EXHIBIT A – SCOPE OF WORK
SECTION 07 52 00 - MODIFIED BITUMINOUS MEMBRANE ROOFING - HOT APPLIED
FIRE STATION No. 75 – BEAR CREEK

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

A. Contractor shall provide all labor, equipment, tools, supervision, services, transportation, waste disposal, facilities and other miscellaneous material and items needed to install County furnished and purchased modified bitumen roofing system for the Riverside County Fire Department. The Contractor shall be financially responsible for all materials not supplied by the County. Please refer to Section 3.14 of this specification for details.

B. Roofing materials specifically listed in Section 3.14 will be provided by the County. All other materials needed for proper installation of the modified bituminous roofing system shall be provided by the Contractor.

1.2 SUMMARY

A. Scope of Work:

1. Contractor shall tear off existing roof system and dispose of properly. Before reroofing begins, County shall inspect exposed wood substrate. Contractor shall include as an additive alternative in their bid submittal the square foot cost of deck replacement.

2. Contractor shall test all drains before reroofing begins and immediately notify the County if any drains are clogged. Contractor shall not proceed until drains are fixed. Contractor will be responsible for all drains to be in working condition once roof is complete.

3. Contractor will be responsible for all air conditioning units, making sure they are all in working condition once roof is complete. .

4. Contractor shall remove all abandon curbs and pipe penetrations and install new wood substrate to match exciting.

5. Contractor shall install “Cool Roof” roofing system as per manufactures specification.

6. Contractor shall insure the minimum slope is ¼” per 12” increase and add crickets as needed.

7. Contractor is solely responsible to insure positive drainage is accomplished throughout the entire roofing area. Ponding water will be cause for rejection

8. Contractor shall loose lay red rosin paper and mechanically fasten HPR (High Performance Roofing) Glasbase sheet to properly prepared substrate.

9. Contractor shall install two (2) inner ply of Type IV felts in hot asphalt.

10. Contractor shall provide and install an extra layer of SBS (Styrene – Butadiene – Styrene) modified smooth membrane in all flashings, base plies, penetrations plies, and all transitions.

11. Contractor shall install a high strength SBS and SIS (Styrene – Isoprene – Styrene) modified cap sheet utilizing recycled content in hot asphalt.

12. Contractor shall follow all procedures identified in this specification for counter flashings, copings, drains / overflows, and all other related roof top equipment.

13. Contractor shall coat entire roof with 1.5 gallon per square per coat in a two coat application of a Title 24 elastomeric Pyramic roof coating at the end of the project to ensure that the roof is completely white. (3 gallon per square total)

14. Contractor shall coat all drainage and waterways with White Star Title 24 coating at 2 gallons a square and embed 300lbs of white gravel into the wet coating.

15. Absolutely no asbestos will be allowed in any products or form on this job.

16. Contractor shall install new redwood blocking and clamps and install walk pads around all units and roof hatch openings. Blocking should be nailed to a 5/8" thick walk pad.

17. Pitch pans are not allowed on this roofing project. Contractor shall install at locations with multiple cables penetrating the decking fabricate a metal goose neck.

18. Contractor shall install surface mounted counter flashing around all large HVAC units that do not have counter flashings.

19. Contractor shall supply and install new roof hatch.

20. Contractor shall replace all plastic drainage covers with new metal drainage covers. All through wall scuppers and overflows must be replaced with new.

21. Contractor must provide to the County; ASCE 7-5 and ES 1 calculations to comply with IBC (International Building Code) requirements. (Section 1.14, Uniform wind uplifts)

22. Contractor must provide to the County an Approved Applicator Letter.

23. Contractor must have a minimum Five (5) years of Commercial / Industrial re-roofing experience of comparable size and have an active DIR registration.

B. Related Work:

1. Rough Carpentry

2. Roofing Demolition

3. Sheet Metal Flashing and Trim

4. Roof Windows and Skylights

1.3 REFERENCES

A. American Society of Civil Engineers (ASCE):

1. ASCE 7-05, 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 D4586 Standard Specification for Asphalt Roof Cement.

9. ASTM D2824 Standard Specification for Aluminum-Pigmented Asphalt Roof Coating.

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

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

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

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

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

C. National Roofing Contractors Association (NRCA):

1. Roofing and Waterproofing Manual

D. Underwriters Laboratories, Inc. (UL):

1. Fire Hazard Classifications.

E. Warnock Hersey (WH):

1. Fire Hazard Classifications.

F. 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

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. 1’ x 1’ sample of roofing cap sheet for review.

2. 1’ x 1’ sample of roofing base flashing sheet for review.

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

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 the roof system is adhered properly to meet or exceed the requirements of FM 1-90.

D. 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.

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

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

G. Written certification from the roofing system manufacturer certifying the applicator is currently authorized for the installation of the specified roof system.

H. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7-05, Method 2 for Components and Cladding, sealed by a registered professional 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 Section 1.7 - Quality Assurance of this RFB.

J. Test Reports: Submit third party validation of environmental claims, prepared UL Environment, and for all modified bituminous sheet material containing recycled content and/or bio based content.

1.6 CONTRACT CLOSEOUT SUBMITTALS

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

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

C. Insurance Certification: Assist County 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.

D. Demonstration and Training Schedule: Provide a schedule of proposed dates and times for instruction of County 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 10 years documented experience and have ISO 9001 certification.

B. Contractor 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. Contractor'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: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be approved in writing by the County.

1. Upon request of the County, 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, County, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work; including, (where applicable) 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. Review notification procedures for weather or non-working days.

C. A County Representative will record the conference 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. Contractor will not proceed with roofing work until such issues are resolved to the satisfaction of the County. This shall not be construed as interference with the progress of Work on the part of the County.

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. 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 Contractor’s expense.

1.10 MANUFACTURER'S INSPECTIONS

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

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

2. Provide job site inspections (5) days per week with on-line report tools.

3. Report to the County 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.

1.13 WARRANTY

A. Upon completion of installation, and acceptance by the County the Manufacturer will provide to the County a (30) year warranty.

B. Contractor shall provide to the County a (2) year bonded contractor warranty and an additional (3) year contractor labor warranty. Total of a (5) year warranty.

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. (TO BE COMPLETED BY CONTRACTOR)

- **a.** Design Code: ASCE 7-05, Method 2 for Components and Cladding.
- **b.** Category [I, II, III, or IV] Building with an Importance Factor of [0.77, 1.0, 1.15, or 2.0]
- **c.** Wind Speed: [ ] mph
- **d.** Ultimate Pullout Value: [ ] pounds per each of the fastener
- **e.** Exposure Category: [B, C, D]
- **f.** Design Roof Height: [ ] feet.
- **g.** Minimum Building Width: [ ] feet.
- **h.** Roof Pitch: [ ] inches per foot.
- **i.** Topographic Factor: [ ]
  - **1.** Roof Area Design Uplift Pressure:
    - **i.** Zone 1 - Field of roof [ ] psf
    - **ii.** Zone 2 - Eaves, ridges, hips and rakes [ ] psf
    - **iii.** Zone 3 - Corners [ ] psf

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.

2.2 MANUFACTURER MATERIALS

A. The design is based upon roofing systems engineered and manufactured by The Garland Company: The Garland Company 3800 East 91st Street Cleveland, Ohio 44105, www.garlandco.com. Roofing materials specifically listed in Section 3.14 will be provided by the County. Specification of the Materials can be found in Attachment 1.1 -1.7

2.3 DESCRIPTION

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

1. Minimum two (2) plies of approved ASTM D2178, Type IV glass fiber roofing felt bonded to the prepared substrate with hot bitumen.

2. Hot Bitumen: ASTM D312, Type III steep asphalt having the following characteristics:

a. Softening Point 185°F - 205°F
b. Flash Point 500°F
c. Penetration @ 77°F 15-35 units
d. Ductility @ 77°F 2.5 cm

3. Base Flashing Ply: One (1) ply of 145 mil SBS base flashing ply covered by an additional layer of modified bitumen membrane and set in bitumen.

4. Modified 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.

5. Surfacing: Apply white acrylic coating ASTM G26.

2.4 BITUMINOUS MATERIALS

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

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

C. Interply Adhesive: ASTM D312, Type III.

2.5 SHEET MATERIALS

A. Felt Plies: Fiberglass Felts: ASTM D2178, Type IV

B. Base Flashing Ply: 145 mil SBS modified membrane with woven fiberglass scrim reinforcement with the following minimum performance requirements according to ASTM D5147. Properties (Finished Membrane):

1. Tensile Strength (ASTM D5147):
a. 2 in/min. @73.4 ± 3.6°F: MD 1000 lbf/in CMD 1100 lbf/in

2. Tear Strength (ASTM D5147)
a. 2 in/min. @ 73.4 ± 3.6°F MD 1700 lbf CMD 1800 lbf

3. Elongation at Maximum Tensile (ASTM D5147)
a. 2 in/min. @ 73.4 ± 3.6°F MD 7% CMD 7%

4. Recycle: post Industrial content 22% and Post consumer content 7%

C. Modified Base Flashing Ply:

1. StressPly Max

D. Modified Membrane Properties (Finished Membranes): STRESSPLY PLUS FR MINERAL; ASTM D6162, Type III Grade G

1. Tensile Strength (ASTM D5147)
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 (ASTM D5147)
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 (ASTM D5147)
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 SURFACING

A. White Elastomeric Roof Coating: Pyramic; Energy Star 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%

2.7 RELATED MATERIALS

A. Roof Insulation Fasteners: In accordance with NRCA Standards.

B. Roof Insulation: In accordance with NRCA Standards.

C. Base Sheet: ASTM D4601, Type II; as recommended and furnished by the modified membrane manufacturer; HRP GlasBase Sheet.

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. 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. Metal Discs: Flat discs or caps of zinc-coated sheet metal not lighter than twenty eight (28) gauge and not less than one (1) inch in diameter. Form discs to prevent dishing. Bell or cup shaped caps are not acceptable.

F. Walkway Pads: Factory formed recycled rubber, nonporous, with a slip-resisting surface texture, manufactured specifically for adhering to modified bituminous membrane roofing as a protection course for foot traffic, of the following thickness:

1. ¾" thick for use in high traffic areas

2. Products: Subject to compliance with requirements, provide one of the following:
a. Supplied by membrane manufacturer

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

H. Rust Inhibitive Paint: As recommended and furnished by the membrane manufacturer for mechanical units and other metal surfaces to control and prevent surface rust.

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

1. Tensile Strength (ASTM D412) 250 psi

2. Elongation (ASTM D412) 950%

3. Hardness, Shore A (ASTM C920) 35

4. Adhesion-in-Peel (ASTM C920) 30 pli

J. Sealant: Single component, 100% solids structural adhesive as furnished and recommended by the membrane manufacturer.

1. Elongation (ASTM D412) 300%

2. Hardness, Shore A (ASTM C920) 50

3. Shear Strength (ASTM D1002) 300 psi

K. Silicone Sealant: One part, medium modulus, non-corrosive high performance silicone sealant as recommended and furnished by the membrane manufacturer.

1. Tensile Strength (ASTM D412) 230 psi

2. Elongation (ASTM D412) 360%

3. Hardness, Shore A (ASTM C920) 24

L. Silicone Damp-Proofing: Transparent and colorless solution designed to damp-proof above grade masonry surfaces as recommended and furnished by the membrane manufacturer.

1. Density @77°F 8.4 lb/gal min.

2. Viscosity (Zahn #2 cup) Typical 14 sec.

M. Acrylic Damp-Proofing: Damp-proofing that provides heavy body protection while bridging small hair line cracks and masonry imperfections as recommended and furnished by the membrane manufacturer.

1. Density @77°F 12.25 lb/gal typical

2. Viscosity (ASTM D562) 95 KU

N. Butyl Tape: 100% solids, asbestos free and compressive tape designed to seal as recommended and furnished by the membrane manufacturer.

O. Non-Shrink Grout: Use an all weather fast setting chemical action concrete material to fill pitch pans.

1. Flexural Strength (ASTM C78 (modified)) 7 days 1100psi

2. High Strength (ASTM C109 (modified)) 24 days 8400lbs (3810kg)

P. Pitch Pocket Sealer: Two part, 100% solids, self leveling, polyurethane sealant for filling pitch pans as recommended and furnished by the membrane manufacturer.

1. Durometer (ASTM D2240) 40-50 Shore

2. Elongation (ASTM D412) 250%

3. Tensile Strength (ASTM D412) 200 @ 100 mil

Q. 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.

R. Flashing Boot: Neoprene pipe boot for sealing single or multiple pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.

S. Vents and Breathers: Heavy gauge aluminum and fully insulated vent that allows moisture and air to escape but not enter the roof system as recommended and furnished by the membrane manufacturer.

T. Roof Drains: Drain system as recommended and furnished by the membrane manufacturer.

U. Sky Light Protection System: Compression mounted skylight protection system that meets OSHA requirements for skylights as recommended and furnished by the membrane manufacturer.

V. Drain Flashings should be 4lb (1.8kg) sheet lead formed and rolled

W. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.

PART 3 — EXECUTION

3.1 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, valleys, or eaves.

D. Verify that adjacent roof substrate components do not vary more than [¼] inch in height.

E. Verify that deck surfaces are dry and free of ice.

F. Confirm that moisture content does not exceed twelve (12) percent by moisture meter tests. On concrete deck pour hot asphalt on to deck if it bubbles / foams and once cooled does not adhere to the substrate, the moisture levels are too high.

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

3.2 DECK PREPARATION

A. Wood Deck

1. Verify that wood decking is flat and has tight joints.

2. Seal plywood joints with tape.

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 coal tar 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 moppings of bitumen and with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work.

E. Asphalt Bitumen Heating: Heat and apply bitumen in accordance with the Equiviscous Temperature (EVT) Method as recommended by National Roofing Contractors Association (NRCA). Do not raise temperature above minimum normal fluid-holding temperature necessary to attain EVT (plus 5°F at point of application) more than one (1) hour prior to time of application. Determine flash point, finished blowing temperature, EVT, and fire-safe handling temperature of bitumen either from information by manufacturer or by suitable test. Do not exceed recommended temperature limits during bitumen heating. Do not heat to a temperature higher than twenty five degrees (25°F) below flash point. Discard bitumen that has been held at temperature exceeding Finishing Blowing Temperature (FBT) for more than three (3) hours. Keep kettle lid closed except when adding bitumen.

F. Asphalt Bitumen Mopping Rate:

1. Interply Mopping: Apply bitumen at the rate of approximately twenty five (25) lb.(11.3kg) of bitumen per roof square.

2. Modified Membrane Mopping: Apply bitumen at the rate of approximately thirty (30) lb (13.6kg). of bitumen per roof square.

3. Flood Coat: Apply bitumen at the rate of approximately sixty (60) to seventy (70) lb.(27-31kg) of bitumen per square (plus or minus twenty five (25) percent on a total job average basis).

G. Substrate Joint Penetrations: Prevent bitumen from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

H. 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.

I. Cut-Offs (Waterstops): At end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation. Provide temporary covering of two (2) plies of #15 organic roofing felt set in full moppings of bitumen with joints and edges sealed.

J. Broadcast minerals into the bleed out of bitumen while bitumen is at its recommended EVT temperature to achieve uniform color throughout.

3.4 VAPOR RETARDER INSTALLATION

A. Fiberglass Plies: Install [two (2)] fiberglass ply sheets in twenty five (25) lbs. (11.3kg) per square of bitumen shingled uniformly to achieve two plies over the entire prepared substrate.

Shingle in direction of slope of roof to shed water on each area of roof.

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

C. Extend plies two (2) inches (50mm) beyond top edges of cants at wall and roof projections and equipment bases.

D. Install base flashing ply to all perimeter and projection details. Properly seal all curbs penetrations and perimeter, prior to application of remaining roof.

3.5 INSULATION INSTALLATION

A. Deck type: Wood

3.6 FELT PLY INSTALLATION

A. Fiberglass Plies: Install two (2) fiberglass ply sheets in twenty five (25) lbs (11.3kg) per square of bitumen shingled uniformly to achieve two plies over the entire prepared substrate. Shingle in direction of slope of roof to shed water on each area of roof. Do not step on felt rolls until asphalt has cooled, fish mouths should be cut and patched.

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

C. Lightly broom in fiberglass plies to assure complete adhesion.

D. Extend plies two (2) inches (50mm) beyond top edges of cants at wall and roof projections and equipment bases.

E. Install base flashing ply to all perimeter and projection details after membrane application.

3.7 MODIFIED MEMBRANE APPLICATION

A. Solidly bond the modified membrane to the base layers with specified asphalt at the rate of twenty five (25) to thirty (30) lbs. (11-13kg) per 100 square feet.

B. The modified membrane roll must push a puddle of asphalt in front of it with asphalt slightly visible at all side laps. Exercise care during application to eliminate air entrapment under the membrane.

C. Apply pressure to all seams to ensure that the laps are solidly bonded to substrate.

D. Install subsequent rolls of modified membrane across the roof as above with a minimum of four (4) inch (101mm) side laps and eight (8) inch (203mm) end laps. Stagger the end laps. Apply the modified membrane in the same direction as the previous layers but stagger the laps so they do not coincide with the laps of the base layers.

E. Apply asphalt no more than five (5) feet (1.5m) ahead of each roll being embedded.

F. Extend membrane two (2) inches (50mm) beyond top edge of all cants in full moppings of the specified asphalt.

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 flashing membrane.

B. Prepare all walls, penetrations, expansion joints 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 asphalt unless otherwise noted in these specifications. Nail off at a minimum of eight (8) inches o.c. from the finished roof at all vertical surfaces.

D. Solidly adhere the entire sheet of flashing membrane to the substrate.

E. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and fiberglass mesh.

F. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work.

G. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.

H. Metal Edge:

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

2. Run one ply over the edge. Assure coverage of all wood nailers. Fasten plies with ring shank nails at eight (8) inches o.c.

3. Install continuous cleat and fasten at six (6) inches o.c.

4. Install new metal edge hooked to continuous cleat and set in bed of roof cement. Fasten flange to wood nailer every three (3) inches o.c. staggered.

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

6. Strip in flange with base flashing ply covering entire flange in bitumen with six (6) inches on to the field of roof. Assure ply laps do not coincide with metal laps.

7. Install a second ply of modified flashing ply in bitumen over the base flashing ply, nine (9) inches on to the field of the roof.

I. Scupper Through Roof Edge:

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

2. Run one ply over the edge. Assure coverage of all wood nailers. Fasten plies with ring shank nails at eight (8) inches o.c.

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 flange. Make sure all corners are closed and soldered. Prime scupper at a rate of one hundred (100) square feet per gallon and allow to dry.

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

5. Strip in edge with base flashing ply covering entire area in bitumen with six (6) inches on to the field of the roof.

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

J. Scupper Through Wall:

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 flange. Make sure all corners are closed and soldered. Prime scupper at a rate of one hundred (100) square feet per gallon and allow to dry.

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

5. Strip in flange of scupper box with base flashing ply covering entire area with six (6) inch 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 on to the field of the roof. Apply a three-course application of mastic and mesh at all seams.

K. Scupper Through Wall (Overflow):

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 flange. Make sure all corners are closed and soldered. Prime scupper at a rate of one hundred (100) square feet per gallon and allow to dry.

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

5. Strip in flange scupper box with base flashing ply covering entire area with six (6) inch 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 on to the field of the roof. Apply a three-course application of mastic and mesh at all seams.

L. Coping Cap:

1. Minimum flashing height is eight (8) inches. Maximum flashing height is twenty four (24) inches. Prime vertical wall at a rate of one hundred (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.

3. Attach tapered board to top of wall.

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

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

6. Install continuous cleat and fasten at six (6) inches o.c. to outside wall.

7. Install new metal coping cap hooked to continuous cleat.

8. Fasten inside cap twenty four (24) inches o.c. with approved fasteners and neoprene washers through slotted holes which allow for expansion and contraction.

M. Surface Mounted Counterflashing:

1. Minimum flashing height is eight (8) inches. Maximum flashing height is twenty four (24) inches. Prime vertical wall at a rate of one hundred (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.

3. Install base flashing ply covering wall set in bitumen with six (6) inches 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 on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.

5. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall.

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

N. Reglet Mounted Counterflashing:

1. Minimum flashing height is eight (8) inches. Maximum flashing height is twenty four (24) inches. Prime vertical wall at a rate of one hundred (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.

3. Install base flashing ply covering wall set in bitumen with six (6) inches 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 on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.

5. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall.

6. Cut reglet in masonry one joint above flashing.

7. Secure reglet counterflashing with expansion fasteners and caulk reglet opening.

O. Through Wall Counterflashing:

1. Minimum flashing height is eight (8) inches. Prime vertical wall 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 wall with six (6) inches 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 on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.

5. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall at eight (8) inches o.c.

6. Install counterflashing in through wall reglet.

P. Equipment Support:

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 field plies over cant a minimum of two (2) inches.

3. Install base flashing ply covering curb set in bitumen with six (6) inches 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 on to the field of the roof. Attach top of membrane to top of 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 and aluminize.

5. Install pre-manufactured cover. Fasten sides at twenty four (24) inches 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.

Q. Skylight:

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 field plies over cant a minimum of two (2) inches.

3. Install base flashing ply covering curb set in bitumen with six (6) inches 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 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 o.c. with fasteners and neoprene washers.

R. Exhaust Fan:

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 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 and aluminize.

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

S. Passive Vent/Air Intake:

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 and aluminize.

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

T. Roof Drain:

1. Plug drain to prevent debris from entering plumbing.

2. Taper insulation to drain minimum of twenty four (24) inches from center of drain.

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

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

5. Install base flashing ply (forty (40) inch square minimum) in bitumen.

6. Install modified membrane (forty eight (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.

U. Plumbing Stack :

1. Minimum stack height is twelve (12) inches.

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 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 down inside of stack.

V. Heat Stack :

1. Minimum stack height is twelve (12) inches.

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 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.

3.9 APPLICATION OF SURFACING

A. Reflective Coating:

1. Allow all cold applied mastics and coating to properly dry and cure before installing the coating. Embed mineral into fresh mastic.

2. Paint all exposed membrane with manufacturer's Energy Star acrylic coating installed at a rate of one (1) gallon per square per coat in a two coat application.

3.10 FIELD QUALITY CONTROL

A. Perform field inspection and testing as required.

B. Correct defects or irregularities discovered during field inspection.

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

3.11 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.

3.12 CONSTRUCTION WASTE MANAGEMENT

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

3.13 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. 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.

3.14 COUNTY SUPPLIED ROOFING MATERIAL

A. Contractor must provide all skilled labor, tools, equipment, supervision and ancillary supplies needed to properly install/apply County supplied materials as part of their bid. All materials not specifically included in the County supplied materials section will be the responsibility of the contractor to provide and install in accordance with the terms conditions and specification of this RFB. Any material overages will be returned to the County. Under estimated quantities will be the full responsibility of the contractor to supply and install in full compliance with this section.

B. Contractor must take delivery of materials, properly protect, cover and securely store all County and Contractor supplied materials.

C. 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 stipulated in this RFB.

D. Materials Provided by the County:

	Material	**Coverage**	**Quantity Supplied**
1.	StressPly Plus FR Mineral	¾ Square Roll	114 Rolls
2.	HPR Glasbase	3 Square Roll	28 Rolls
3.	VersiPly 40	2 Square Roll	8 Rolls
4.	Pyramic (cool roof coating)	1.5 gal/ Sq. (2 coats)	4 55 gal drums
5.	Pyramic (cool roof coating)	1.5 gal/ Sq. (2 coats)	3 5 gal pails
5.	White Star	2 gal/ Sq. (1 coat)	4 5 gal pails
6.	Flashing Bond Mastic	5 gal pail	4 5 gal Pail
7.	Tuff Stuff Caulking	30 per case	1 Cases

END OF EXHIBIT A - MODIFIED BITUMINOUS MEMBRANE ROOFING - HOT APPLIED