ROOFINGPROJECTS-COM

ROOF REPLACEMENT SPECIFICATION

Silver Bears Real Estate – Berne Square Shop Centre – 2662 ML King Blvd., New Bern, NC

Roof Sections: BASE BID: A, B, C, D, E & F (see roof plan drawing #1)
ALTERNATE BID: A, B, C, D & E (see roof plan drawing #2)

PART 1 GENERAL

1.1 SUMMARY

A. Scope of Work:

1. Work specified herein shall be provided only to the extent and as applicable to the work included in this specification.
2. The base bid is for complete removal of all materials down to the steel deck and installation as per this specification for all roof sections (see roof plan drawing #1). The bid form will address alternate bids to address a reduced area (see roof plan drawing #2). The bid form will also address alternate pricing for various coating systems. Refer to separate specifications for alternate coating systems.
3. The existing roof system is as follows:
    a. Sections A & B: Minerals Surfaced cap sheet BUR membrane followed by ½" perlite Insulation followed by a gravel surfaced BUR membrane, followed by 2 ½" Lightweight Concrete followed by a steel deck totaling approximately 4 ½ inches in thickness.
    b. Sections C, D, E & F: Minerals Surfaced cap sheet BUR membrane followed by ½" wood fiber board followed by a gravel surfaced BUR membrane, followed by 1 ½" isocyanurate insulation followed by a steel deck totaling approximately 3 inches in thickness.
4. Remove existing roofing including but not limited to removal of insulation, recovery boards, membranes, gravel surfacing, flashings and lightweight concrete down to the steel roof deck. Sweep deck flutes of all debris before the application of the new roof system.
5. Install mech attached ½" dens deck over all wall and curb flashing substrates prior to installing new flashings.
6. Install manufacturer approved vapor barrier on steel deck prior to installing new roof system.
7. Install new roof system: a FM approved fully adhered .060 mil reinforced TPO single ply membrane over 2 layers of mechanically attached polyisocyanurate insulation equaling a total R=Value of 30 minimum. Insulation and roof system shall be attached to the steel deck to FM-1-135 Guidelines. The building is not FM insured, however, as a design standard, attach insulation and adhere membrane to meet FM-1-135 guidelines including requirements for increased fastener and adhesive rates in the perimeter and corner zones. RoofNav number to be provided by the material manufacturer. Deck fastening enhancement will not be required on this project.
8. Install specified FM approved sheet metal flashings and accessories that meet the stated FM-1-135 wind uplift guidelines – include all clips, sealants, fasteners, and connections to make watertight.
9. Coordinate all necessary disconnects and reconnection of roof top equipment required to install new roof system with Property provided electrician and HVAC contractor. The owner may choose to pay for work of other trades (electrical, mechanical, etc.) through the contingency allowance included in the roofing contract. A line item on the bid form will address a percentage markup for administering these services through the contract.

10. The perimeter edge conditions are to be addressed as noted on the roof plan drawing and the drawing details. New area dividers will be required for the Alternate Areas – see roof plan drawing #2 for additional information.
11. Replace existing drip edge, gutters and downspouts associated with the roof replacement referenced above. Contractor's choice of 24 g. steel or .040 aluminum, Kynar coated metal. Contractor to include any blocking required to bring the drip-edge substrate up to match the height of the new roof system, including tapered edge strip to promote drainage into the gutter and to prevent ponding water along roof edge. See Roof Plan Drawing for gutter size, downspout location and disacharge to match existing locations and conditions.
12. Re-use of existing pre-manufactured pipe supports is allowed – all wood blocking must be replaced with contractors choice of new pre-manufactured pipe supports anchored to the pipe.
13. Install tapered insulation crickets to the up slope side of all Roof Top Units and curbs 1'-6" wide or greater as specified.
14. The Bid Form will address add alternate pricing to replace the roof hatches (each) Type S Roof Hatch by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Web: www.BILCO.com. and to install hatch rail system (each) Roof Hatch Safety Rails by SafePro. Complies or exceeds OSHA standard CFR 29 1910.28 and CFR 29 1910.29.
15. Remove abandoned items designated by owners representative or roofing projects.com and infill openings in deck with 22 ga. steel decking as specified herein.
16. Install manufacturers walk pads at roof access points and at all serviceable sides of roof top units. Install 4' wide strip of mechanically attached ¼" dens deck under new membrane at all unit service doors and roof access points (extend full length of service door or access point). A lineal foot price is available on the bid form for additional walk pads to be determined later.
17. **Contractor to include in their lump sum pricing a Contingency Allowance of $10,000.** All contingency allowance expenditures must be authorized in writing by Owners representative and roofingprojects.com prior to being performed. Payment will not be made on any unauthorized contingency expenditures. Any allowance value not approved during the course of the project will be credited back to the Owner.
18. Provide a manufacturer's 20 Year Labor and Material, NO Dollar Limit (NDL) watertighness warranty and a contractor's 2 year warranty. Contractor to provide at Pre-Construction meeting the Warranty Reference Number assigned when the contractor registers the project with the Material Manufacturer providing the Long-term Warranty.
19. Any Local, State or Federal Energy Rebates, Incentive or Credits shall be the property of the owner. Contractor to provide the owner with information and assist in preparation of the application of these rebates, etc.
20. All required municipal permits, project fees and taxes are to be included in the contractors base bid price.
21. All contractor payment applications are to be submitted to Roofingprojects.com for approval and certification to Owners Representative for payment on standard AIA forms. Contractors are to include copies of itemized material supplier invoices and release of liens with all payment applications.
22. Contactor is responsible to asses interior Tennant's and common areas ceiling/roof construction, its conduits and circuits, then solve roof installation restrictions by avoiding any damage to tenants and common areas interior conduits or circuits that could be caused by roof fasteners during the installation of the new roof.
23. Contractor is responsible to make repairs for any Tenant's and common area damage as a result of the new roof installation.

B. Section Includes:

1. Roofing Membrane and Insulation Removal.
2. TPO Membrane Roofing Systems.
3. Waterproofing Membrane.
4. Flashing Membrane.
5. Recovery Board.

6. Roof Insulation.

a. Polyisocyanurate Insulation (For Insulation, Fill & Crickets)

C. Acceptable Manufacturer's:

- Carlisle-Syntec, Inc.
- Firestone Building Products, Inc.
- Johns Manville

1.2 REFERENCES

A. American Society for Testing and Materials:
1. ASTM C 208 - Cellulosic Fiber Insulating Board.
2. ASTM C 1289 - Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
3. ASTM C 1303 - Standard Test Method For Estimating The Long-Term Change In The Thermal Resistance Of Un-faced Rigid Closed-Cell Plastic Foams By Slicing And Scaling Under Controlled Laboratory Conditions

B. FM Global Research Corporation (FM):
1. FM Loss Prevention Data Sheet 1-28 – Wind Design
2. FM Loss Prevention Data Sheet 1-29 – Roof Deck Securement and Above Deck Roof Components
3. FM Standard 4470 – Single Ply, Polymer Modified Bitumen Sheet, Built-up Roof (BUR and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction.
4. FM Loss Prevention Data Sheet 1-49 – Perimeter Flashing

C. Underwriters Laboratories, Inc. (UL):
1. UL - Roofing Materials and Systems Directory.
2. UL 790 - Standard Tests for Fire Resistance of Roof Covering Materials.
3. UL 1256 - Standard Fire Test of Roof Deck Construction.

1.3 SYSTEM DESCRIPTION

A. Single Ply Membrane Roofing System: Single ply 60 mil reinforced for fully adhered membrane roofing system consisting of the membrane material as applicable to the following. Provide a bid for at least one of the following Membrane Roofing System types:

1. FM Approved Mechanically Attached Single Ply TPO (thermoplastic polyolefin) Membrane Roofing System from Carlisle-Syntec, Inc.

2. FM Approved Mechanically Attached Single Ply TPO (thermoplastic polyolefin) Membrane Roofing System from Firestone Building Products, Inc.

3. FM Approved Mechanically Attached Single Ply TPO (thermoplastic polyolefin) Membrane Roof System from Johns Manville.

B. Insulation Board of the following type:

1. FM Approved Polyisocyanurate insulation board Mechanically Attached to the Steel Deck (FM-1-135 Guidelines).

C. Flashing and Waterproofing Membranes: FM Approved 60 mil-reinforced TPO membrane, fully adhered, as defined herein and indicated on the drawings.

1.4 SUBMITTALS

A. Submittals after Award of Contract: After award of project, submit the following submittals to Owners Representative with an electronic copy transmitted to Roofingprojects.com. Submittals shall be available at all times to the Owners Representative.

1. MSDS sheets for products to be used on site.
2. Product Data sheets for accepted system showing compliance with the specified physical properties.
3. Shop Drawing showing:
   a. Fastener and adhesive patterns to meet uplift requirements.
   b. Details required for completion but not shown on attached drawings.
   c. Techniques for end of workday tie offs.
4. List of any sub-contractors being used under primary roofing contractor's contract.
5. Required Building Permits
6. Copies of required State Licenses
7. Preconstruction Damage Report – Form to be provided after award of contract.
8. Construction Schedule
9. Certificates of Insurance
10. Copy of Certified Applicator Statement from system manufacturer (If Requested).
    a. Job names, size, scope, letters from owner contact, present owner contact name and phone number to verify logistical and system experience (If Requested).

1.5 QUALITY ASSURANCE

A. General

1. Standards: Comply with the latest additions of standards as listed below:

   a. The NRCA Roofing and Waterproofing Manual, Latest Edition – National Roofing Contractors Association.
   b. The Membrane Material Manufacturer's current published specifications, application instructions, and technical bulletins.
   c. Annual Book of ASTM Standards, Latest Revision – ASTM International.

2. Qualifications of Roofing Contractor: All bidders shall be licensed Roofing Contractors and shall be certified by the Material Membrane Manufacturer to install the roofing system outlined in the Scope of Work and meet the requirements further outlined in Section 1.5 B. 1. "System Experience".

3. Qualification of Workers: Use the necessary quantity of skilled laborers who are completely trained and versed in the necessary trades, and are thoroughly instructed in the various scopes of work required to complete this project as specified. Lack of skill or inadequate instruction of laborers to the scope of work required for this project will not be an excuse for accepting or rejecting the work performed.

4. Sub-Contracting of Roof System Installation: The Roofing Contractor (under contract) will not sub-contract the installation of major roofing system components to an individual or firm that is not a full time employee of the contracted Roofing Contractor. Major roofing system components are considered as the following:

   a. Insulation or Recovery Board
   b. Roof Membrane
   c. Flashings
   d. Roof Walk Pads

5. Code Compliance: Bids must be in compliance with all applicable local and state codes. Contractor will be required to secure any and all permits required by local and state jurisdictions in order to conduct this project as specified. All costs for required permits must be included in contractor's base bid price.

6. Employee Conduct: All employees and sub contracted employees must conduct themselves professionally at all times while on property. Owners Representative will have a ZERO tolerance policy for employee interaction with property customers. There will be no drinking of alcoholic beverages on Property. In addition there will be no smoking allowed on the roof during the course of the project. Violation of the above mentioned items will be grounds for that employee to be banned from future work.

B. Qualifications of Applicator:

   1. System Experience:

      a. Contractor shall have been trained by and shall be an authorized installer or licensed contractor for the roofing system manufacturer, as defined by the roof system manufacturer, for five (5) years prior to the bid date.
      b. Contractor shall be rated by the roofing system manufacturer as a certified applicator and be able to present documentation from the material manufacturer to substantiate this claim prior to the award of contract.
      c. Contractor shall have installed a minimum of fifteen (15) projects using the specified roofing system.
      d. Contractor shall have been in business a minimum of ten (10) years performing work under the current registered name.

C. Regulatory Requirements for Roof Assembly: Comply with FM Global System Guidelines, Underwriters Laboratories, Inc. Roofing Materials, Building Code, Energy Code and Systems Directories as specified:

   1. FM Global: Provide roofing assembly meeting FM Class 1– 105-A guidelines for fire resistance and wind uplift in accordance with FM Loss Prevention Data Sheet 1-28, 1-29, & 1-49.
   2. Underwriters Laboratory: UL Class A External Fire Rating
   3. International Building Code

D. Pre-installation Conference:
   1. RoofingProjects.com shall convene a pre-installation conference at the site, prior to commencing work of this Section. Require attendance of parties directly affecting work of this Section, including, but not limited to, the Owner's representative, Roofing Applicator and job foreman, and Roofing Manufacturer's Representative.
   2. RoofingProjects.com shall record discussions of conference and decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. Review foreseeable methods and procedures related to roofing work, including the following:

a. Tour, inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work.
b. Review required submittals.
c. 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.
d. Review required inspections, testing, certifying, and material usage accounting procedures.
e. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).

E. Manufacturer's Site Inspections:

1. Provide site inspection and reports by the manufacturer's representative at the following periods:
   a. Prior to 50% of roof installation.
   b. Final Inspection: Two weeks prior to Final Payment.
2. Prepare certificate of acceptance of completed roof installation by the Manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall make arrangements for delivery of materials in manufacturer's original unopened containers, dry, undamaged, seals and labels intact.

B. Contractor shall store materials in weather-protected environment, clear of ground and moisture. Storage requirements for insulation are as follows:
1. Cut or remove plastic shipping wrap from insulation.
2. Cover with tarpaulin, shield from moistures and ultraviolet rays.
3. Elevate minimum of 4 inches above substrate.
4. Secure to resist high winds.
5. Distribute insulation stored on roof deck to prevent concentrated loads. Place over main structural components.
6. Do not install wet insulation. Insulation shall be thoroughly dry prior to installation.

C. Store cements, primers, and caulks in heated area above 40 degrees F during cold weather and in area below 80 degrees F in warm weather.

D. Protect adjacent materials and surfaces against damage from roofing work. Do not store materials on completed roofing.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Follow industry standards for environment requirements including, but not limited to, the following:

1. Do not apply roofing membrane during inclement weather. When air temperature is expected to fall below 40 degrees F, follow specified Cold Weather Application Procedures as specified herein.
2. Do not apply finished roofing system to wet, damp or frozen surfaces or when precipitation is occurring.
3. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.8 SEQUENCING AND SCHEDULING

A. Contractor shall coordinate the Work with installation of associated metal counterflashings specified under other sections as the Work of this Section proceeds.

1.9 WARRANTY

A. Material Manufacturer: Provide a warranty to the Building Owner naming Owners Representative and the Project Address and roof size - commencing at date of roof final acceptance by the RoofingProjects.com, Owners Representative and Material Manufacturer, that includes the cost of labor and materials for loss of weather tightness without financial limit for a period of 20 years.

B. Contractor Warranty: All work performed by the Roofing Contractor shall be guaranteed, in writing, for a period of Two (2) Years from the date of roof final acceptance by the RoofingProjects.com, Owners Representative and Material Manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with specification requirements herein, manufacturers listed below are considered acceptable to Owners Representative that provide the 20 year warranty (as specified in Section 1.9 Warranty) and roofing systems or products that meet the performance criteria listed in Section 2.2 MEMBRANE PERFORMANCE CRITERIA.

B. Acceptable Manufacturer's:

- Carlisle-Syntec, Inc.
- Firestone Building Products, Inc.
- GAF
- Johns Manville

2.2 MEMBRANE PERFORMANCE CRITERIA

A. TPO: Membranes composed of a top and bottom film formulated with an ultra-violet resistant thermoplastic polyolefin with a polyester reinforcement, 60 mil thickness, white. Membrane sheets not to exceed 12 feet unless approved by roof RoofingProjects.com – final width to be determined by Manufacturer based on deck type, building elevation and FM Requirements may be narrower than 12 feet.

2.3 FLASHING MEMBRANE

A. Flashing Membrane: Reinforced and non-reinforced membrane and pressure-sensitive or heat welded flashings by Roofing System manufacturer, minimum 60 mils, specifically designed for use in flashing at perimeters and wall, and around projections through roofing system.

2.4 WATERPROOFING MEMBRANE

A. Waterproofing Membrane: Membrane waterproofing formed into uniform, flexible sheets by Roofing System manufacturer. Reinforced, 60 mils nominal thickness.

B. Waterproofing Flashing: Reinforced and non-reinforced membrane and pressure-sensitive or heat welded flashings by Roofing System manufacturer, minimum 60 mils, specifically designed for use in flashing at perimeters and wall, and around projections through roofing system.

2.5 ROOF INSULATION & FASTENERS

A. Polyisocyanurate (Insulation, Tapered Insulation, New Roof Crickets)

1. Insulation will be closed cell, iscocyanurate foam core with factory installed facers meeting ASTM ASTM C 1289, Type II, on both major surfaces. Foam core will have a rated spread of flame of 25 or less as defined by ASTM E 84.

B. Fasteners for Steel Deck

1. Steel Decks: Insulation mechanical fasteners for metal decks shall be factory coated for corrosion resistance. The fastener shall conform meet or exceed Factory Mutual Standard 4470 and when subjected to 30 Kesternich cycles, show less than 15% red rust.

2.6 ROOF PENETRATION FLASHING AND SEALS

A. Molded Pipe Flashing: Pre-molded flexible pipe flashing as recommended and supplied by the roofing manufacturer.

B. Pitch Boxes: Manufacturer's coated metal products. *Note: Use of Pitch Boxes must first be approved by RoofingProjects,com and will only be allowed when the alternative does not provide the likelihood of a longer term watertight seal.*

C. Pitch Box Pourable Sealer: Manufacturer's two-part pourable urethane sealer.

2.7 SHEET METAL FLASHING

A. All sheet metal flashings will be .040 Aluminum or 24 ga. Galvanized Steel – metal shall be Kynar Coated with Manufacturer's 20 Year Warranty on the finish. Shop Fabricated Metal Components will adhere to SMACNA Standards.

2.8 ACCESSORIES

A. Provide new manufacturer's system accessories as required for a complete and warranted Roofing System. Use of each accessory item indicates its acceptance by the material manufacturer providing the long-term warranty. Roofing contractor is responsible for using accessory items that are acceptable by the manufacturer of the primary roofing material.

2.09 PLYWOOD & PLYWOOD FASTENERS (If Required)

A. All Plywood: Exterior Rated APA, Structural 1 – Thickness: minimum ½ inch

B. Plywood Fasteners:

1. All Fasteners: Shall be corrosion resistant coated carbon steel.
2. Self tapping, self drilling screw with low profile head.

2.10 PIPE & CONDUIT SUPPORTS

A. Replace all wood pipe supports with contractors choice of pre-manufactured pipe support (adjustable height to meet existing piping conditions) at 10' on-center maximum spacing. Anchored to pipe to maintain alignment. Pre-fabricated pipe supports in good condition may be re-used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Due to multiple roof system options the installation guidelines listed may include more than one alternative. Finished installation must be approved by FM Global and acceptable to the Material Manufacturer of the proposed primary roof membrane material for issuance of the specified long-term warranty.

B. SAFETY

1. Contractor shall follow all current OSHA and roofing industry requirements and standards for procedures followed during the roof replacement project.

2. Daily clean-up of work, staging and personnel areas is required.

3. Barricades: Barricades must be put in place prior to the start of the work that requires them. Proper barricades must be in place to encompass the entire swing radius of the crane to ensure and prevent the possibility of the public or employees being harmed by the crane or its operations.

4. Fire extinguishers must be present on the job site at all times – number of fire extinguishers should be sufficient so that any point is within 100 feet of a fire extinguisher.

5. Cranes and Hoists: Contractor must know and work within the load capacity, limitations and specifications provided by the equipment manufacturer.

6. Public Access: Unauthorized persons are not allowed to enter the roof at any time.

7. Fumes: Notify Property Management when there is the possibility that fumes and/or dust can be drawn into the building through air intake ducts so that steps can be taken to cover or shut down the unit.

3.2 EXAMINATION

A. Verify substrate surfaces are dry and free of water, snow, and ice.

B. Beginning installation means acceptance of substrate and pre-installation conference has been held with agreements reached.

C. **NOTE: Roofing Contractor is to verify that all drain lines are fee from debris and are free flowing prior to beginning this project. Any drains that are discovered to be blocked or suspect as free flowing shall be brought to the attention of the Owners Representative prior to beginning work. Any drains discovered to be blocked or non-free flowing after the start of the project will be the contractors' responsibility to correct at their cost.**

3.3 PREPARATION

A. Provide covers and other means of protection as necessary to protect building surfaces against damage during roofing work.

B. Where Work shall continue over newly finished roof membrane, protect surfaces from damage.

C. Prior to start of work, verify that all pipe vents, vent stacks, steel supports are attached to the building structure. Be sure these items are removed or secured to the building structure prior to the start of work.

D. Block all drains within any tear off and removal areas of the roof prior to beginning tear off – remove plug at the end of work for that day or in the onset of inclement weather.

3.4 TEAR OFF OF EXISTING ROOF

A. Remove existing roof system(s) including but not limited to roof gravel, membrane, base flashing, insulation and all accessories down to the steel roof deck.

B. Sweep the deck clean of all dirt and debris.

C. Clean bottoms of the steel deck flutes of dirt and debris.

D. Rusted or damaged decking shall be reviewed by Owners Representative and the Roofing Contractor – a consensus decision will be made to either replace the decking or rehabilitate the rusted deck surface by wire brushing the surface rust to bare metal and painting the deck with approved rust inhibitor paint. Unit prices for both metal deck replacement and rehabilitation of the metal deck are requested on the bid form. Any Deck replacement or rehabilitation must be fully documented by the contractor through photos, measurements, etc.

3.5 REMOVAL OF EXISTING WALL/CURB FLASHING & OBSOLETE EQUIPMENT

A. Removal of the vertical wall and curb flashings is required. Surfaces shall be cleaned and prepared for application of new materials as satisfactory with the manufacturer.

B. Remove and dispose of all identified roof top equipment and penetrations identified by roof plan, the project estimator assistant and or by Owners Representative. Openings in the roof deck created during the removal of this equipment and penetrations to receive new 22 gauge metal decking (to match existing Type) screw or spot weld into place.

Note: The cost to fill in of openings in the roof deck must be included in the contractor's base bid price.

C. Remove and dispose of existing roof related sheet metal flashings unless identified on the roof drawing or specification to re-use the existing.

3.6 ROOF INSULATION INSTALLATION

A. Install insulation boards with 12 inch staggered board joints in one direction. If installing insulation in two layers, stagger joints to avoid aligned or stacked seams in the two layers of insulation. Mechanically fasten boards to the steel deck with fasteners and plates in accordance with FM 1-135 Guidelines. Fastener density may increase at the perimeter and corners to meet FM 1-135 Guidelines – refer to FM Loss Prevention Data Sheets 1-28, 1-29, & 1-49.

1. Install fasteners using drill with torque clutch. Other types of drills will not be permitted.
2. Install fasteners in the pattern and spacing as recommended by the manufacturer to meet the FM 1-135 Guidelines but not closer than 6" from either edge of the insulation board. Engage the top portion of the flutes of the steel deck. Use shortest possible screws to engage the roof deck ¾".

B. Lay boards to moderate contact without forcing joints. Do not kick separator boards into place. Cut separator board to fit neatly around protrusions through roof. At parapet walls, cut boards around protrusions and embed plates. Butt boards tight against wall to provide sealing. Fill gaps over 1/4 inch wide with filler as recommended by the manufacturer.

C. Place roof crickets and tapered insulation to required slope pattern or as required to prevent ponding when required for complete roof removal and replacement.

D Apply no more insulation than can be sealed with membrane in same day.

E. Do not install wet, damaged or warped separator boards.

F. Install tapered insulation to the upslope side of roof top curbs. Cricket shall extend out from the curb half the curbs width and be at ½ inch per foot slope.

3.7 ROOFING MEMBRANE APPLICATION

A. When approved by the Owner, the manufacturers recommended methods of installation (unless superseded by this specification) will become the basis for inspecting and the accepting or rejection of the actual installation procedures used on this work.

B. Surface Conditions

1. Surfaces scheduled to receive roofing are to be free of any standing water, frost, snow or loose debris.

2. Substrate is to be smooth, free of sharp projections and free of obvious depressions.

3. All necessary metal fittings are to be in place before roofing.

4. **All required nailers shall be securely installed prior to roofing & any additional nailers needed to achieve the proper height for roofing shall be included in the contractor's base bid price – this excludes any rotted or damaged nailers that are unsuitable for the new roof system installation. Unit prices are requested on the bid form to identify lineal foot prices for wood nailer replacement.**

C. Installation - General

1. Perform all related work specified elsewhere necessary for the installation of the specified membrane system.

2. Ensure that fasteners do not penetrate conduit or other miscellaneous items on bottom side of the deck.

3. Increased fasteners in the field of the roof will not reflect the FM 1-135 Guidelines at perimeters and corners.

D. Cold Weather Application Procedures: When air temperature is expected to fall below 40 degrees F, follow Cold Weather Application Procedures as follows:

1. Store materials in heated storage units prior to installation. Rotate adhesive, cement, and sealant containers to maintain their temperature above 40 degrees F.

2. Allow membrane to relax until no wrinkles are visible and restrict work to sunny days

3. Allow adequate time for solvents in cements to flash off. Check dryness of applied cements before sealing joints.

4. Verify that frost, dew, and other forms of moisture have evaporated prior to covering insulation with membrane to prevent entrapment of moisture within finished roof system.

3.8 INSTALLATION OF FULLY ADHERED ROOFING MEMBRANE

A. Unroll and position membrane without stretching. Allow the membrane to relax for bonding. Fold the sheet back onto itself so half the underside of the membrane is exposed.

1. Install low rise adhesive in the pattern and spacing as recommended by the manufacturer.
3. Allow the adhesive to rise up approximately 1/8" and develop strings prior to setting membrane into adhesive. String-time is measured by touching the adhesive with a splice wipe and looking for development of “strings” of adhesive as you pull the splice wipe out of the adhesive.
4. Once the adhesive rises up to the acceptable level, roll the membrane into the adhesive and roll using a 30" wide, 100 – 150 pound weighted steel roller to ensure full embedment.
5. Fold back the un-bonded half of the membrane sheet and repeat the bonding procedure.

B. Overlap roofing membrane a minimum of 5 inches for side laps and 3 inches for end laps.

C. Install membrane so that side laps run across the roof slope lapped towards drainage points.

D. All exposed sheet corners shall be rounded by a minimum of 1 inch.

E. Membrane laps shall be heat welded together. All welds shall be continuous, without voids or partial welds. Welds shall be free of burns or scorch marks.

F. Weld shall be a minimum of 1 ½ inch in width for automatic machine welding and a minimum of 2 inches for hand welding.

G. All cut edges of the reinforced roof membrane must be sealed with manufacturer’s edge sealant.

3.09 SEAM APPLICATION

A. General

1. **Seaming area is to be absolutely clean and free of moisture traces, dust, dirt, or debris.**

2. All field seams must be installed in strict accordance with the manufacturer's requirements.

3. Any areas where the reinforced membrane edge has been cut shall be sealed with manufacturer's seam sealant.

B. Quality Control of Membrane Seams

1. All seams shall be checked for integrity with a blunt ended probe. Any openings or "fishmouths" shall be repaired with a hand held hot air tool fitted with a narrow nozzle tip with a roller.

2. Several times each day the seam welding machine shall be tested for proper calibration. Typically this will occur at the start of work and at a minimum after the mid-day break. A test seam will be welded for inspection by the onsite roof inspector. These test samples will be numbered and marked with dates and times of the test weld.

3.10 FLASHINGS

A. General

1. All flashing must be in accordance with manufacturer's details and be 100% prelaminated tape backed, including prelaminated corners. Flashings are to extend a minimum of 6 inches onto the roof membrane and 8 inches up the vertical surface.

2 All surfaces to receive base flashing must be dry and smooth. In areas where a minimum of 75% adhesion of the base flashing to the substrate cannot be achieved, a suitable covering must be installed over the base substrate. Follow manufacturer's guidelines for membrane and adhesive product selection when complete removal of all asphalt residue from previous roof system cannot be achieved.

3. All parapet wall flashing membrane (including sloped portions) shall be fully adhered to the wall substrate following manufacturer's specification.

4. Intermittent fastening of the flashing membrane at parapet wall heights exceeding 3 feet must be figured if required by manufacturer.

B. ***Premolded flashing corners, pipe boots, and accessories must be used wherever practical.***

C. This Contractor shall be responsible for providing and installing all sheet metal counterflashing, coping metals, etc.

D Apply flexible flashings to seal membrane to vertical elements using manufacturer's standard peel and stick or heat welded flashings.

E Reinforced Flashing Membrane: Where conditions permit, flash penetrations and walls with reinforced flashing membrane.

F Uncured Flashing: Limit use of uncured flashing to overlay vertical seams as required at angle changes, to flash inside and outside corners, scuppers, and other penetrations or unusually shaped walls as approved by the manufacturer.

G. Seal flashings and flanges of items penetrating membrane.

H. Gas Pipe, Conduit Supports and Isolation Pads: Replace pipe supports as specified. Install new isolation pads at each pipe support and provide new strap anchor to pipe to maintain support alignment.

I Walkway Pads: Layout pattern shall provide membrane protection at all service doors of the roof top equipment Secure pads to roofing membrane by weld or adhesive to prevent displacement in maximum anticipated design wind velocity. A lineal foot price for walk pads is available on the bid form for any additional walk pads to be determined at a later date.

3.11 PERIMETER MEMBRANE SECUREMENT

A. The membrane is to be secured at the roof perimeter, curbs, walls, all projections, and at changes in plane greater than 15 degrees.

B. Membrane securement shall consist of one of the following as approved by the manufacturer:

1. Manufacturer's termination bar – anchor every 12 inches to maintain constant compression.

2. Manufacturer's approved metal details

C. Membrane securement shall be in accordance with FM 1-29.

D. Base Tie-Ins: All base tie-ins that are required by the manufacturer's specifications shall be performed with the manufacturer's reinforced securement, strip method of perimeter securement with seam tape factory laminated.

3.12 FLASHING DETAILS

A. GENERAL

1. Flashing Details by Number as shown in the Detail Drawing Link.

B. FLASHING DETAIL DRAWINGS

1. See Detail Drawing Link under the Project Links for each project.

3.13 Metal Gutter and Leader Roof Drainage Systems:

A. Gutter system: shall be shop fabricated 24 G Kynar coated steel or .040 Kynar coated Aluminum (Contractor's choice). Expansion Joints shall be spaced a maximum of 50 feet on center and shall be comprised of two end caps with a slip splice over the joint. The gutter sections are to be 20 feet long, minimizing the number of joints between ends and expansion joints. Hidden top hanger straps are to be installed at 24 inches on center. All new gutters and leaders are to match the existing size, profile and routing as the existing system.

B. Provide 5-year Contractor's Watertightness and Workmanship Warranty on the gutter and leader system

3.14 WATER CUTOFFS AND WEATHER PROTECTION

A. Install water cut-offs at end of day's operation to seal insulation and edge of roof membrane from

moisture entry. If inclement weather appears imminent during roofing application, cease operations and protect deck, insulation, flashings, penetrations, and membrane from moisture infiltration with water cutoffs. Insulation and roofing materials not so protected prior to inclement weather will be considered damaged and will be cause for rejection.

B Remove water cut-offs and other temporary weather protections prior to continuing roofing work. Remove materials that have been subject to moisture damage and return deck to a clean, dry condition before proceeding with roofing operations. Remove damaged materials from job site.

C The water cut-offs and weather protection shall not be considered a part of the final roof system

3.15 PROJECT CLOSE OUT

A. Project Completion

1. When the project is considered completed by the Roofing Contractor, the contractor will do the following:

a. Notify Owners Property Representative and Roofing Projects.com in writing that the Project is considered completed and that it has been inspected by the Material Manufacturer for warranty purposes. Letter shall list any punch list items generated by the Manufacturer's Inspection and that these items have been corrected to the Manufacturer's satisfaction.
b. Provide RoofingProjects.com with all inspection reports to include the Material Manufacturer's final inspection report.
c. Assure surfaces of new work and surrounding ground areas are clean and free of excess construction material and all debris.

B. Final Completion Inspection

1. When the Roofing Contractor, and Material Manufacturer have indicated that the project is complete then a final inspection with RoofingProjects.com, Property Representative and the Roofing Contractor will take place.

2. All defects noted and non-compliances with the Specifications or the unfulfilled recommendations of the Material Manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Applicator to the satisfaction of the Property Representative and RoofingProjects.com. and the Material Manufacturer prior to demobilization.

C. Final Payment

1. The following documents shall be submitted to Roofingprojects.com and accepted prior to final payment being made:
   a. Manufacturer's final inspection report.
   b. Confirmation that any punch list items identified on the manufacturers and Roofingprojects.com final inspection reports have been resolved.
   c. Contractor and manufacturers warranties as referenced in this specification.
   d. Contractor release of liens indicating that all entities involved with the project have been paid in full including but not limited to labor, materials, fees, taxes, etc.

END OF SPECIFICATION