Oceanside Unified School District
Bond Construction Management Office
2111 Mission Avenue – Bldg. E
Oceanside, CA 92058
(760) 966-4069

Date: March 11, 2021

Subject: **El Camino High School**
**Drama Classroom Roofing – EDR 07**
400 Rancho Del Oro Drive
Oceanside, CA 92057

## OUSD Bid No.: 2021-21-24B

## Project Number: 872-722

## FINAL ADDENDUM (ADD1)

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The following changes, omissions and/or additions to the Construction Contract Documents shall apply to bid proposals made for and to the execution of the various parts of the work affected thereby, and all other conditions shall remain the same.

All parties of interest shall take careful note of the Addendum so that the proper allowances may be made in strict accordance with the Addendum and that all trades shall be fully advised in the performance of the work, which will be required of them.

Bidder shall acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.

In case of conflict between any Drawings, Project Manual and this Addendum, this Addendum shall govern.

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**ITEM 1:** **SPECIFICATION**

A. Replace 072500, 073213, 074100, 075500, 075700 with the provided **074216**.Refer to revised specification attached via email and found at the below link.

https://www.dropbox.com/sh/ulldjmq9je9n71q/AADyMU2frjN8P6nW83fxTo-Ia?dl=0

**ITEM 2:** **PRE-BID REQUESTS FOR INFORMATION**

A. The below noted bid-RFIs have been received during the bidding period and attached with responses, which shall be construed as a part of the Contract Documents (refer to attachment ADD1-02).

**ITEM 3:** **APPROVED INSTALLERS**

A. Certified installers provided by The Garland Company (refer to attachment ADD1-03). Also attached via email and uploaded to the below link.

https://www.dropbox.com/sh/ulldjmq9je9n71q/AADyMU2frjN8P6nW83fxTo-Ia?dl=0

**END OF FINAL ADDENDUM**

ADD1-02

# PRE-BID REQUESTS FOR INFORMATION

RFI 01: After reviewing the bid docs for this project I did not notice a Lead & Asbestos Report. Is there a report?

RFI 01 Answer: Lead and Asbestos Inspection is scheduled for 03/12/21, report is forthcoming.

RFI 02: Is there a list of certified installers for Garland?

RFI 02 Answer: Yes, list of certified installers for Garland Company is attached – refer to ADD1-03.

RFI 03: Who will remove the T-Mobile equipment on the roof?

RFI 03 Answer: Prime Contractor to remove from roof and store in adjacent mechanical yard. T&M for labor and billed from owner allowance.

RFI 04: Is the roof hatch being replaced?

RFI 04 Answer: Yes, the roof hatch is to be replaced – pricing included in base bid.

**(End of Document)**

ADD1-03

# Garland Approved Roofing Contractors

System Type: Modified BUR

| Contractor | Contact | Phone | Email |
|---|---|---|---|
| A Good Roofer | Mark Miller | 619-847-7150 | mark@agoodrooferinc.com |
| Best Contracting | Matt Adab | 310-380-6060 | madab@bestcontracting.com<br>rgarcia@bestcontracting.com |
| Boyce Roofing | Jim Boyce | 760-583-9326 | boyceroofing@hotmail.com |
| ChapmanCoast | Rogie Cabral | 714-738-6611 | rogie@chapmancoastroof.com |
| CI | Charlie Walters | 619-465-3739 | charlie@ciroof.com |
| Exbon Development | Peter An | 909-670-5690 | peter.an@exbon.com |
| Letner Roofing | Jesus Ramirez | 714-633-0030 | jramirez@letner.com |
| Preman Roofing | Tom Smith | 619-276-1700 | tom@premanroofing.com |
| R&R | Woody Jasso | 951-264-9207 | menifeeroofing@yahoo.com |
| Roof Construction | Suny Harrington | 760-703-3526 | sunny@roofconstruction.com |
| San Marino Roofing | Mike Sanabria | 714-833-7229 | mike@sanmarinoroof.com |
| Sylvester Roofing | Anthony Zaffuto | 760-743-0048 | tony@sylvesterroofing.com |
| Tecta America | Jeff Lim | 714-973-6233 | jlim@tectaamerica.com |

**(End of Document)**

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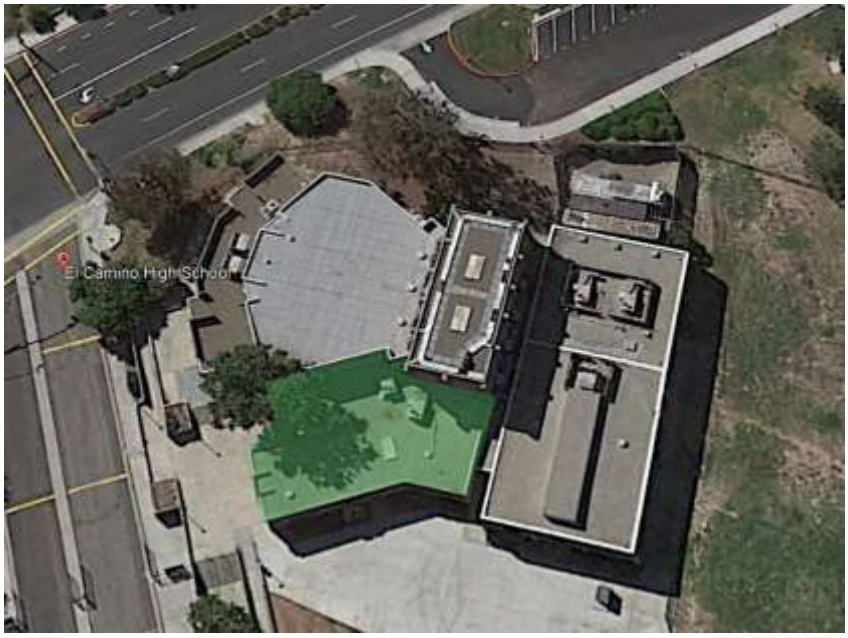
| Tecta America | Jeff Lim | 714-973-6233 | jlim@tectaamerica.com |

SECTION 074216
MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Roofing Membrane Installation: ECHS Drama Bldg. (Highlighted Below)




1. All debris to be removed by Contractor (T&M).
2. Remove the existing roof system to the structural deck. Comply with abatement report.
3. Repair any damaged decking as required. Contractor to include 7% deck replacement in the base bid. If the amount of deck replacement exceeds 7%, the contractor is to receive a change order equal to the unit price for deck replacement per sq ft multiplied by the sq ft in excess of the base bid amount. If the amount of deck replacement is less than 7%, the contractor is to provide a credit to the District equal to the unit price of deck replacement per sq ft multiplied by the sq ft less than the base bid amount.
4. Mechanically fasten Type II base sheet with rosin paper.
5. Apply 80 mil SBS modified underlyament in hot asphalt at rate of 25 lbs per sq.
6. Apply dual fiberglass-reinforced SBS modified, UV Resistant cap sheet in hot asphalt at rate of 30 lbs per sq.
7. Flashings:
   a. Apply SBS-modified flashing ply in all flashing areas –80 mil SBS

modified underlyament. Flashing ply to extend min 6" onto the roof field. Apply dual fiberglass-reinforced SBS modified cap sheet flashing cap ply in all flashing areas extending a min 9" onto the roof field.

b. All flashing plies to be terminated with a termination bar set in butyl tape and fastened every 6" o.c. Caulk above the termination bar.

c. HVAC / Equipment / Roof Hatch: Flashing plies to be terminated with a termination bar set in butyl tape. Fasten every 6" o.c. Caulk above termination bar. Install 22 gauge, galvanized skirt metal to the existing counterflashing metal.

d. Existing Counterflashing Metal: Flashing plies to be terminated with a termination bar set in butyl tape. Fasten every 6" o.c. Caulk above termination bar. Re-install existing counterflashing metal. Remove existing caulking above counterflashing metal. Install new caulking material and ensure water tight condition. Seal the wall with wall sealant – White damproofer – at a rate of 1.5 gal per sq.

e. Existing Coping Cap Metal: Remove the existing coping cap metal. Install wood nailer if needed. Flashing plies to extend up and over the parapet wall to the leading edge. Re-install the existing coping cap metal. Caulk the seams of the coping joints. Seal with caulking at the wall and coping intersection.

8. No pitch pockets on roof. Lead flash all penetrations. Roofing contractor to supply and install all lead flashings. Install umbrella cover over all caulked clamps. Caulk umbrella.
9. All conduit to be placed on rubber walkpads.
10. All vents to be replaced with new vent covers.
11. All drains to receive new drain rings and drain covers.
12. Duct Work: Seal the duct work and wall intersection with liquid flashing. Tape all joints of the duct work. Coat the duct work as well as the metal pan at a rate of 2.5 gal per sq with urethane coating.
13. Ladder mount penetrations to be sealed with caulking.
14. Install downspout splash pans where existing downspouts drain on the roof.
15. Contractor to be responsible for any ponding water. Contractor to ensure positive drainage.

1.2 RELATED SECTIONS

A. Section 06100 - Rough Carpentry.

B. Section 06114 - Wood Blocking and Curbing: Wood nailers and cant strips.

C. Section 07220 - Insulation Board: Insulation and fastening.

D. Section 07620 - Sheet Metal Flashing and Trim: Weather protection for base flashings.

E. Section 07710 - Manufactured Roof Specialties: Counter flashing gravel stops, and fascia.

F. Section 07724 - Roof Hatches: Frame and integral curb; Counter flashing.

G. Section 08620 - Unit Skylights: Skylight frame and integral curb and counter flashing.

H. Section 08630 - Metal-Framed Skylights: Skylight frame and integral curb and counter flashing.

I. Section 08950 - Translucent Wall and Roof Assemblies: Counter flashing

J. Section 08960 - Sloped Glazing Assemblies: Counter flashing.

K. Section 15120 - Piping Specialties: Roof Drains, Sumps.

1.3 REFERENCES

A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

B. ASTM D 312 - Standard Specification for Asphalt used in Roofing.

C. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.

D. ASTM D 1970 - Specification for Sheet Materials, Self-Adhering Polymer Modified Bituminous, Used as Steep Roofing Underlayment for Ice Dam Protection.

E. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.

F. ASTM D 1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.

G. ASTM D 1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.

H. ASTM D 2178 Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.

I. ASTM D 2824 Standard Specification for Aluminum-Pigmented Asphalt Roof Coating.

J. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.

K. ASTM D 4601 Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.

L. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.

M. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass

Fiber Reinforcements.

N. ASTM D 6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.

O. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

P. ASTM D 6754 - Standard Specification for Ketone Ethylene Ester (KEE) Sheet Roofing.

Q. ASTM D 6757 - Standard Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep-Slope Roofing.

R. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings

S. Factory Mutual Research (FM): Roof Assembly Classifications.

T. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.

U. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.

V. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.

W. Warnock Hersey (WH): Fire Hazard Classifications.

X. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.

Y. ASCE 7, Minimum Design Loads for Buildings and Other Structures

Z. UL - Fire Resistance Directory.

AA. FM Approvals - Roof Coverings and/or RoofNav assembly database.

BB. FBC - Florida Building Code.

CC. California Title 24 Energy Efficient Standards.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Perform work in accordance with all federal, state and local codes.

B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings as follows:
   1. Factory Mutual Class A Rating.
   2. Underwriters Laboratory Class A Rating.

C. Energy Star: Roof System shall comply with the initial and aged reflectivity required by the U.S. Federal Government's Energy Star program.

D. Roof System membranes containing recycled or bio-based materials shall be third party certified through UL Environment.

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation instructions.

B. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.

C. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins.

D. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.

E. Manufacturer Inspections: Provide written confirmation the manufacturer will provide inspections at the job site a minimum 4 times per week.

F. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. Testing must be performed at 77 deg. F. Tests at 0 deg. F will not be considered.

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

H. Manufacturer's Fire Compliance Certificate: Certify that the roof system furnished is approved by Factory Mutual (FM), Underwritters Laboratories (UL), Warnock Hersey (WH) or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.

I. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.

C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.

D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.

E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.

F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.7 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to commencing Work of this section.

B. Review installation procedures and coordination required with related Work.

C. Inspect and make notes of job conditions prior to installation:
   1. Record minutes of the conference and provide copies to all parties present.
   2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
   3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.

B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.

C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.

D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.

E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.

F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.9 COORDINATION

A. Coordinate Work with installing associated metal flashings as work of this section proceeds.

1.10 PROJECT CONDITIONS

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

1.11 WARRANTY

A. Upon completion of the work, provide the Manufacturer's written and signed NDL Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
   1. Warranty Period:
      a. 30 years from date of acceptance.

B. Upon completion of the work, provide the Contractors warranty:
   1. Warranty Period:
      a. 5 years from date of acceptance.

PART 2 PRODUCTS

2.1 GENERAL

A. Basis of Design: Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105.
   1. Miles Taylor (310) 367-766

B. The Products specified are intended and the Standard of Quality for the products required for this project. If other products are proposed the bidder must disclose in the bid the manufacturer and the products that they intend to use on the Project. If

no manufacturer and products are listed, the bid may be accepted only with the use of products specified.

1. Bidder will not be allowed to change materials after the bid opening date.
2. If alternate products are included in the bid, the products must be equal to or exceed the products specified. Supporting technical data shall be submitted to the Owner for approval prior to acceptance. Submittal must be provided within 7 days of bid opening.
3. In making a request for substitution, the Bidder/Roofing Contractor represents that it has:
    a. Personally investigated the proposed product or method, and determined that it is equal or superior in all respects to that specified.
    b. Will provide the same guarantee for substitution as for the product and method specified.
    c. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
    d. Will waive all claims for additional cost related to substitution, which consequently become apparent.
    e. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
    f. Will reimburse the Owner for all redesign cost by the Architect for accommodation of the substitution.
4. Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
5. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors request for manufacturer substitution.

## 2.2 HOT APPLIED 4-PLY ASPHALT ROOFING

A. Nailable Base Sheet: One ply fastened to the deck per wind uplift calculations.
    1. Type II base sheet
    2. Rosin Paper

B. Base (Ply) Sheet:
    1. Stressbase 80

C. Modified Cap (Ply) Sheet:
    1. Stressply Plus FR Mineral

D. Interply Adhesive:
    1. Type III Asphalt:

E. Flashing Base Ply:
    1. Stressbase 80

F. Flashing Cap (Ply) Sheet:
   1. Stressply Plus FR Mineral

G. Flashing Ply Adhesive:
   1. Type III Asphalt:

2.3 ACCESSORlES:

A. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel, Fasteners shall be self-clinching type of penetrating type as recommended by the deck manufacturer. Fasten nails and fasteners flush-driven through flat metal discs not less than 1 inch (25 mm) diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than 1 inch (25 mm) diameter are used.

B. Walkway Pads - Commercial Innovations Walkway Pads: As recommended and furnished by the membrane manufacturer set in approved adhesive to control foot traffic on roof top surface and provide a durable system compliant non-slip walkway.

C. Sealant – Tuff Stuff: Single component, 100% solids structural adhesive as furnished and recommended by the membrane manufacturer.

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

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

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Inspect and approve the deck condition, slopes and fastener backing if applicable, parapet walls, expansion joints, roof drains, stack vents, vent outlets, nailers and surfaces and elements.

C. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.

D. If substrate preparation and other conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. General: Clean surfaces thoroughly prior to installation.
   1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
6. Fasteners and plates for fastening components mechanically to the substrate shall provide a minimum pull-out capacity of 300 lbs. (136 k) per fastener. Base or ply sheets attached with cap nails require a minimum pullout capacity of 40 lb. per nail.
7. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.

B. Wood Deck:
1. Dimensional wood deck shall be minimum 1 inch (25 mm) thick, knotholes and cracks larger than 1/4 inch shall be covered with sheet metal. All boards shall be appropriately nailed and have adequate end bearing to the centers of beams/rafters. Lumber shall be kiln dried.
2. Plywood shall be a minimum 15/32 inch (11.9 mm) thick and conform to the standards and installation requirements of the American Plywood Association (APA).
3. If no roof insulation is specified, provide a suitable dry sheathing paper, followed by an approved base sheet nailed appropriately for the specified roof system, with 1 inch (25 mm) diameter caps and annular nails unless otherwise required by the applicable Code or Approval agency.
4. Insulation is to be mechanically attached in accordance with the insulation manufacturer's recommendations unless otherwise required by the applicable Code.
5. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer's recommendations and standards of the APA/Engineered Wood Association prior to new roof application.
6. Light metal wall ties or other structural metal exposed on top of the wood deck shall be covered with one ply of a heavy roofing sheet, such as HPR Glasbase Base Sheet, extending 2 inches to 6 inches (51 mm to 152 mm) beyond the metal in all directions. Nail in place before applying the base ply.

C. Re-Roofing Applications:
1. Remove existing roof flashings from curbs and parapet walls down to the surface of the roof. Remove existing flashings at roof drains and roof penetrations.
2. Remove all wet, deteriorated, blistered or delaminated roofing membrane or insulation and fill in any low spots occurring as a result of removal work to create a smooth, even surface for application of new roof membranes.
3. Install new wood nailers as necessary to accommodate insulation/recovery

board or new nailing patterns.

4. When mechanically attached, the fastening pattern for the insulation/recovery board shall be as recommended by the specific product manufacturer.
5. Re-roofing over coal tar pitch requires a mechanically attached recovery board or insulation and a base sheet prior to the application of roofing system.
6. Existing roof surfaces shall be primed as necessary with asphalt primer meeting ASTM D 41 and allowed to dry prior to installing the roofing system.

3.3 INSTALLATION - GENERAL

A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.

B. General: Avoid installation of modified bitumen membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:

1. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
2. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must be replaced with roll from a heated storage area.

C. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water

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

3.4 INSTALLATION HOT APPLIED ROOF SYSTEM

A. Mechanically fasten per wind uplift requirements rosin paper and Type II base sheet to the structural deck.

B. Base/Felt Ply(s): Install Stressbase 80 in twenty five (25) lbs (11.3kg) per square of bitumen shingled uniformly to achieve one or more plies over the entire prepared

substrate. Shingle in direction of slope of roof to shed water on each area of roof. Do not step on base rolls until asphalt has cooled, fish mouths should be cut and patched.

1. Lap ply sheet ends 8 inches (203 mm). Stagger end laps 2 inches (304mm) minimum.
2. Install base flashing ply to all perimeter and projection details after membrane application.
3. Extend plies 2 inches beyond top edges of cants at wall and projection bases.
4. Install base flashing ply to all perimeter and projection details.
5. Allow the one ply of base sheet to cure at least 30 minutes before installing the modified membrane. However, the modified membrane must be installed the same day as the base plies.

C. Modified Cap Ply(s): Solidly bond the modified membrane to the base layers with specified material at the rate of 25 to thirty 30 lbs. (11-13kg) per 100 square feet.

1. Roll must push a puddle of hot material in front of it with material slightly visible at all side laps. Use care to eliminate air entrapment under the membrane. Exercise care during application to eliminate air entrapment under the membrane.
2. Apply pressure to all seams to ensure that the laps are solidly bonded to substrate.
3. Install subsequent rolls of modified membrane as above with a minimum of 4 inch (101 mm) side laps and 8 inch (203 mm) end laps. Stagger end laps. Apply membrane in the same direction as the previous layers but stagger the laps so they do not coincide with the laps of the base layers.
4. Apply hot material no more than 5 feet (1.5 m) ahead of each roll being embedded.
5. Extend membrane 2 inches (50 mm) beyond top edge of all cants in full moppings of the specified hot material.

D. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and fasteners.

E. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips

1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
2. Wood nailers should match the height of any insulation, providing a smooth and even transition between flashing and insulation areas.
3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.

F. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings. Install in accordance with the SMACNA "Architectural Sheet

Metal Manual" or the NRCA Roofing Waterproofing manual.

G. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 6 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if required.

H. Flashing Base Ply: Install flashing sheets by the same application method used for the base ply.
   1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
   2. Prepare all walls, penetrations, expansion joints and surfaces to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
   3. Adhere to the underlying base flashing ply with specified hot material unless otherwise noted in these specifications. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
   4. Solidly adhere the entire sheet of flashing membrane to the substrate.
   5. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and mesh.
   6. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work as specified.
   7. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.

I. Flashing Cap Ply: Install flashing cap sheets by the same application method used for the cap ply.
   1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
   2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
   3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
   4. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
   5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
   6. All stripping shall be installed prior to flashing cap sheet installation.
   7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
   8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.

J. Surface Coatings: No surface coating required.

K. Roof Walkways: Provide walkways in areas indicated on the Drawings.

## 3.5 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

A. Fabricated Flashings: Fabricated flashings and trim as needed per scope of work. .
   1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the Copper Development Association "Copper in Architecture - Handbook" as applicable.

B. Manufactured Roof Specialties: Manufactured copings, facia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are provided as specified in Section
   1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the National Roofing Contractor's Association "Roofing and Waterproofing Manual" as applicable.

C. Counterflashing / Skirt Metal Flashing.
   1. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches. Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
   2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
   3. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to field of the roof.
   4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
   5. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall. Alternatively use caulk to replace the butyl tape.
   6. At existing reglet counterflashing, mechanically fasten new 22 gauge, galvanized skirt metal to the existing counterflashing metal.
   7. Where new reglet metal ins required, cut reglet in masonry one joint above flashing. Secure reglet counterflashing with expansion fasteners and caulk reglet opening.

D. Curb Detail/Air Handling Station:
   1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
   2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
   3. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
   4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course

application of mastic and mesh at all vertical seams and allow to cure and aluminize.

5. Install pre-manufactured counterflashing with fasteners and neoprene washers or per manufacturer's recommendations.
6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

E. Pre-manufactured Curb For Equipment Support:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
2. Run all field plies over cant of the pre-manufactured equipment support a minimum of 2 inches.
3. Install base flashing ply covering pre-manufactured curb with 6 inches (152 mm) on to field of the roof.
4. Install a second ply of modified flashing ply installed over the base flashing ply, 9 inches (228 mm) on to field of the roof. Attach top of membrane to top of wood curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
5. Install pre-manufactured cover. Fasten sides at 24 inches (609 mm) o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.
6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

F. Exhaust Fan:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
2. Set cant in bitumen. Run all plies over cant a minimum of 2 inches (50 mm).
3. Install base flashing ply covering curb with 6 inches (152 mm) on to field of the roof.
4. Install a second ply of modified flashing ply installed over the base flashing ply, 9 inches (228 mm) on to field of the roof. Attach top of membrane to top of wood curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.
5. Install metal exhaust fan over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendation.

G. Passive Vent/Air Intake:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
2. Set cant in bitumen. Run all plies over cant a minimum of 2 inches (50 mm).
3. Install base flashing ply covering curb with 6 inches (152mm) on to the field of the roof.
4. Install a second ply of modified flashing ply installed over the base flashing ply, 9 inches (228 mm) on to field of the roof. Attach top of membrane to top

of wood curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and allow to cure and aluminize.

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

H. Roof Drain:
1. Plug drain to prevent debris from entering plumbing.
2. Taper insulation to drain minimum of 24 inches (609 mm) from center of drain.
3. Run roof system plies over drain. Cut out plies inside drain bowl.
4. Set lead flashing (30 inch square minimum) in 1/4 inch bed of mastic. Run lead/copper into drain a minimum of 2 inches (50 mm). Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
5. Install base flashing ply (40 inch square minimum) in bitumen.
6. Install modified membrane (48 inch square minimum) in bitumen.
7. Install clamping ring and assure that all plies are under the clamping ring.
8. Remove drain plug and install strainer.

I. Plumbing Stack:
1. Minimum stack height is 12 inches (609 mm).
2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch (6 mm) bed of roof cement.
4. Install base flashing ply in bitumen.
5. Install membrane in bitumen.
6. Caulk the intersection of the membrane with elastomeric sealant.
7. Turn sleeve a minimum of 1 inch (25 mm) down inside of stack.

J. Heat Stack:
1. Minimum stack height is 12 inches (609 mm).
2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch (6 mm) bed of roof cement.
4. Install base flashing ply in bitumen.
5. Install modified membrane in bitumen.
6. Caulk the intersection of the membrane with elastomeric sealant.
7. Install new collar over cape. Weld collar or install stainless steel draw brand.

K. Liquid Flashing:
1. Mask target area on roof membrane with tape.
2. Clean all non-porous areas with isopropyl alcohol.
3. Apply 32 wet mil base coat of liquid flashing over masked area.
4. Embed polyester reinforcement fabric into the base coat of the liquid flashing.
5. Apply 48-64 wet mil top coat of the liquid flashing material over the fabric extending 2 inches (51 mm) past the scrim in all directions.

6. Apply minerals immediately or allow the liquid flashing material to cure 15-30 days and then install reflective coating.

## 3.6 SURFACING

A. Powerwash the roof system and ensure no debris or dirt on the roof system. Allow the roof to dry with no moisture on the roof.

B. Apply Pyramic coating (spray or roll application) at 2 gal per sq. Apply in two coats at 1 gal per sq cross directionally.

## 3.7 CLEANING

A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.

B. Remove asphalt markings from finished surfaces.

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

## 3.8 PROTECTION

A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.

B. Protect exposed surfaces of finished walls with tarps to prevent damage.

C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.

D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.

E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

## 3.9 FIELD QUALITY CONTROL

A. Inspection: Provide manufacturer's field observations at start-up and at intervals of approximately 30 percent, 60 percent and 90 percent completion. Provide a final inspection upon completion of the Work.
   1. Warranty shall be issued upon manufacturer's acceptance of the installation.
   2. Field observations shall be performed by a Sales Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
   3. Provide observation reports from the Sales Representative indicating procedures followed, weather conditions and any discrepancies found during

inspection.

4. Provide a final report from the Sales Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

## 3.10 SCHEDULES

A. Base (Ply) Sheet:
   1. StressBase 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass scrim, performance requirements according to ASTM D 5147.
      a. Tensile Strength, ASTM D 5147
         1) 2 in/min. @ 0 +/- 3.6 deg. F MD 100 lbf/in XD 100 lbf/in
         2) 50mm/min. @ -17.78 +/- 2 deg. C MD 17.5 kN/m XD 17.5 kN/m
      b. Tear Strength, ASTM D 5147
         1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 110 lbf XD 100 lbf
         2) 50mm/min. @ 23 +/- 2 deg. C MD 489 N XD 444 N
      c. Elongation at Maximum Tensile, ASTM D 5147
         1) 2 in/min. @ 0 +/- 3.6 deg. F MD 4 % XD 4 %
         2) 50mm/min@ -17.78 +/- 2 deg. C MD 4 % XD 4 %
      d. Low Temperature Flexibility, ASTM D 5147, Passes -40 deg. F ( -40 deg. C)

B. Thermoplastic/Modified Cap (Ply) Sheet:
   1. StressPly Plus FR Mineral P-80: 155 mil eco-responsible, UV resistant, SBS (Styrene-Butadiene-Styrene) mineral, fire resistant, surfaced, rubber modified roofing membrane with fire retardant characteristics, and dual fiberglass reinforced scrim. ASTM D 6163, Type III Grade G
      a. Tensile Strength, ASTM D 5147
         1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 310 lbf/in XD 310 lbf/in
      b. Tear Strength, ASTM D 5147
         1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf XD 500 lbf
      c. Elongation at Maximum Tensile, ASTM D 5147
         1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 8% XD 8%
      d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-26 deg.)

C. Interply Adhesive:
   1. Generic Type III Asphalt: Hot Bitumen, ASTM D 312, Type III steep asphalt having the following characteristics:
      a. Softening Point 185 deg. F - 205 deg. F
      b. Flash Point 500 deg. F
      c. Penetration @ 77 deg. F 15-35 units
      d. Ductility @ 77 deg. F 2.5 cm

D. Flashing Base Ply:

1. StressBase 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass scrim, performance requirements according to ASTM D 5147.
    a. Tensile Strength, ASTM D 5147
        1) 2 in/min. @ 0 +/- 3.6 deg. F MD 100 lbf/in XD 100 lbf/in
        2) 50 mm/min. @ -17.78 +/- 2 deg. C MD 17.5 kN/m XD 17.5 kN/m
    b. Tear Strength, ASTM D 5147
        1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 110 lbf XD 100 lbf
        2) 50 mm/min. @ 23 +/- 2 deg. C MD 489 N XD 444 N
    c. Elongation at Maximum Tensile, ASTM D 5147
        1) 2 in/min. @ 0 +/- 3.6 deg. F MD 4 % XD 4 %
        2) 50 mm/min. @ -17.78 +/- 2 deg. C MD 4 % XD 4 %
    d. Low Temperature Flexibility, ASTM D 5147
        1) Passes -40 deg. F (-40 deg. C)

E. Surfacing:
1. Flashing Cap (Ply) Sheet:
    a. StressPly Plus FR Mineral P-80: 155 mil eco-responsible, UV resistant, SBS (Styrene-Butadiene-Styrene) mineral, fire resistant, surfaced, rubber modified roofing membrane with fire retardant characteristics, and dual fiberglass reinforced scrim. ASTM D 6163, Type III Grade G
        1) Tensile Strength, ASTM D 5147
            a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 310 lbf/in XD 310 lbf/in
        2) Tear Strength, ASTM D 5147
            a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf XD 500 lbf
        3) Elongation at Maximum Tensile, ASTM D 5147
            a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 8% XD 8%
        4) Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-26 deg.)
2. Surface Coatings:
    a. Surfacing:
        a) No Surfacing Required. UV Mineral white cap sheet.

END OF SECTION