed to precipitation or left exposed overnight. Provide cut-offs at end of each day's work to cover exposed ply sheets and insulation with two (2) plies of #15 organic roofing felt set in full mopping’s of bitumen and with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work.

E. Substrate Joint Penetrations: Prevent cold process adhesive from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

F. Apply roofing materials as specified by manufacturer's instructions.

1. Keep roofing materials dry before and during application.

2. Do not permit phased construction.

3. Complete application of roofing plies, modified sheet and flashing in a continuous operation.

4. Begin and apply only as much roofing in one day as can be completed that same day.

3.4 INSULATION UNDERLAYMENT INSTALLATION

A. Install one layer of Red Rosin sheet over entire roof substrate prior to installation of insulation board.

B. Lap rosin sheet ends eight (8) inches (203mm). Stagger end laps twelve (12) inches (304mm) minimum.

3.5 INSULATION INSTALLATION

A. Install all insulation and roofing in strict accordance with manufacturer's current recommendations and reference standards, as specified, and as required for ASCE7-10.

B. Mechanically attach base layer of ridged insulation using fasteners at the rate of 11-17-22.

C. Install boards with long joints continuous and running in a direction parallel to the roof decking. Short joints should be staggered. All joints shall be butted tightly together.

D. Install top layer of insulation with ALL joints staggered in insulation adhesive. Maximum board size shall be 4' x 8'. ALL joints must be staggered by a minimum of 1'.

E. Tapered insulation system shall be installed as detailed on plans and as required to provide positive drainage at all roof areas. Starting at the drain sumps, install pre-formed tapered insulation in insulation adhesive Panels shall be installed with no gaps larger than ¼".

3.6 BASE PLY INSTALLATION

A. Install (1) one base ply in two (2) gallons per square of cold applied membrane adhesive, shingled uniformly to achieve one ply throughout over the prepared substrate. Shingle in proper direction to shed water on each large area of roofing. Prior to installation, cut sheets into 18' lengths and allow to them to relax.

B. Lap ply sheet ends eight inches. Stagger end laps twelve inches minimum.

C. Extend plies two inches beyond top edges of cants at wall and projection bases.

D. Install one (1) base ply to all perimeter and projection details.

E. Allow the one (1) ply of base sheet to cure at least thirty minutes before installing the modified membrane. However, the modified membrane must be installed the same day as the base plies.

F. Lightly broom sheet to ensure proper adhesion.

3.7 MODIFIED MEMBRANE APPLICATION

A. Solidly bonded to the base layer with specified cold adhesive at the rate of two (2) gallons per 100 square feet.

B. The roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Care should be taken to eliminate air entrapment under the membrane.

C. Subsequent rolls of modified shall be installed across the roof as above with a minimum of four (4) side laps and eight (8) end laps. The end laps shall be staggered a minimum of (3). The modified membrane shall be laid in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.

D. Extend membrane two (2) beyond top edge of all cants in full moppings of the cold adhesive as shown on the drawings.

E. Lightly broom sheet to ensure proper adhesion.

3.8 FLASHING MEMBRANE INSTALLATION

A. Seal all curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or under the flashing membrane.

B. Prepare all walls, penetrations, expansion joints and where shown on the drawings to be flashed with asphalt primer at the rate of one hundred (100) square feet per gallon. Allow primer to dry tack free.

C. Use the modified membrane as the flashing membrane. Adhere to the underlying base flashing ply with specified cold adhesive in these specifications. Nail off at a minimum of eight (8) inches (203mm) o.c. from the finished roof at all vertical surfaces.

D. Solidly adhere the entire sheet of flashing membrane to the substrate. Tops of all flashings that are not run up and over curb shall be secured through termination bar 6 inches (152mm) and sealed at top.

E. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and fiberglass mesh, add granules to the mastic for full coverage.

F. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work [as specified in other sections].

G. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work as specified in other sections. When using mineralized cap sheet all stripping shall be installed prior to cap sheet installation.

3.9 FLASHING MEMBRANE INSTALLATION

A. Scupper Through Wall [Detail No. MBC-15]:

1. Inspect the nailer to assure proper attachment and configuration.

2. Run one ply over nailer, into scupper hole and up flashing as in typical wall flashing detail. Assure coverage of all wood nailers.

3. Install a scupper box in a ¼ inch (6mm) bed of mastic. Assure all box seams are soldered and have a minimum four (4) inch (101mm) flange. Make sure all corners are closed and soldered. Prime scupper at a rate of 100 square feet per gallon and allow to dry.

4. Fasten flange of scupper box every three (3) inches (76mm) o.c. staggered.

5. Strip in flange of scupper box with base flashing ply covering entire area with six (6) inch (152mm) overlap on to the field of the roof and wall flashing.

6. Install a second ply of modified flashing ply in bitumen over the base flashing ply, nine (9) inches (228mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all seams, embed roofing granules.

B. Scupper Through Wall (Overflow) [Detail No. MBC-16]:

1. Inspect the nailer to assure proper attachment and configuration.

2. Run one ply over nailer up the overflow, into the scupper hole and up flashing as in typical wall flashing detail. Assure coverage of all wood nailers.

3. Install scupper box in a ¼ inch (6mm) bed of mastic. Assure all box seams are soldered and have a minimum four (4) inch (101mm) flange. Make sure all corners are closed and soldered. Prime scupper at a rate of 100 square feet per gallon and allow to dry.

4. Fasten flange of scupper box every three (3) inches (76mm) o.c. staggered.

5. Strip in flange scupper box with base flashing ply covering entire area with six (6) inch (152mm) overlap on to the field of the roof and wall flashing.

6. Install a second ply of modified flashing ply in bitumen over the base flashing ply, nine (9) inches (228mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all seams, embed roofing granules.

C. Coping Cap:

1. Minimum flashing height is eight (8) inches (203mm) above finished roof height. Maximum flashing height is 24 inches. Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.

2. Set cant in bitumen. Run all field plies over cant a minimum of two (2) inches (50mm).

3. Install base flashing ply covering entire wall and wrapped over top of wall and down face with six (6) inches (152mm) on to field of the roof and set in cold asphalt. Nail membrane at eight (8) inches (203mm) o.c.

4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, nine (9) inches (228mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all seams, embed roofing granules.

5. Install coping cap per manufacturer's recommendations.

D. Surface Mounted Counterflashing [Detail No. MBC-22]:

1. Minimum flashing height is eight (8) inches (203mm) above finished roof height. Maximum flashing height is 24 inches. Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.

2. Set cant in bitumen. Run all field plies over cant a minimum of two (2) inches (50mm).

3. Install base flashing ply covering wall set in bitumen with six (6) inches (152mm) on to field of the roof.

4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, nine (9) inches (228mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure.

5. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall. Alternatively use caulk to replace the butyl tape.

6. Secure counterflashing set on butyl tape above flashing at eight (8) inches (203mm) o.c. and caulk top of counterflashing.

E. Equipment Support [Detail No. MBC-32]:

1. Minimum curb height is eight (8) inches (203mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.

2. Set cant in bitumen. Run all field plies over cant a minimum of two (2) inches (50mm).

3. Install base flashing ply covering curb set in bitumen with six (6) inches (152mm) on to field of the roof.

4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, nine (9) inches (228mm) on to the field of the roof. Attach top of membrane to top of curb and nail at eight (8) inches (203mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure.

5. Install pre-manufactured cover. Fasten sides at 24 inches (609mm) o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.

6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

F. Curb Detail/Air Handling Station [Detail No. MBC-33]:

1. Minimum curb height is eight (8) inches (203mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.

2. Set cant in bitumen. Run all field plies over cant a minimum of two (2) inches (50mm).

3. Install base flashing ply covering curb set in bitumen with six (6) inches (152mm) on to field of the roof.

4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, nine (9) inches (228mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams, embed roofing granules.

5. Install pre-manufactured counterflashing with fasteners and neoprene washers or per manufacturer's recommendations.

6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

G. Skylight [Detail No. MBC-34]:

1. Minimum curb height is eight (8) inches (203mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.

2. Set cant in bitumen. Run all field plies over cant a minimum of two (2) inches (50mm).

3. Install base flashing ply covering curb set in bitumen with six (6) inches (152mm) on to field of the roof.

4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, nine (9) inches (228mm) on to the field of the roof. Attach top of membrane to top of wood nailer and apply a three-course application of mastic and mesh. Allow to cure and aluminize.

5. Install pre-manufactured lens and fasten flashing sides at eight (8) inches (203mm) o.c. with fasteners and neoprene washers.

H. Pre-manufactured Curb For Equipment Support [Detail No. MBC-35]:

1. Minimum curb height is eight (8) inches (203mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.

2. Run all field plies over cant of the pre-manufactured equipment support a minimum of two (2) inches.

3. Install base flashing ply covering pre-manufactured curb with six (6) inches (152mm) on to field of the roof.

4. Install a second ply of modified flashing ply installed over the base flashing ply, nine (9) inches (228mm) on to field of the roof. Attach top of membrane to top of wood curb and nail at eight (8) inches (203mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams, embed roofing granules.

5. Install pre-manufactured cover. Fasten sides at 24 inches (609mm) o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.

6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

I. Exhaust Fan [Detail No. MBC-36]:

1. Minimum curb height is eight (8) inches (203mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.

2. Set cant in bitumen. Run all plies over cant a minimum of two (2) inches (50mm).

3. Install base flashing ply covering curb with six (6) inches (152mm) on to field of the roof.

4. Install a second ply of modified flashing ply installed over the base flashing ply, nine (9) inches (228mm) on to field of the roof. Attach top of membrane to top of wood curb and nail at eight (8) inches (203mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams, embed roofing granules.

5. Install metal exhaust fan over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendation.

J. Passive Vent/Air Intake [Detail No. MBC-37]:

1. Minimum curb height is eight (8) inches (203mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.

2. Set cant in bitumen. Run all plies over cant a minimum of two (2) inches (50mm).

3. Install base flashing ply covering curb with six (6) inches (152mm) on to the field of the roof.

4. Install a second ply of modified flashing ply installed over the base flashing ply, nine (9) inches (228mm)on to field of the roof. Attach top of membrane to top of wood curb and nail at eight (8) inches (203mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure.

5. Install passive vent/air intake over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendations.

K. Roof Drain [Detail No. MBC-41]:

1. Plug drain to prevent debris from entering plumbing.

2. Taper insulation to drain minimum of 24 inches (609mm) from center of drain.

3. Install one (1) base flashing ply (40 inch square minimum) in bitumen.

4. Set lead/copper flashing (30 inch square minimum) in ¼ inch (6mm) bed of mastic. Run lead/copper into drain a minimum of two (2) inches (50mm). Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.

5. Run roof system plies over drain. Cut out plies inside drain bowl.

6. Install modified membrane (48 inch square minimum) in bitumen.

7. Install clamping ring and assure that all plies are under the clamping ring.

8. Remove drain plug and install strainer.

L. Plumbing Stack [Detail No. MBC-50]:

1. Minimum stack height is 12 inches (609mm).

2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.

3. Prime flange of new sleeve. Install properly sized sleeves set in ¼ inch (6mm) bed of roof cement.

4. Install base flashing ply in bitumen.

5. Install membrane in bitumen.

6. Caulk the intersection of the membrane with elastomeric sealant.

7. Turn sleeve a minimum of one (1) inch (25mm) down inside of stack.

M. Heat Stack [Detail No. MBC-51]:

1. Minimum stack height is 12 inches (609mm).

2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.

3. Prime flange of new sleeve. Install properly sized sleeves set in ¼ inch (6mm) bed of roof cement.

4. Install base flashing ply in bitumen.

5. Install modified membrane in bitumen.

6. Caulk the intersection of the membrane with elastomeric sealant.

7. Install new collar over cape. Weld collar or install stainless steel draw brand.

N. Passive Vent/Air Intake [Detail No. MBH-37]:

1. Minimum curb height is eight (8) inches. Prime vertical at a rate of one hundred (100) square feet per gallon and allow to dry.

2. Set cant in bitumen. Run all plies over cant a minimum of two (2) inches.

3. Install base flashing ply covering curb with six (6) inches on to the field of the roof.

4. Install a second ply of modified flashing ply installed over the base flashing ply, nine (9) inches on to field of the roof. Attach top of membrane to top of wood curb and nail at eight (8) inches o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure.

5. Install passive vent/air intake over the wood nailers and flashing to act as counterflashing. Fasten per manufacturers recommendations.

3.10 APPLICATION OF SURFACING

A. Prior to installation of surface, obtain approval from manufacturer as to work completed. On average, at least 30 days are required prior to final surfacing.

B. Reflective Coating:

1. Allow all cold applied mastics and coating to properly dry and cure before coating application.

2. Paint all exposed roofing with manufacturer's base coat acrylic coating installed at a rate of one and a half (1.5) gallons per square, back roll entire installation required.

3. Paint all exposed roofing with manufacturer's Energy Star top coat acrylic coating installed at a rate of one and a half (1.5) gallons per square, back roll entire installation required. Complete coverage is required with a clean finished appearance.

3.11 FIELD QUALITY CONTROL

A. Perform field inspection and as required.

B. Correct defects or irregularities discovered during field inspection.

C. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system. A copy of the specification should also be on site at all times.

3.12 CLEANING

A. Remove bitumen adhesive drippings from all walls, windows, floors, ladders and finished surfaces.

B. In areas where finished surfaces are soiled by asphalt 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.

3.13 CONSTRUCTION WASTE MANAGEMENT

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

3.14 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 thermo graphic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermo graphic 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.

3.15 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.

3.16 OWNER SUPPLIED MATERIALS

A. The district will only supply the quantity listed in the owner supplied materials section of this specification below. All additional materials and accessories will be the full responsibility of the contractor to provide and install per the specification and project requirements.

1. Any material or accessories required for the installation of the roof system in excess of the district provided material must be supplied by the Contractor and added into the bid cost proposal. It is up to the Contractor to determine the precise amount of material required for the completion of this project; and to provide excess material, as required. The cost to handle and break flashing metal from the District provided flat stock is contractor's responsibility and to be added into the bid cost proposal.

2. All required flashings as required per each specification section for plumbing, electrical, gas, etc. will be the Contractors responsibility to provide and install as well as to be included in the bid cost.

3. 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 52 00.

4. Freight charges of owner supplied materials will be the responsibility of the owner. Contractor must unload 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 52 00.

B. Materials specifically provided by the Owner;

216_____Stressply Plus FR Mineral surface sheet (75 sq ft per roll)

108_____Stressbase 80 Ply Sheet (150 sq ft per roll)

10_____Flashing Bond Mastic (5 gal pail)

30_____Tuff Stuff Urethane Sealant (10.1 oz tube)

3_____Garla-Prime VOC (5 gal pail)

3_____Garmesh (150' x 6")

5_____Pyramic Acrylic Coating, Base Coat (55 gal drum)

5_____Pyramic Acrylic Coating, Top Coat (55 gal drum)

2_____WhiteKnight Plus WC, Urethane Top Coat (5 gallon pail)

12_____Weatherking Plus WC (55 gal drum)

50_____Garla Flex Mastic (10.1 oz tube)

10_____GreenLock Flashing Adhesive (3.5 gallon pail)

1_____Freight to jobsite

END OF SECTION 07 52 00 - MODIFIED BITUMINOUS MEMBRANE ROOFING - COLD-APPLIED