

**TECHNICAL SPECIFICATIONS
FOR
ROOF REPLACEMENT AT THE JUSTICE CENTER**



8 / 26 / 2015

1.0 GENERAL

All provisions of the Contract Documents, including any/all General Conditions and Supplementary Conditions shall govern work under this division.

2.0 SCOPE OF WORK

2.1 GENERAL: Work under this division of the specifications includes all labor, materials, equipment, and all necessary appurtenances and incidental work to provide a complete and serviceable reroofing project.

2.2 DESCRIPTION OF WORK: The Base Proposal includes all work necessary to provide a complete and serviceable reroofing system, including but not limited to: completely removing all the existing roofing down to the deck; properly preparing the roof deck; repairing or replacing damaged or deteriorated decking; installing rigid board insulation; installing tapered insulation where indicated in the drawings; installing all new membrane and sheet metal flashings and wall panels; installing a new gravel covered, 4 ply, asphalt, fiberglass built-up roof; removing existing equipment screen, installing a new ladder, installing new overflow drains, and providing a 20-Year NDL Warranty from the Primary Roofing Material Manufacturer.

2.3 WORK INCLUDED (BUT NOT LIMITED TO):

SURFACE PREPARATION/TEAR OFF: Completely remove and lawfully dispose of all existing roofing materials, membrane flashings, and sheet metal flashings down to the structural deck. Clean, dry, and properly prepare the structural deck.

EXISTING ROOFING MATERIALS: The existing roofing materials located on the designed roof areas are as follows (from deck up): *(This information is provided for informational purposes only – Field verify all existing conditions prior to providing a bid/proposal):*

Existing Gravel Surfaced Roofs:

- Metal Deck
- ¾" Fiberglass Insulation mechanically attached
- ¾" Fiberglass set in asphalt
- Gravel Covered BUR (Built-Up Roof)

PERFORMANCE REQUIREMENTS FOR NEW ROOF SYSTEM (WIND UPLIFT): Provide a roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.

1. Field Uplift Pressure: -60 PSF.
“The uplift pressure includes a safety factor of two (2x).”
2. On Metal Decks: Provide prescriptive increases in perimeter fastening of 50%, but not less than 1 fastener per 2 square foot. Provide corner fastening of 1 fastener per 1 square foot.
3. Roof Perimeter width shall be established as 10’-0” wide. Roof Corner shall be established as 10’-0” in size.

DECK REPAIRS: Repair any structural damage to the deck. Deck repairs shall be performed as a Change Order to the Contract and in accordance with the Change Order Provisions and Unit Price Provisions of the Contract Documents.

ABANDONED EQUIPMENT SCREEN: Remove all of the existing equipment screen, trim, flashings, and sheet metal and dispose of properly. Install new metal deck and new roofing as specified and detailed in the drawings. This work will be included in the Base Bid. Remove existing lightning protection to the roof surface.

ABANDONED ROOF DRAIN: Remove the roof drain, clamping ring, strainer, and all associated sheet metal. Repair the metal deck. This work will be included in the Base Bid.

ABANDONED SKYLIGHT: Remove the skylight, curb, and associated sheet metal and wood. Repair the metal deck as shown in the drawings. This work will be included in the Base Bid.

ROUGH CARPENTRY: Install all new wood blocking and/or wood nailers as shown in the drawings.

SHEET METAL: Install all new sheet metal accessories, vents, and flashings.

SHEET METAL WALL PANELS: Install new sheet metal “M” panel where indicated on the drawings.

INSULATION: Install new rigid board insulation as specified.

TAPERED INSULATION Install tapered insulation where indicated on the drawings.

CRICKETS: Install crickets where indicated on the drawings and as required to ensure positive drainage. Install crickets behind all roof mounted equipment curbs to ensure positive drainage.

MEMBRANE ROOFING: Install all new gravel covered, four (4)-ply, asphalt, fiberglass built-up roof.

MEMBRANE FLASHINGS: Install all new membrane flashings. All membrane flashings shall be properly terminated and protected by a sheet metal counter flashing.

EQUIPMENT: Perform all mechanical, electrical, and other work as may be required to

disconnect, remount, and reconnect all roof mounted equipment, ductwork, or piping as required to provide a minimum eight inch (8") curb height for the flashings and to comply with the drawings.

PIPE SUPPORTS: Install new pipe supports at all roof-mounted conduit/piping. This shall include all gas, electrical, condensate, and all other miscellaneous conduit/piping on the roof.

EXISTING DRAINS: Adjust elevation of existing drains to ensure proper drainage. Install new cast iron clamping rings and new cast iron strainers on all existing drains. All drains and drain lines shall be properly cleaned out and cleared so as to cause the drains to freely drain.

NEW ROOF DRAIN PLUMBING: Perform all work necessary to install new drains, strainers, deck clamps, clamping rings, insulation, and pipe hangers.

NEW OVERFLOW DRAINS: Install overflow drains where shown on the drawings and install new cast bronze downspout nozzle.

MODIFY EXISTING OVERFLOW SCUPPERS: Perform all work necessary to modify (raise/lower/enlarge) existing overflow scuppers. Size of overflow scuppers shall be as shown on the drawings.

ROOF WALK PADS: Install roof walk pads around all roof top HVAC units, around all roof hatches, and at the top and bottom of all roof access ladders.

PAINTING: Paint sheet metal work where shown on the drawings.

KETTLE REQUIREMENTS: Provide an Afterburner System with Safety Loader for each kettle used on the project.

LIGHTNING PROTECTION: Contractor shall remove/re-locate/salvage/re-install the existing lightning protection system in order to facilitate the roof replacement project. Contractor shall modify/upgrade the existing lightning protection system (in the area of roof replacement only) in order to comply with applicable standards established by the National Fire Protection Association, Underwriters Laboratories, Inc., and the Lightning Protection Institute. It is not the intent of this project to re-certify the existing lightning protection system. Relocate to inside of coping or roof surface.

ROOF ACCESS LADDERS: Install new roof access ladders as specified.

PRIMARY ROOFING MATERIAL MANUFACTURER'S NDL WARRANTY: Provide a 20-Year NDL (No Dollar Limit) Warranty from the Primary Roofing Material Manufacturer. The Warranty shall cover defects in both materials and workmanship for the membrane roofing, membrane flashings, and insulation (above top of structural deck), and shall have no limit to the penal sum for the coverage period. The warranty shall cover leaks as a result of defects in materials and workmanship.

CONTRACTOR'S WARRANTY: A 5-year Contractor's Warranty is required.

PREFINISHED METAL WARRANTY: Provide a 20-year Warranty on the sheet metal finish.

ROOF ACCESS LADDER WARRANTY: Provide a 5-year warranty from the Ladder Manufacturer covering defects in materials.

2.4 APPLICABLE STANDARDS

National Roofing Contractors Association (NRCA).

Sheet Metal and Air Conditioning Contractor's National Association (SMACNA).

American Society of Testing and Materials (ASTM).

Factory Mutual (FM).

Underwriters Laboratory (UL), Class A.

3.0 GENERAL REQUIREMENTS:

- 3.1 ROOFING CONTRACTOR'S QUALIFICATIONS: The Roofing Contractor shall be approved by the Primary Roofing Material Manufacturer to apply the designated roofing system qualifying for the specified Primary Roofing Material Manufacturer's NDL Warranty. The Roofing Contractor shall have had at least 5-years experience as a Roofing Contractor for the Primary Roofing Material Manufacturer.
- 3.2 SUBMITTALS: The Contractor shall provide complete submittals in accordance with Section 6.0. Submittals shall be provided to the Architect/Engineer a minimum of 5 working days prior to the Pre-Construction Conference.
- 3.3 PRECONSTRUCTION CONFERENCE: The contractor and job site superintendent shall attend a Pre-Construction Conference prior to the performance of any roofing work.
- 3.4 FOREMAN REQUIREMENTS: An English speaking Foreman will be required on site all day. Superintendent must make daily inspections. Site Foreman (point of contact) must attend Preconstruction Conference.
- 3.5 PHOTOGRAPHS: The contractor must take his or her own of the site at the Preconstruction Conference, note any broken items or dead landscaping, and notify the Project Manager in writing.
- 3.6 ADDITIONAL SUBMITTAL REVIEW, OBSERVATIONS OR INSPECTIONS BY ARCHITECT:
 - A. In the event that the Contractor exceeds the completion date for whatever reason it shall be responsible for reimbursing the Owner through authorized change order/for all costs of the Architect's staff and expenses to carry on inspection duties at the rate performed during the project prior to that date.

- B. In the event that submittals require review more than once past the initial submittal for each section or item, the Contractor shall be responsible for reimbursing the Architect for all costs of submittal review for the third and all subsequent submittal reviews prior to each. The Architect shall inform the Contractor of the anticipated time required for such review and the Contractor shall provide payment in the form of a check made payable to the Architect for the anticipated time and expenses required prior to the third and/or other subsequent reviews. All submittals, which are found to be unacceptable, shall be returned to the Contractor at the Contractor's expense by common courier.
- C. The rate of reimbursement shall be as follows:
- | | |
|--|----------------------|
| Architect | \$150.00 per hour |
| Registered Roof Consultant | \$150.00 per hour |
| Project Manager | \$ 94.00 per hour |
| Contract Administrator | \$ 78.00 per hour |
| CAD Operator | \$ 75.00 per hour |
| Construction Observer | \$ 75.00 per hour |
| Clerical | \$ 50.00 per hour |
| Mileage | Current Mileage Rate |
| Travel Expenses (lodging, meals, etc.) | Cost plus 10% |
| Architect's Consultant Expenses | Cost plus 10% |
- D. The above costs, if necessary, may be deducted from any payments remaining due to the Contractor upon completion of the work by duly authorized change order.

3.7 **SUBSTANTIAL COMPLETION:** The Contractor must give the Architect/Engineer written notice that they have substantially completed the project and are ready for an inspection. Within ten (10) calendar days after notification, the Architect/Engineer and the Owner shall inspect the work to verify completion. The Architect/Engineer will generate a punch list including contractor and Owner items and assemble and distribute a Certificate of Substantial Completion for signature. The following items must be complete in order to be considered substantially complete:

- A. Roofing and flashing
- B. Sheet metal and flashing
- C. Operational HVAC
- D. Gas lines tested and certified

3.8 **FINAL INSPECTION:** The Contractor must give the Architect/Engineer written notice that the punch list documented on the Certificate of Substantial Completion has been completed and request an inspection. Within ten (10) calendar days after notification, the

Architect/Engineer and the Owner shall inspect the work to determine if the punch list has been completed and the project is complete. The final inspection must take place prior to the scheduled Project Completion date stipulated in the contract.

4.0 MATERIALS (ALL MATERIALS SHALL BE ASBESTOS FREE)

4.1 APPROVED PRIMARY ROOFING MATERIAL MANUFACTURERS ARE:

JOHNS-MANVILLE, Roofing Systems Division, PO Box 5108, Denver, CO 80217.

US PLY, INC., P.O. Box 2505, Port Arthur, Texas 77643.

TAMKO Asphalt Products, 220 West 4th Street, P.O. Box 1404, Joplin, MO 64801.

4.2 MEMBRANE ROOFING MATERIALS:

Roofing Felt shall be a premium glass fibered felt meeting ASTM D 2178, Type VI, and qualifying for the specified warranty.

Modified Bitumen for Membrane Flashings shall be a granule surfaced, SBS (Styrene-Butadiene-Styrene), glass fibered and/or polyester mat reinforced flashing sheet as recommended by the Primary Roofing Material Manufacturer for the specified warranty. Granule color shall be white.

Membrane Flashing at Metal Flanges shall consist of a minimum of 2 layers of roofing felt set in hot asphalt and 1 layer of granular surfaced modified bitumen set in hot asphalt; or 4 plies of roofing felt set in hot asphalt, and as required by the Primary Roofing Material Manufacturer and qualifying for the warranty required.

Plastic Cement (Roof Cement) shall be an asbestos free asphalt roof cement meeting ASTM D 4586, Type I.

Modified Flashing Cement shall be asbestos free elastomeric flashing cement specifically formulated for use with Modified Bitumen Flashings.

Fiberglass Membrane shall be a woven glass membrane meeting ASTM D 1668.

Primer shall be an asphalt primer meeting ASTM D 41.

Bitumen (Asphalt) shall be a low-odor, low-fuming asphalt that neutralizes asphalt odor without impacting performance which meets ASTM D 312, Type III, as manufactured by Trumbull, Owens Corning.

Surfacing Aggregate shall be nominal 3/4" to #4's in size, hard, clean, opaque gravel meeting ASTM D 1863 - Type 67A.

Rigid Board Insulation shall be 2 layers consisting of the following:

Roof Areas 1 and 2: The first layer shall be 1 layer of 3.3" polyisocyanurate

meeting the physical property requirements of ASTM C 1289, Type II, Class I. The thickness of the polyisocyanurate shall be based on Long Term Thermal Resistance (LTTR). The polyisocyanurate foam core shall be bonded to universal fiberglass reinforced facers. The maximum board size of Polyisocyanurate shall be 4'-0" x 4'-0" for all deck types except for metal decks that can utilize a 4'-0" x 8'-0" board size.

The second layer shall be 1 layer of 3/4" perlite meeting ASTM C 728.

Combined Insulation R-Value shall be R-20 (Minimum).

Roof Area 3: The first layer shall be 1 layer of 1/4" per foot tapered polyisocyanurate with a 3.3" starting thickness meeting the physical property requirements of ASTM C 1289, Type II, Class I. The thickness of the polyisocyanurate shall be based on Long Term Thermal Resistance (LTTR). The polyisocyanurate foam core shall be bonded to universal fiberglass reinforced facers. The maximum board size of Polyisocyanurate shall be 4'-0" x 4'-0" for all deck types.

The second layer shall be 1 layer of 3/4" perlite meeting ASTM C 728.

Combined Insulation R-Value shall be R-20 (Minimum).

5'-0" Sumps (Where Indicated in the Drawings): shall be 2 layers of rigid board insulation consisting of the following:

Roof Area 1 and 3: The first layer shall be 1 layer of 1.75" polyisocyanurate meeting the physical property requirements of ASTM C 1289, Type II, Class I. The thickness of the polyisocyanurate shall be based on Long Term Thermal Resistance (LTTR). The polyisocyanurate foam core shall be bonded to universal fiberglass reinforced facers. The maximum board size of Polyisocyanurate shall be 4'-0" x 4'-0" for all deck types except for metal decks that can utilize a 4'-0" x 8'-0" board size.

The second layer shall be 1 layer of 3/4" perlite meeting ASTM C 728.

The perimeter of the Sump shall be constructed with 0"-1.5" x 12" tapered perlite edge strip meeting ASTM C 728.

Cant Strip shall be a nominal 4" and cut from perlite insulation meeting ASTM C 728.

Tapered Edge shall be as noted in the drawings and factory cut from perlite board meeting ASTM C 728.

Tapered Insulation for Drain Sumps shall be factory cut from perlite board meeting ASTM C 728 and of sufficient slope to achieve the slope as required for each drain sump. No field tapering shall be allowed.

Tapered Insulation for Crickets shall be factory cut from perlite board meeting ASTM C 728 and of sufficient slope to achieve a minimum NET slope of 1/4" per foot to the

drains. No field tapering shall be allowed.

Liquid Reinforced Flashings: shall consist of a polyurethane/bitumen resin – JM Perma Flash or equal. Reinforcement shall be a high-performance, spun-laced polyester fabric reinforcement. The liquid flashings shall be included and covered by the manufacturer's warranty.

4.3 SHEET METAL:

Galvanized Sheet Metal shall be 24-gauge (unless otherwise noted in the drawings) and shall be hot dipped galvanized, meeting ASTM A 653.

Prefinished Sheet Metal shall be 24-gauge (unless otherwise noted in the drawings) G-90 hot dipped galvanized metal (meeting ASTM A525 and ASTM A446) coated on one side with a Kynar 500 Fluoropolymer coating (.95 to 1.25 dry mil thickness including prime coat) and coated on the reverse side with a primer coating (.25 dry mil thickness). Color to be selected from Manufacturer's standard colors. A strippable film shall be applied to the top-side of the Prefinished Sheet Metal to protect the finish during fabrication. Acceptable manufacturers shall be Vincent Metals, Peterson Aluminum, and MBCI, or equal.

Stainless Steel Sheet Metal shall be a minimum 24-gauge (unless otherwise noted in the drawings) soft annealed stainless steel sheet metal meeting FS #3042B and ASTM A 167. Finish to be a mill finish, "2-B".

"Paint Grip" Sheet Metal shall be 24-gauge (unless otherwise noted in the drawings) shall be hot dip galvanized, lock forming quality, and shall be factory phosphatized at the factory to bond paint without further treatment.

Metal "M" Panels shall be a standard "M" panel, fabricated from 24 gauge, prefinished steel panels and color coated with a Kynar 500 coating, and having a minimum warranty of 20 years from the manufacturer.

Solder for galvanized sheet metal shall be alloy grade 50A meeting ASTM B-32.

Flux for galvanized sheet metal shall be an approved standard brand.

Bituminous Coating shall be an asphaltic coating meeting FS TT-C-494.

Leads for Stack Flashings shall be a seamless 4-pound lead and have a minimum 4" flange.

Leads for Drains shall be a seamless 2 1/2 pound lead.

4.4 FASTENERS

Nails for attaching Roofing to Wood shall be galvanized annular threaded (or) ring shank nails with integrally capped heads (minimum 1" in diameter) or through tin caps.

Nails for attaching Galvanized Sheet Metal to Wood shall be large headed (3/8" - 7/16" diameter) hot dip galvanized roofing nails.

Nails for Wood Blocking and rough carpentry shall be galvanized 16d common nails.

Exposed Sheet Metal Screws (with Weatherproof Gaskets) shall be hex head self-tapping screws (galvanized for galvanized metal, stainless for stainless steel or copper metal, and color matching/coated for prefinished metal). The screws shall have EPDM sealing gaskets. The gaskets shall be protected with a metal jacket (weather guard).

Sheet Metal Screws (Not Exposed to Weathering) shall be hex head or pancake head self-tapping screws (galvanized for galvanized metal, stainless for stainless steel or copper metal).

Rivets for attaching galvanized sheet metal shall be hot dipped galvanized. Rivets for stainless steel sheet metal shall be stainless. Rivets for copper sheet metal shall be copper. Rivets for the Prefinished Sheet Metal shall be color matching.

Anchors for attaching sheet metal to masonry, concrete, stucco, or other non-wood substances shall be of similar metal and of sufficient strength to securely hold sheet metal. Anchors shall be Hilti "Metal Hit", or an approved equal. No plastic or nylon anchors shall be permitted.

Concrete Anchors for attaching structural steel supports to concrete shall be Hilti "Drop In" or Hilti "Self Drilling" anchors, or an approved equal.

Insulation Fasteners/Plates for Metal Decks shall be a minimum #12 screw type fastener/plate assembly with a minimum 3" diameter metal plate. The screw shall be of appropriate length to penetrate the metal deck a minimum of 3/4". The fastener/plate assembly shall meet the Performance Requirements for Wind Uplift, be approved by the Primary Roofing Material Manufacturer, and shall be coated for protection from corrosion.

Anchors for attaching Wood Blocking/Nailers to Metal Deck shall be minimum #12 screw type fastener (similar to insulation screw) with 5/8" o.d. galvanized steel washers under the screw head. The screw shall be coated for protection from corrosion.

4.5 WOOD AND PLYWOOD

Lumber for Nailers, Curbing, and Blocking shall be #2 yellow pine and shall be Fire Treated. Minimum width of 5-1/2" shall be provided.

Plywood shall be nominal 3/4" thick or as shown on the drawings, shall be exterior type with exterior glue grade C-D or better, shall be Fire Treated, and shall bear either APA or TECO trademarks.

4.6 ACCESSORIES

General Sealant for Sheet Metal shall be a one-component gun-grade, moisture-curing

high performance polyurethane sealant, conforming to ASTM C 920, Type S.

Pourable Sealant shall be a one-part self-leveling polyurethane sealant, conforming to ASTM C 920, Type S.

Tape Sealant shall be gray pressure sensitive tape blended of butyl and EPDM rubbers with not less than 50% butyl.

30# Felt shall be an asphalt saturated organic plain (no perforated) felt meeting ASTM D 226, Type II.

Neoprene Pads shall be Type "A"; 3/8" thick cross ribbed molded neoprene with alternately raised and lowered ribs providing uniform deflection over a load range of 25 psi to 75 psi with 1/8" minimum deflection at a recommended load rating of 50 psi. Pads shall be NeoFLEX series NNP.

Flexible Vapor Retarder shall be a cold applied, self-adhering 30-mil thick rubberized membrane. The membrane shall be composed of high strength polyethylene film coated on one side with adhesive consistency rubberized butyl with a release sheet as manufactured by Grace Construction Products (Grace Ultra) or W.R. Meadows.

Non-Shrink Grout shall be Super Por-Rok as manufactured by CGM Incorporated, Set 45 as manufactured by Master Builders, or an approved equal.

Roof Walk Pads shall be Manville Dyna-Tred or as recommended by the Primary Manufacturer.

Kettle Afterburner System and Safety Loader shall be an Afterburner System with Safety Loader as Manufactured by Reeves Roofing Equipment Co. Inc., P.O. Box 720, Helotes, Texas 1-800-383-3063, (or equal).

Roof Mounted Pipe Support System for Gas Lines and Electrical Lines shall be as manufactured by Miro Industries, Inc., 844 South 430 West, Suite 100 Heber City, UT 84032 (800) 768-6978 www.miroind.com, RoofStuff, Inc. 3626 N Hall Street, Suite 703, Dallas, Texas 75219 phone 214 224-0055, or as manufactured by Portable Pipe Hangers, 5534 Harvey Wilson Drive, Houston, Texas 77020-8017, (or equal). Pipe supports shall be the appropriate style and type to properly support the size and weight of the pipes on this project. Support bases shall be either Stainless Steel or High Density Polypropylene with UV-inhibitors.

Roof Mounted Condensate Pipe Support shall be Model SS-C-2 or SS-C-4 as manufactured by RoofStuff, Inc. 3626 N Hall Street, Suite 703, Dallas, Texas 75219 phone 214 224-0055, by Miro Industries, Inc., 844 South 430 West, Suite 100 Heber City, UT 84032, (800) 768-6978 www.miroind.com, (or equal). Pipe supports shall be the appropriate style and type to properly support the size and weight of the pipes on this project. Support bases shall be either Stainless Steel or High Density Polypropylene with UV-inhibitors.

Termination Bar shall be a standard, pre-punched aluminum termination bar as required for anchoring the top of base flashings (min. 8" o.c.) to non-nailable substrates.

4.7 PAINT:

Paint shall approximately match the existing, be designed to bond to the surface designated, be manufactured by Glidden, Sherwin Williams, (or equal).

Primer for Wood shall be a wood primer designed for use with the paint selected.

Primer for Metal shall be a metal primer designed for use with the paint selected.

4.8 PLUMBING

New Roof Drain Strainers and Clamping Rings for Existing Drains shall be universal cast iron drain strainers and clamping rings as manufactured by Zurn, Josam, or JR Smith.

Drain Pipe and Fittings shall be schedule 40 PVC or service weight cast iron pipe and fittings as required by Code.

Hangers shall be Grinnell #260 Adjustable Clevis Hangers with turnbuckles supported by 1/2 inch all thread hanger rods.

Downspout Nozzle for Overflow Drains where shown on drawings shall be a J.R. Smith Series 1770, cast bronze downspout nozzle. Equivalent Josam or Zurn downspout nozzles shall be approved as equal.

4.9 METAL DECK REPAIRS (UNIT PRICING)

Metal Decking shall be 22 gauge, galvanized narrow rib deck (or to match the existing in shape, thickness, and size) in accordance with the Steel Deck Institute.

Screws for the attachment of Metal Deck to the steel structure shall be 12-24 x 7/8" hex washer head TEK/4 cadmium plated screws by Building Fasteners Inc., Buildex, or an approved equal.

Screws for stitching ribs of Metal Deck shall be 12-14 x 3/4" TEK/1 cadmium plated screws by Building Fasteners Inc., Buildex, or an approved equal.

4.10 LIGHTNING PROTECTION

Lightning Rods (Air Terminals) to replace the missing lightning rods shall be of the same material (aluminum or copper) and of the same size as the existing lightning rod system and shall be manufactured by Thompson Lightning Protection, Inc., 901 Sibley Highway, Saint Paul, Minnesota 55118-1792, Phone Number 612-455-7661 or as approved by the Architect/Engineer.

Lightning Rod Supports and Cable Supports shall be "Adhesive Point Base" supports of the same material as the lightning rod and/or cable and shall be manufactured by Thompson Lightning Protection, Inc., 901 Sibley Highway, Saint Paul, Minnesota 55118-1792, Phone Number 612-455-7661 or as approved by the Architect/Engineer.

Lightning Rod Conductors (Cable) to replace missing shall be of the same size and material as the existing Lightning Protect System and shall be manufactured by Thompson Lightning Protection, Inc., 901 Sibley Highway, Saint Paul, Minnesota 55118-1792, Phone Number 612-455-7661 or as approved by the Architect/Engineer.

4.11 ROOF ACCESS LADDERS: (Safety cages are required on all ladders over 20 foot)

Vertical Roof Access Ladder without Cage shall be the following (or equal to) Model Number #502, Tubular Rail Low Parapet Access Ladder with Roofover Rail Extensions as Manufactured by O'Keeffe's Inc., 75 Williams Avenue, San Francisco, CA 94124-2693, (415)822-4222. All ladders shall meet or exceed OSHA requirements. Shop drawings shall be submitted prior to fabrication. Ladder shall be of aluminum construction, installed as per Manufacturer's recommendations including the following options:

- A) 1-1/4" serrated tubular aluminum rungs.
- B) Heavy Duty Tubular Side Rails.
- C) Roofover Rail Extensions.
- D) Alternate Bottom Support.
- E) Finish - Standard, Mill Finished Aluminum.
- F) 5 Year Guarantee.

5.0 QUALITY CONTROL

- 5.1 OWNER may employ a testing laboratory as deemed necessary to perform specified services and testing. Employment of the laboratory shall in no way relieve the contractor's obligation to perform work and provide materials in accordance with the contract documents.
- 5.2 The testing laboratory, if other than ROOFTECH, is not authorized to approve or accept any portion of the work, perform any of the contractor's duties, or alter the contract documents in any way.
- 5.3 Contractor shall cooperate with the laboratory, provide access to the work, secure and deliver samples, furnish copies of test reports, and provide incidental labor as required to secure samples and make repairs as required.
- 5.4 Should testing reveal any failure of the work performed to comply with the contract documents, the Contractor shall bear the cost of any additional testing required (as deemed necessary by the Architect/Engineer).

6.0 SUBMITTALS

- 6.1 All shop drawings, product data, samples, and re-submittals (if necessary) shall be submitted to the Architect/Engineer in sufficient time (minimum 5-working days from receipt of submittal) for review.
- 6.2 All submittal items shall be properly indexed and numbered. All submittals shall contain the date of submission, project title, name of contractor, and manufacturer, applicable specification section, identification of deviations from Contract Documents, and clearly identified field dimensions where applicable.
- 6.3 Shop Drawings shall be presented in a clear and thorough manner to clearly illustrate the work and that work to be performed will be in conformance to the Contract Documents.

Please note that detailed shop drawings are only required if the contractor proposes a change to the Contract Documents.

- 6.4 Samples shall be submitted in sufficient size to clearly illustrate its function and utility.
- 6.5 Product Data shall clearly illustrate compliance with the Contract Documents.
- 6.6 The Submittals shall include, but not be limited to the following:
 - A. **ROOFING CONTRACTOR'S QUALIFICATION LETTER:** Provide a letter from the Primary Roofing Material Manufacturer that states the Roofing Contractor is approved to apply the designated roofing system qualifying for the specified Primary Roofing Material Manufacturer's NDL Warranty. The Roofing Contractor shall have had at least 3-years experience as a Roofing Contractor for the Primary Roofing Material Manufacturer.
 - B. **ROOFING MATERIAL/WARRANTY LETTER:** Provide a letter from the Primary Roofing Material Manufacturer approving the use of all roofing materials (regardless of manufacturer) used in conjunction with the roofing assembly (from deck up). The letter shall specifically approve the use of all materials that are not manufactured by the Primary Roofing Material Manufacturer and shall state that all materials shall be covered under the specified Primary Roofing Material Manufacturer's NDL Warranty.
 - C. **ROOFING SYSTEM LETTER – TESTED ASSEMBLY:** Provide a letter from the Primary Roofing Material Manufacturer stating that the roofing system (from deck up) and (as submitted) is a tested roofing assembly meeting the specified Performance Requirements for Wind Uplift. The letter shall specifically include applicable fastener patterns and supporting data clearly illustrating conformance to Performance Requirements for Wind Uplift.
 - D. **Product Data Sheet** for all materials listed in Section 4.0 of this Specification. If a Product Data Sheet is not available for a particular item, the Contractor shall list the item and state, in writing, that the item/material will meet the specifications.
 - E. A Product Safety Data Bulletin on each applicable product.
 - F. A sample copy of all warranties required on the project, including but not limited to the Primary Roofing Manufacturer NDL Warranty, the Contractor's Warranty, and the Sheet Metal Finish Warranty.
 - G. Certificate of Insurance for all insurance listed in the Supplementary Conditions.
 - H. **Shop Drawings:** Detailed shop drawings are only required if the contractor proposes a change to the details as shown in the Contract Documents.
 - I. Shop drawings showing the tapered insulation layout.

- 6.7 Mock-ups of sheet metal and flashing transitions and terminations as noted on the plans and/or requested by the Architect/Engineer. The “mock ups” do not have to be submitted prior to the Preconstruction Conference but must be submitted in sufficient time to review and resubmit, if necessary, prior to the installation of these transitions.

7.0 PERFORMANCE

- 7.1 Any damages resulting from failure of the contractor to maintain the work area, including areas under construction, areas of storage, and areas used for access, in a water tight condition shall be the full responsibility of the contractor. The costs resulting from damage (including the Owner’s time/material loss), shall be charged to the Contractor.
- 7.2 Extreme care shall be taken when removing loose gravel (if applicable) and working over the existing roof surface. Consideration shall be made for the potential damage to the existing roof system and decking. Contractor shall use reasonable care in transporting materials across the existing roof surface. Extreme care shall be taken to prevent damage to the existing roof surface. Contractor shall minimize the use of any portion of the existing roof surface. Contractor shall protect all roof surfaces exposed to any more than casual foot traffic with no less than 1 layer of 1" thick polyisocyanurate insulation installed directly on the roof surface and an overlay of ¾" plywood. Contractor shall make permanent repairs to the existing roof system, if damaged.
- 7.3 There shall be sufficient material, labor, equipment, and any other items required to insure complete and proper reroofing each day.
- 7.4 Extreme care shall be taken to protect the new roofing and insulation. A watertight "Tie-In" shall be installed between the new roof and the existing roof, upon completion of each day’s work. Completely remove the “Tie-In” before beginning the next day’s work.
- 7.5 Roof Top Storage/Staging (if utilized): If roof top storage/staging is utilized, all material, debris, equipment must be distributed across the roof deck to avoid damage to the structural deck. Contractor assumes full responsibility for loading on the structural deck of roofing materials during the reroofing operations. Architect/Engineer reserves the right to reject any loadings deemed unacceptable.
- 7.6 Contractor shall use reasonable care in transporting materials across the new/finished roof surface. Extreme care shall be taken to prevent damage to the new/finished roof surface. Contractor shall minimize the use of any portion of the new/finished roof surface. Contractor shall protect all roof surfaces exposed to any more than casual foot traffic with no less than 1 layer of 1" thick polyisocyanurate insulation installed directly on the roof surface and an overlay of ¾" plywood. Contractor shall make permanent repairs to the new/finished roof surface if damaged.
- 7.7 Contractor shall note the building will be occupied and operated as an on-going business and will restrict his activities to the areas specified by the Owner.
- 7.8 Contractor shall maintain the job site in a safe, clean, and orderly fashion at all times. All doors and exits shall be made safe and secure from any possibility of falling debris or danger from any work associated with this project. PROPER AND ADEQUATE EGRESS

TO AND FROM THE BUILDING SHALL BE MAINTAINED AT ALL TIMES.

- 7.9 Upon completion of the roofing work the contractor shall thoroughly clean the area of all trash, debris, dust, dirt, etc. resulting from the contractor's work. In addition, all Roof Top HVAC units shall be washed off with potable water.
- 7.10 Contractor shall provide latrines and other necessary facilities, as is required. Contractor's employees will not be allowed to use building facilities.
- 7.11 Except for modifications as called for in the details and specifications, the contractor shall return all items attached or affixed to the roof to their approximate original position, and said items shall be in the same condition as they were at commencement of work.
- 7.12 The Contractor shall install and maintain all required storage enclosures and safeguards. The Contractor shall comply with the Owner's safety standards. Storage areas, where hazardous or potentially hazardous products or equipment is stored, shall be restricted to general access. This requirement shall apply to all kettle staging areas, if kettles are to be utilized for the project.
- 7.13 Rooftop hoisting equipment shall be properly assembled and maintained. Only persons that are thoroughly familiar with hoisting equipment shall operate such equipment. All such equipment shall be erected and supported so that it will not damage the existing structural deck or roofing systems.
- 7.14 Debris shall be removed by appropriate means, and in a safe/orderly manner. All roof debris becomes the property of the Contractor. Contractor shall be responsible for the lawful removal and disposal of all trash and debris.
- 7.15 Contractor shall maintain sufficient equipment, materials, and man power on the job site so as to replace any rotted decking/curbing, or to make deck repairs as required.
- 7.16 Contractor shall employ only orderly and competent workers, skillful in the performance of the type work required.
- 7.17 Contractor shall erect all required roof barriers and safety lines as required by OSHA and comply with OSHA regulations for safety.
- 7.18 Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work included in the Construction Documents. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:
 - A. Contractor's Employees and other persons who may be affected thereby;
 - B. The Work and materials and equipment to be incorporated therein; and
 - C. Other property at the site or adjacent thereto.
- 7.19 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on safety of persons and property and their protection from damage, injury, or loss. The Contractor shall promptly

remedy damage and loss to property at the site caused in whole or in part by the Contractor, any Subcontractor, or anyone directly or indirectly employed by them, or by anyone for whose acts they may be liable and for which the Contractor is responsible.

- 7.20 Contractor shall comply with the most current (Occupational Safety and Health Administration) OSHA requirements as to the proper implementation of safety equipment as deemed necessary by such requirements for all employees of the Contractor working on the Site, any Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible. In addition, the Contractor shall provide at all times a minimum of three (3) complete additional safety equipment units, i.e. harnesses, rigging gear, hardhats, etc., as deemed necessary by the OSHA requirements for all workers. The three- (3) additional units are for the use by the Owner, Owners' Representatives, Architect, Engineer, and A/E Roof Observers.
- 7.21 Contractor shall verify location of all roof-top fresh air intakes for the building. Contractor shall cover all fresh air intakes while roof replacement work is being performed in the area around the fresh air intakes. Coordinate this work with the Owner.
- 7.22 Fire Extinguishers – Contractor shall provide one (1) fire extinguisher for each kettle on the project plus one (1) additional fire extinguisher per every 100 squares of roofing area. All fire extinguishers shall be a minimum of 25 lbs.
- 7.23 Landscaping – Upon completion of the project, the Contractor shall repair all damage to the existing landscaping resulting from the Contractor's work. The repair shall include all damaged plants, trees, sod, sprinkler heads/lines, concrete sidewalks/curbs, asphalt pavement, etc. The repair shall restore the damaged area to match the existing condition prior to the commencement of the project.

8.0 ENVIRONMENTAL

- 8.1 No roofing work shall be performed below 40 degrees, when the wind chill factor is below 40 degrees, or when rain is eminent (30% chance or greater). No roofing shall be performed when the average wind is above 25 mph without written permission from the Architect/Engineer. No roofing work shall be performed 30 minutes prior to sundown. The roof deck shall be dry and free from any moisture, ice, or other deleterious materials prior to roofing.
- 8.2 All materials susceptible to moisture shall be protected in dry, above ground, watertight storage. ALL ROLL GOODS, INSULATION, CANT STRIP, AND TAPERED EDGE SHALL BE STORED IN WATER TIGHT, ENCLOSED TRAILERS, and these materials shall be loaded onto the roof on a daily basis. Exterior storage is also acceptable as long as the materials are properly palletted, tarped with breathable tarps, and properly secured against the wind. Plastic “shrink-wrapped” materials are not considered properly protected. All labels shall be intact and legible, clearly showing the product, manufacturer, and other pertinent information.
- 8.3 Any materials that are susceptible to moisture that become wet or damaged will be rejected and shall be immediately removed from the job site. Any materials found to be improperly

stored shall be considered wet and removed from the job site.

- 8.4 Asphalt shall not be heated above 500 degrees Fahrenheit. Asphalt, stored in tankers, shall be stored at a maximum of 350 degrees Fahrenheit.
- 8.5 Kettles shall be thermostatically controlled and equipped with a working, readable thermometer. An additional calibrated thermometer shall be maintained at the job site to periodically test the kettle thermometer.
- 8.6 Kettles shall have an Afterburner System with Safety Loader for each kettle on the project.

9.0 DECK REPAIRS:

- 9.1 General: The entire roof deck shall conform to the requirements of the Primary Roofing Material Manufacturer, the National Roofing Contractor's Association, the Local Building Code, and these Contract Documents, the most restrictive applying. Any damaged or deteriorated decking shall be replaced.
- 9.2 Abandoned Equipment: All abandoned equipment shall be removed. All deck openings shall be closed/repared with appropriate deck repair materials/methods.

9.3 METAL DECKS:

- A. All damaged or deteriorated metal decking shall be neatly covered with new metal decking matching the existing profile and overlapping onto existing sound metal decking a minimum of 12" and secured by means of appropriate mechanical fasteners. Metal decking shall be attached 6" o.c. at each bar joist and 12" o.c. down each lap.
- B. Holes less than 12" in Diameter: Install 18 gauge galvanized sheet metal plate over the opening and spanning a minimum of 4" beyond the opening in all directions. Secure the sheet metal plate to the deck.

10.0 INSULATION INSTALLATION:

- 10.1 General: Insulation shall be installed in strict accordance with the recommendations and requirements of the Primary Roofing Material Manufacturer, the recommendations of the National Roofing Contractor Association (NRCA), the Performance Requirements for Wind Uplift, and these Contract Documents, the most restrictive applying. All roofing materials shall be as described in Section 4.0 MATERIALS and shall be provided and/or approved by the Primary Roofing Material Manufacturer. Phased application is not acceptable. No more roofing, flashing, or insulation shall be removed than can be completely replaced within the same day.
- 10.2 Metal Decks: Insulation shall be installed in 2 layers, the first layer being mechanically attached to the decking. The second layer of insulation shall be adhered in a continuous and even mopping of asphalt applied at the MINIMUM rate of 30 pounds per 100 square feet (minimum 30 lbs/100 SF). All joints between the first and second layers of insulation shall be staggered a minimum six inches (6"). All end joints shall be staggered a minimum six inches (6"). The insulation pattern shall not vary once it has been established. Tie-ins

shall be continuously staggered so there are no continuous joints through the layers of insulation. All joints shall be tight, smooth, and flush, and there shall be no voids or gaps between the insulation boards.

- 10.3 Cricket Installation: Install crickets where indicated on the drawings. Beginning at the low edge of the cricket, solidly adhere tapered insulation to the top layer of insulation in a continuous layer of Type III asphalt applied at the approximate rate of 30 pounds per 100 square feet (30lbs/100sf). Stagger all joints, Cut, and fit pieces tightly and neatly so as to provide a continuous, smooth, and even substrate for the roofing.
- 10.4 Tapered Insulation: Carefully lay out the insulation pattern in accordance with the approved shop drawings. Verify that there is a positive slope to all drains and/or edges of roof designed for drainage. Beginning at the low downhill edge of the roof, uniformly and evenly embed the tapered insulation in a continuous and even mopping of asphalt (applied to the first layer of insulation) at the approximate rate of thirty pounds per one hundred square feet (30 lbs/100SF). All joints between the first layer of insulation and the tapered insulation shall be staggered a minimum six inches (6"). All end joints shall be staggered a minimum six inches (6"). The insulation pattern shall not vary once it has been established. Tie-ins shall be continuously staggered so there are no continuous joints through the layers of insulation. All joints shall be tight, smooth, and flush; there shall be no voids or gaps between the insulation boards, and there shall be uniform and slope to the drains.

11.0 MEMBRANE INSTALLATION:

- 11.1 General: Membrane Roofing shall be installed in strict accordance with the recommendations and requirements of the Primary Roofing Material Manufacturer, the recommendations of the National Roofing Contractor Association (NRCA), the Performance Requirements for Wind Uplift, and these Contract Documents, the most restrictive applying. All roofing materials shall be as described in Section 4.0 MATERIALS and shall be provided and/or approved by the Primary Roofing Material Manufacturer. Phased application is not acceptable. No more roofing, flashing, or insulation shall be removed than can be completely replaced within the same day.
- 11.2 Beginning at the low, downhill edge of the roof install four (4) plies of felt in shingle fashion in a uniform and continuous layer of bitumen applied at the approximate rate of 23 to 25 lbs./square/ply or as required by the Primary Roofing Material Manufacturer. The application temperature shall be approximately 400 degrees Fahrenheit or as required to maintain the proper interply mopping weight. Overlapping shall be such that there is no less than 4 plies in any area, and there is a 2" head lap and an 8 1/2" exposure of the felt.
- 11.3 Care shall be taken to avoid any traffic on the felts until the asphalt has set or chilled sufficiently to support traffic without displacing the asphalt between the plies. Care shall be taken to avoid wrinkles or fish mouths in the membrane during application. Should a fish mouth occur, it should be immediately cut and sealed. Two layers of felt shall be immediately installed extending a minimum 6" beyond the cut.
- 11.4 A watertight "Tie-In" shall be installed between the new roof and the existing roof, upon completion of each day's work. The watertight "Tie-In" shall be installed in accordance with the Primary Roofing Material Manufacturer's requirements, but with no less than two plies of #15 organic felt set in asphalt/plastic cement. Completely remove the "Tie-In"

before beginning the next day's work.

12.0 MEMBRANE FLASHINGS:

- 12.1 General: Membrane Flashings shall be installed in strict accordance with the recommendations and requirements of the Primary Roofing Material Manufacturer, the recommendations of the National Roofing Contractor Association (NRCA), the Performance Requirements for Wind Uplift, and these Contract Documents, the most restrictive applying. All roofing materials shall be as described in Section 4.0 MATERIALS and shall be provided and/or approved by the Primary Roofing Material Manufacturer. Phased application is not acceptable. No more roofing, flashing, or insulation shall be removed than can be completely replaced within the same day.
- 12.2 Preparation: Remove all loose, unattached, and/or deteriorated flashing materials or any other material deleterious to attachment of new flashings.
- 12.3 Primer: Prime all masonry, metal, mineral board, or concrete surfaces from the top of the roof membrane to the termination of the flashing level with asphalt primer at the rate of 1.0 gallon per 100sf or as recommended by the Primary Roofing Material Manufacturer. Allow the primer to dry thoroughly.
- 12.4 Membrane Flashing at Walls and Curbs shall consist of 1 ply of roofing felt set in hot asphalt and 1 layer of granular surfaced modified bitumen flashing membrane (set in hot asphalt) as recommended by the Primary Roofing Material Manufacturer. Membrane base flashings at walls and curbs shall extend a minimum of six (6") inches onto the flat of the roof and to a minimum of eight (8") inches above the roof unless otherwise indicated in the drawings. Cut Membrane flashing material into workable (maximum 8'-0") lengths. Back mop all walls and curbs and back mop membrane-flashing material and immediately install membrane flashing. Back mop all laps. At all nailable substrates, the top of the base flashing shall be nailed a minimum of eight (8") inches on center. At all non-nailable substrates, the top of the base flashing shall be secured with a termination bar with anchors installed a minimum of eight (8") inches on center. The top of all membrane flashings shall extend a minimum of two (2") inches under a metal counter flashing or coping unless otherwise indicated on the drawings. The top of all membrane flashings shall be properly sealed with plastic cement and fiberglass membrane (3-course), unless shown otherwise in the drawings.
- 12.5 Membrane Flashings at Metal Flanges: All flange type flashings shall be primed, set in mastic (approximately 1/8" thick), and stagger nailed 3 inches on center. The flange shall be stripped in with minimum 4 plies of roof felt set in hot asphalt or 2 layers of roofing felt set in hot asphalt and 1 layer of granular surfaced modified bitumen set in hot asphalt.
- 12.6 Membrane Flashings at Drains: The membrane roofing, lead flashing, and membrane flashings (strip-in) shall extend into the drain bowl. Prime the lead flashing on both sides set the lead flashing in plastic cement and tightly mold it to the roof and drain bowl. The lead flashing shall then be stripped in with a minimum 2 plies of roof felt set in hot bitumen. Extreme care shall be taken to ensure a watertight flashing. Tightly bolt the clamping ring to the drain so as to securely seal the flashings together at the drain to provide a watertight connection. Properly install and secure the drain strainer.

12.7 Flashing Location: Flashings shall be located so as to provide access for maintenance. Flashings shall not be closer than 18 inches from other flashings and be situated so no flashing interferes with another. Any penetration that does not meet the spacing requirement of 18" for proper flashing separation shall be relocated to allow for proper flashing separation.

12.8 All flashings and details shall conform to the Contract Documents. Upon completion of the work, all penetrations, equipment mounts, etc. shall be examined to verify compliance to these documents.

13.0 CORRECTIVE ACTION:

13.1 All corrective action shall be approved in writing from the Primary Roofing Material Manufacturer.

13.2 A minimum of two (2) plies of felt shall be mopped over all areas found to be deficient unless testing results require complete removal of the roofing membrane. Voids greater than 1 1/2", dry spots greater than 1/4", and interply mopping less than eighteen pounds per 100 square foot (18 lbs/100SF) shall constitute deficiencies. Voids which extend through multiple plies shall be repaired by cutting the void through the multiple plies and mopping the same number of multiple plies over the deficient area. Any areas with less than the required number of plies shall be covered with the number of missing plies plus an additional ply, (e.g. if the sample indicates there are 3 plies on a 4 ply system, then the missing ply plus one (1) ply -- making a total of two (2) plies -- shall be installed). Remove and replace all roofing with more than forty pounds of interply mopping per hundred square feet per ply (40 lbs/100 SF/ply).

13.3 No phased application will be accepted and no roofing installed during inclement weather conditions will be accepted. This will constitute deficiencies, and all roofing will be removed down to the substrate and replaced.

14.0 SURFACING

14.1 The roofing membrane shall be left unsurfaced until test results are completed, and the roof has been approved by the Architect/Engineer for surfacing.

14.2 Gravel Surfacing: Upon receipt of written approval by the Architect/Engineer, completely and uniformly embed aggregate to completely and uniformly cover the roof surface (minimum 400 lbs/100 square feet) in a uniform and even pouring of bitumen at the rate of 60 lbs/100 square feet. Aggregate shall be raked smooth so as to completely and uniformly cover the flood coat.

15.0 SHEET METAL

15.1 General: All work shall be in accordance with SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc.), NRCA (National Roofing Contractors Association), and these Contract Documents, the most restrictive standard applying.

- 15.2 Protection: Exercise extreme care when working on roof surfaces to avoid damaging or puncturing the roof membrane or membrane flashings.
- 15.3 Expansion & Contraction: Provide for expansion and contraction for all sheet metal components/accessories.
- 15.4 Seams & Joints - Sheet Metal Gravel Guards, Fascia, and Edge Metal: Sheet metal shall be installed in maximum 10'-0" sections/lengths with a 1/4" space between each section. The 1/4" space/joint shall be protected with a centered, 6" wide cover plate.
- 15.5 Seams & Joints – Sheet Metal Receivers and Counter Flashings: Sheet metal shall be installed in maximum 10'-0" sections/lengths with a 3" overlap provided at each joint.
- 15.6 Seams and Joints – Sheet Metal Copings: Sheet metal shall be installed in maximum 10'-0" sections/lengths with 1" tall standing seams that are folded down at a 45-degree angle at the edge of the coping. Standing seams shall be cleated to the substrate (as shown in the drawings). 1" tall standing seams are required at all coping corners, coping intersections, and at changes in coping width.
- 15.7 Seams & Joints – Sheet Metal Gutters: Seams in gutters shall be overlapped 1", riveted 2" o.c., and sealed so as to form a watertight joint. Gutter Expansion Joints shall be installed as details with riveted and sealed joints.
- 15.8 Seams & Joints – Sheet Metal Pitch Pans and Vents: Seams/Joints at all pitch pans, pitch pan covers, and vents shall be riveted and soldered watertight. All pitch pan bases shall have a continuous flange. All pitch pans shall have a removable watertight cover. Pitch pan covers shall be installed to protect the pitch pan sealant from direct UV light.
- 15.9 Back Painting: Back paint flashings with bituminous paint where sheet metal is expected to be in contact with cementitious materials or dissimilar metals.
- 15.10 Fabrication: All sections shall be square, true, and accurate to size, and free from distortion. Lines shall be straight, true, and free from distortion. All edges shall be neatly hemmed.
- 15.11 Installation: Sheet metal shall fit tight in place with square corners, surfaces straight in planes, and lines accurate to profiles. Sheet metal shall be fabricated and installed so flashings will properly shed water and protect underlying membranes from physical damage and water penetration.
- 15.12 Soldering: All soldered joints shall be watertight. All soldered joints shall be lapped and riveted prior to soldering. Wipe and wash clean immediately after soldering to remove all traces of flux.
- 15.13 Sealant Installation: Continuously and uniformly apply sealant to all areas vulnerable to water entry.
- 15.14 Dissimilar Metals: No dissimilar metals shall come into contact with each other. Use

only fasteners and other metal components that are compatible with the metal type being secured.

- 15.15 All sheet metal flashings shall be continuous at all corners and transitions. Counter flashings shall extend a minimum of 2" beyond the termination of the membrane flashing, and the exposed end shall be appropriately hemmed and sealed as required. Mitered terminations, transitions, and corners shall be used so as to provide a continuous flashing system including both the sheet metal counter flashing and membrane base flashing. All ends and junctures between flashings of different height, types, etc. shall be neatly finished so as no edges of roofing, insulation, cant strip, blocking, flashing, etc. are exposed.
- 15.16 Prefinished Sheet Metal: Remove all strippable film from the top surface of all prefinished sheet metal before installation. Prefinished metal shall not be soldered.
- 15.17 Hat Sections: Anchor Hat Sections into concrete substrates by staggering anchor 24" o.c. Top and Bottom of flanges. Anchor Hat Sections to vertical steel structural members in Top and Bottom flange, where applicable.
- 15.18 "M" Panels shall be installed in accordance with the manufacturer's recommendations. Panels shall be fastened 12" o.c. top and bottom. Laps shall be stitched together with #10 sheet metal screws at 18" o.c. An intermediate row of fasteners shall be installed at 2'-0" intervals and fasteners shall be 12" o.c.

16.0 LIGHTNING PROTECTION:

- 16.1 General: The Lightning Protection System shall be made to comply with applicable standards established by the National Fire Protection Association, Underwriters Laboratories, Inc. and the Lightning Protection Institute. This shall include replacing damaged or missing Lightning Rods and other associated Lightning Protection Equipment as required. It is not the intent of this project to re-certify the existing lightning protection system. It is not the intent of this project to "extend" or "add to" the coverage area of the existing Lightning Protection System.
- 16.2 Completion: Upon completion of the work, the Contractor shall provide a letter from the Lightning Protection Installer which states that the existing lightning protection system (in the area of roof replacement only) has been installed in order to comply with applicable standards established by the National Fire Protection Association, Underwriters Laboratories, Inc. and the Lightning Protection Institute.

17.0 ROUGH CARPENTRY

- 17.1 Install miscellaneous blocking, cants, nailing strips, framing and sheathing members true, plumb, and level. Construct members of continuous pieces of longest possible lengths. Rough carpentry shall be securely anchored to the structure so as to resist a force of 100 lbs./LF in any direction. Fasteners shall be spaced no more than 4'-0" apart and not less than 2 fasteners per board shall be used. All nailers/blocking, for attachment of sheet metal flange-type flashings, shall be installed in conjunction with the insulation, prior to the installation of the roofing membrane.

- 17.2 Install plywood sheathing to existing wall construction by anchoring the plywood sheathing top and bottom with anchors 12" o.c.. Intermediate rows of anchors shall be installed every 2'-0" horizontally with fasteners spaced 12" o.c. Plywood should be installed in the longest possible lengths.
- 17.3 Wood Blocking/Nailers shall be anchored to the metal deck with two (2) rows of anchors staggered 24" o.c. Provide washers under the screw head and countersink anchors and washers. No less than two anchors shall be required per board.

18.0 MECHANICAL/ELECTRICAL

- 18.1 General: All work shall conform to the requirements of the Local Building Code, Uniform Mechanical Code, National Electric Code, and Underwriters Laboratory. All equipment shall be installed or reinstalled in accordance with the Manufacturer's Requirements and shall be fully operable and functional upon completion.
- 18.2 Raising Existing Roof Mounted/Supported Mechanical Units/Curbs/Vents: Existing roof mounted units/curbs/vents shall be raised as required to install roofing, flashings, and new curbs (if applicable) in accordance with the Contract Documents. Extreme care shall be taken to prevent damage to the units. All support lines/conduits (gas, electrical, steam, ammonia, Freon, etc.) servicing the units shall be properly disconnected in order to facilitate moving the unit. Coordinate with the Owner, and notify the Owner and Architect/Engineer at least 48-hours before disconnecting any mechanical unit. All units disconnected shall be reconnected and be fully operational at the end of the same working day.
- 18.3 Pitch Pan Supports and Flashings: There shall be no pitch pan supports or flashings unless specifically indicated on the drawings. Any pitch pan used shall have a removable watertight cover.
- 18.4 Minimum Curb Height Requirements: Curb heights shall be a minimum of 8" unless indicated otherwise in the drawings.
- 18.5 Equipment Height Requirements: Any equipment that obstructs the reroofing, flashing installation, or future maintenance of areas in, under, and around equipment shall be raised to permit proper work.
- 18.6 Pipe Supports for Roof Top Conduit (Gas, Electrical, Condensate, etc.): All roof top conduit shall be properly supported using pipe supports specifically designed to support the conduit from the surface of the roof without penetrating the roof. There shall be a pipe support no further than eight feet on center (8' o.c.) and a pipe support at each turn or bend in the pipe. Pipe supports system shall be designed and installed in accordance with the requirements of the manufacturer of the pipe support system.
- 18.7 Tolerances (Flashing Location) for Roof Penetrations: Flashings shall be located so as to provide access for maintenance. Flashings shall not be closer than 18 inches from other flashings and be situated so no flashing interferes with another. Any penetration that does not meet the spacing requirement of 18" for proper flashing separation shall be relocated to allow for proper flashing separation.

19.0 PLUMBING

- 19.1: General: all plumbing shall be in strict accordance with the requirements of the Local Building Code, and Uniform Plumbing Code.
- 19.2 Existing Drains: All existing drains shall be adjusted to fit the elevation of the new roof surface so as to promote drainage. On insulated decks only, drains shall be recessed in a sump, formed by using tapered insulation to reduce the depth of insulation at the drain. New cast iron strainers and clamping rings shall be installed.
- 19.3 Existing Roof Drains and New Drain Lines: All drains and drain lines shall be properly cleaned out and cleared so as to cause the drains to flow freely. Cleaning out drains and drain lines shall be performed by installing a Plumber's "Drain Snake" or "Roto Rooter" in the drain lines in order to clean out and clear the drain lines. If the drains or drain lines cannot be cleared after 30 minutes of effort, additional remedial work may be required in order to clear the drain lines. Additional remedial work shall be performed under the Change Order provisions of the Contract.
- 19.4 Drain Pipe: Drainpipe shall slope a minimum of 1/4" per foot. PVC drainpipes shall be securely supported a not further apart than four feet on center (4'-0" o/c.). Cast Iron drainpipes shall be securely supported no further apart than five feet on center (5'-0" o/c.) except where pipe lengths exceed ten feet (10'-0"), in which case ten-foot centers (10'-0" o/c.) are acceptable. Anchors shall be securely anchored to the structure. All fittings shall be watertight.
- 19.5 Termination: Where shown on the drawings, drainpipe shall be extended through the walls and terminated into a new conductor head and downspout. Holes shall be neatly drilled only as large as required for the pipe to fit neatly through the hole. Continuously and uniformly apply sealant to both the inside and outside penetration. A sheet metal closure shall be installed on both sides.

20.0 PAINTING:

- 20.1 Paint designated galvanized and/or paint-grip sheet metal surfaces only where indicated in the drawings.
- 20.2 Thoroughly clean all surfaces until free from dirt, oil, and grease. Wash non-treated galvanized surfaces to remove the flux and prepare the galvanized surfaces to receive the primer and paint. Remove all loose paint from existing painted surfaces.
- 20.3 Prime galvanized surfaces in strict accordance with the manufacturer's written recommendations. Primer shall be uniformly and evenly applied to all surfaces to receive paint. Allow primer to thoroughly dry before applying paint.
- 20.4 Uniformly and evenly apply 2 coats of paint in strict accordance with the manufacturer's recommendations. Allow 24 hours between coats of paint. Paint shall be uniform, even, and free of flaws.

21.0 ABANDONED EQUIPMENT:

- 21.1 General: All abandoned equipment, vents, stacks, or other penetrations no longer necessary as shown on the drawings or as determined by the Owner shall be removed. The roof deck shall be repaired, and the area reroofed in accordance with the Contract Documents.

22.0 CLEANING

- 22.1 Clean all soiled areas and remove bituminous markings from finished surfaces. Consult Manufacturers products and services for advice and conform to their instructions.

23.0 WARRANTIES

- 23.1 Primary Roofing Material Manufacturer's Warranty: Upon completion of the roof, the contractor shall provide the Owner a 20-Year NDL Warranty for both Materials and Labor with no limit to the Penal Sum from the Primary Roofing Material Manufacturer as published in their latest literature.

- 23.2 Contractor's Warranty: In addition, the contractor shall provide a notarized document from an authorized agent on company letterhead stating the following:

The building, roofing membrane, metal panels, sealant work (if applicable) and flashings are in conformance with all the requirements of the primary roofing material manufacturer and qualify for the _____ guarantee (maximum guarantee available) from the _____
(Primary roofing material manufacturer selected).

In addition, should deficiencies (blisters, splits, etc.) and/or leaks occur within the first five years, the contractor shall make repairs as required to maintain the building in watertight condition, in conformance with the requirements in these contract documents, and the requirements of the primary roofing material manufacturer.

Repairs shall be made in a permanent manner in conformance with the standards provided in this document. Any defect causing a leak shall be corrected.

Damage resulting from hurricane force winds, hail, fire, unusual structural movement, structural failure, and abuse are excluded from this agreement.

This agreement in no way absolves the Contractor or Primary Roofing Material Manufacturer from any implied or expressed warranties or fitness for purpose.

- 23.3 Prefinished Metal Warranty: Upon completion, the Contractor shall provide a 20-Year warranty from the Prefinished Sheet Metal Manufacturer covering the finish on the prefinished sheet metal.
- 23.4 Ladder Manufacturer's Warranty: Provide a 5 Year Warranty from the Ladder Manufacturer covering defects in materials.

23.5 Lightning Protection: Upon completion of the work, the Contractor shall provide a letter from the Lightning Protection Installer which states that the existing lightning protection system (in the area of roof replacement only) has been installed in order to comply with applicable standards established by the National Fire Protection Association, Underwriters Laboratories, Inc. and the Lightning Protection Institute. It is not the intent of this project to re-certify the existing lightning protection system. It is not the intent of this project to “extend” or “add to” the coverage area of the existing Lightning Protection System.

24.0 WARRANTIES

24.1 Contractor shall provide 10 inch x 12-inch (minimum) painted signs made of aluminum with a dark color background and letters of contrasting color. Use paints compatible with the aluminum. Permanently post signs at all access points leading to the roofs and prominent points on the roofs. Provide at least one sign on each major roof area with no more than four signs per building. Make the sign to read as follows:

DO NOT MAKE
REPAIRS OR ALTERATIONS
TO THIS ROOF
WITHOUT APPROVAL
FROM THE DIRECTOR OF
OPERATIONS AND MAINTENANCE OFFICE

This roof is guaranteed until (1) by:

PRIMARY ROOFING MATERIAL MANUFACTURER (2)
Address
City, State, Zip Code
Phone: Area Code/Number
Guarantee # (3)

The Roofing Contractor was:

ROOFING CONTRACTOR (4)
Address
City, State, Zip Code
Phone: Area Code/Number

SIGNS TO BE POSTED AS DESIGNATED BY OWNER

- (1) Insert month and year (__ years after final acceptance date)
- (2) Insert the Primary Roofing Material Manufacturer's name, address and phone number.
- (3) Insert the Primary Roofing Material Manufacturer's Guaranty Number
- (4) Insert the Contractor's name, address and phone number.

THIS CONCLUDES THIS SECTION